FINAL

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

NAVAL SUPPORT ACTIVITY CUTLER
CUTLER, MAINE

Prepared for:

Mid-Atlantic Division

Naval Facilities Engineering Command

And

Public Works Department Maine – Environmental Division
Naval Facilities Engineering Command

Prepared by:

CH2M HILL, Inc.
February 2019

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Approving Official's Signature:

______________________	______________________	______________
Signature Commanding Officer Naval Support Activity Cutler	**Printed Name**	**Date**

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Approving Official's Signature:

W Emmett Carawan	W Emmett Carawan	2-27-19
Signature	**Printed Name**	**Date**

Natural Resources Team Lead
Mid-Atlantic Region
Naval Facilities Engineering Command

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Approving Official's Signature:

Signature Installation Natural Resources Manager Naval Support Activity Cutler	**Printed Name**	**Date**

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Approving Official's Signature:

Signature	Printed Name	Date
	Anna Harris	2/15/19

Signature
Field Supervisor
Regional Director
Maine Ecological Services
United States Fish and Wildlife Service
Maine Field Office

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Approving Official's Signature:

	Judith Camuso	2/26/19
Signature	**Printed Name**	**Date**

Commissioner
Maine Inland Fisheries and Wildlife

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Date of Annual Review/Update	Name and Title of Reviewer(s)
____________________	____________________
____________________	____________________
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5th Year Review

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PLAN UPDATES

This Integrated Natural Resources Management Plan (INRMP) is a long-term planning document that guides implementation of the Cutler Natural Resources Program to ensure consistency with the installation's military mission while managing, protecting, and enhancing the biological integrity of military lands and waters to the extent practicable. INRMPs should contain the most up-to-date natural resources information, and updates and revisions will be necessary to maintain a proactive management plan. Natural resources managers are encouraged to use geographic information systems to supplement information contained in their INRMP, and to incorporate the guidance and recommendations contained in Department of Defense Manual 4715.03: Integrated Natural Resources Management Plan (2013) and Chief of Naval Operations Instructions (OPNAVINST) 5090.1D.

In accordance with the Sikes Act (16 United States Code [U.S.C.] 670a et seq.) as amended, Department of Defense Instruction 4715.03: Natural Resources Conservation Program (2011), Department of Defense Manual 4715.03: Integrated Natural Resources Management Plan Implementation Manual (2013), and Chief of Naval Operations Instruction 5090.1D: Environmental Readiness Program Manual (2014) (OPNAVINST 5090.1D), the INRMP will be reviewed annually to ensure INRMP information is current and to evaluate the effectiveness of the INRMP. As part of the annual review, the installation natural resources manager shall complete the Natural Resources Conservation Metrics using the U.S. Navy (Navy) Conservation website with participation from the installation commander and cooperation from the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the Maine Department of Inland Fisheries and Wildlife (MDIFW) (OPNAVINST 5090.1D and Navy, 2006). A review for operation and effect is required every five years. Minor updates to the INRMP should be completed and documented annually, with any revisions coordinated with the USFWS, NMFS, and the MDIFW to reduce the need for a more costly and time-consuming revision following the 5-year review. The forms for documenting periodic reviews is included below.

If results of the review for operation and effect determine that the existing INRMP is current and operational, the INRMP need not be revised. Revisions to the authorities and guidance documents driving INRMP update requirements would be implemented as appropriate during the annual review or update periods.

The review for operation and effect satisfies several additional requirements. The review for operation and effect conducted in coordination with USFWS, NMFS, and state partners shall verify that all: environmental compliance projects have been budgeted for and implemented on schedule; required natural resource positions are filled with trained staff, or are in the process of being filled; projects and activities identified for the coming year are included in the INRMP; required coordination has been conducted; and significant changes to the installation's mission requirements or its natural resources have been identified. Significant changes to the installation's mission or natural resources should be reviewed to determine if an INRMP revision is needed. Minor changes to address new information or new management priorities should be reviewed to determine if an INRMP update is needed.

An INRMP may be updated to accommodate changes to the information contained in the INRMP that do not require substantial changes in how natural resources on the base are to be managed. INRMP necessary updates are usually covered by the original Environmental Assessment (EA) prepared for the INRMP; however, changes to the INRMP should be reviewed to compare the original action documented in the existing INRMP to the proposed modifications to determine if modifications to the INRMP are significant. Proposed INRMP updates that are deemed significant will require additional National Environmental Policy Act of 1969 (NEPA) documentation, usually at the EA level.

Activities that may require an INRMP revision include, but are not limited to the following: the current INRMP no longer provides adequately for the conservation and rehabilitation of the natural resources on base; the installation mission or physical features have changed significantly; and there are substantial natural resources effects anticipated from base realignment and closure, such as a new species listing, new construction, new training, changes to training type or tempo, or other factors that were not addressed in the existing INRMP. The parties to the INRMP shall, in consultation with one another, determine whether an INRMP should be revised.

Annual Review Summary Form

Date of Annual Review/Update	Reviewer		
	Name	Title	Affiliation

Annual Review Form

Date	Section/Page	Comment	Reviewer

Annual Review Form

Date	Section/Page	Comment	Reviewer

EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) has been prepared and will be implemented in accordance with the Sikes Act (16 United States Code [U.S.C.] §670 et seq.) as amended, and the Navy Environmental Readiness Program Manual (OPNAVINST 5090.1D). Sikes Act (16 U.S.C. 670a et seq.) requires the secretary of all military departments to "prepare and implement an INRMP for each military installation in the United States" for those installations that contain habitat that is suitable for conservation and management of natural ecosystems. This INRMP has been prepared for Naval Support Activity Cutler (NSA Cutler), Cutler, Maine (also known as Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler [NCTAMSLANT DET Cutler] or Installation), in accordance with the following authorities, which were current at the time the INRMP was updated. Revisions to the following authorities and guidance documents would replace the older version, and any necessary changes to the INRMP would be documented during the annual review or incorporated into the INRMP at the time it is updated.

- Department of Defense (DoD) Instruction 4715.03, Natural Resources Conservation Program (14 February 2011)
- U.S. Department of the Navy (Navy) Instruction OPNAVINST 5090.1D (10 January 2014), Environmental Readiness Program Manual Chapter 12: Natural Resources Conservation (10 January 2014)
- Sikes Act (16 U.S.C. §670 et seq.) as amended)
- Naval Facilities Engineering Command (NAVFAC) Natural Resources Management Procedural Manual (P-73, Chapter 2: Integrated Natural Resources Management Plans dated 7 December 2005)
- Navy INRMP Guidance dated 10 April 2006
- Department of Defense Manual 4715.03: Integrated Natural Resources Management Plan Implementation Manual (25 November 2013)
- Endangered Species Act of 1973 (ESA) (16 U.S.C. §1531 et seq.)

In addition to these authorities, Natural Resources Managers (NRMs) are encouraged to use geographic information systems as the basis for their INRMPs (OPNAV M-5090.1D [Navy, 2014]), and to incorporate the guidance and recommendations provided in Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers (Benton et al., 2008).

As discussed in detail in the Plan Updates Section the INRMP will be reviewed annually to ensure INRMP information is current and to evaluate the effectiveness of the INRMP. As part of the annual review, the installation NRM shall complete the Natural Resources Conservation Metrics with participation from the installation commander and cooperation from the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the Maine Department of Inland Fisheries and Wildlife(MDIFW) (OPNAVINST 5090.1D and Navy, 2006).

If results of the review for operation and effect determine that the existing INRMP is current and operational, the INRMP need not be revised. Revisions to the authorities and guidance documents driving INRMP update requirements would be implemented as appropriate during the annual review or update periods. Significant changes to the installation's mission or natural resources should be reviewed to determine if an INRMP revision is needed. Minor changes to address new information or new management priorities should be reviewed to determine if an INRMP update is needed.

The management actions and projects identified for the NSA Cutler natural resources program are intended to help installation commanders manage natural resources effectively to ensure Navy lands remain available and in appropriate condition to support the mission and to ensure compliance with relevant environmental regulations. These actions are based on DoD guidance for ecosystem management and are consistent with Navy policy on sustainable use of natural resources on Navy property.

The INRMP is organized into the following sections:

- **Section 1 – Introduction**. This section includes a discussion of the INRMP purpose and authorities applicable to the plan, goals of the INRMP, a brief overview of the history and military mission of NSA Cutler, and a brief overview of natural resources management at the Installation.
- **Section 2 – Existing Conditions**. This section describes the existing physical and natural conditions of NSA Cutler. A general site description is included in this section, along with information on, but not limited to, climate; geology, topography, and soils; water resources, including wetlands and groundwater; flora and fauna, including threatened and endangered species; Significant Wildlife Habitat; land management; cultural resources; and conservation lands.
- **Section 3 – Natural Resources Management Programmatic Objectives and Recommendations**. Natural resources management at NSA Cutler has been divided into four programmatic objectives: land management, fish and wildlife management, forestry management, and outdoor recreation management. This section provides an overview of each of the programmatic objectives that have been established for NSA Cutler, discusses relevant natural resources management issues, and provides specific recommendations and projects that address these issues and that will assist in meeting the established programmatic objectives.
- **Section 4 – NCTAMSLANT DET Cutler Natural Resources Programmatic Objective Management Areas**. Section 4 provides a description of the four programmatic objective management areas and describes how the programmatic objectives have been applied to INRMP projects proposed for the Very Low Frequency (VLF), High Frequency (HF), and Howard Cove areas of the Installation.
- **Section 5 – INRMP Implementation.** This section outlines means for implementing this INRMP including guidelines on supporting the sustainability of the military mission and the natural environment, natural resources consultation requirements, achieving no net loss, National Environmental Protection Act (NEPA) compliance, project development and classification, funding sources, commitment, and use of cooperative agreements.
- **Section 6 – Management Recommendations Summary**. A summary of funding-dependent management recommendations for NSA Cutler are provided in this section.

Recommendations have been grouped according to the Environmental Readiness Levels (ERLs) described in Section 5 as projects that are a compliance requirement, a Navy proactive involvement project, a Navy or DoD policy requirement project, or a Navy environmental stewardship project.

- **Section 7 – References**. This section includes a list of all references used in the development of the INRMP. A list of internet resources that can be accessed by the NRM to obtain useful information also is provided in this section.
- **Section 8 – List of Acronyms**. This section defines all acronyms used in the INRMP.
- **Appendix A – INRMP Cooperative Summary and Environmental Assessment**. Appendix A includes copies of cooperative agreements between federal and state agencies and NSA Cutler; copies of comments received during the public comment process; and a copy of the Environmental Assessment (EA) prepared for the INRMP as part of the NEPA compliance process.
- **Appendix B – Cross-Reference of Integrated Natural Resources Management Plan Guidance for Navy Installations to DOD INRMP Template**. This appendix comprises a "cross-walk table" that demonstrates how the INRMP sections of this document fulfill the requirements of the DOD INRMP template.
- **Appendix C – NCTAMSLANT DET Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine.** Appendix C contains the summary table for all funding-dependent natural resource projects recommended in the INRMP and includes the proposed implementation schedule, prime legal driver/initiative, class, Navy ERL, cost estimate and potential funding sources for each natural resource project. Natural resources projects are grouped and coded within the summary table according to the four programmatic objectives that have been established for the NSA Cutler INRMP.
- **Appendix D – Project Planning Environmental Checklist.** Appendix D includes the Project Planning Environmental Checklist that will be used by the NRM for implementing the natural resources management program.
- **Appendix E – Wetland and Community Type Maps**. Appendix E includes copies of the large wetland and community type maps showing all of the wetland and habitat classifications that have been identified for NSA Cutler.
- **Appendix F – USACE Wetland Delineation and Determination Request**. This appendix includes the results of the U.S. Army Corps of Engineers (USACE) wetland delineation and determination request.
- **Appendix G – Species Lists**. Appendix G contains tables of all plant and animal species that have been confirmed to occur at NSA Cutler through focused field surveys or through agency consultation.
- **Appendix H – Threatened and Endangered Species and Species of Special Concern**. Appendix H includes the list of all species documented at NSA Cutler that are listed as endangered, threatened, or as a species of special concern by federal or state agencies. Additional conservation designations also are included.

- **Appendix I – Vegetation and Wildlife Species and Rare Natural Community Fact Sheets.** Appendix I contains facts sheets for vegetation and wildlife species (including threatened and endangered species) and rare natural communities, if they were available.
- **Appendix J – Eagle Protection Plan.** Appendix J contains a copy of the Eagle Protection Plan for NSA Cutler.
- **Appendix K – Bird and Bat Conservation Strategy.** Appendix K contains a copy of the Bird and Bat Conservation Strategy for NSA Cutler.
- **Appendix L – Deer Management Program Development Guidelines.** Appendix L contains general guidance for developing a deer management plan, including recommendations for creation of an installation hunting program.
- **Appendix M – Osprey Management Plan.** Appendix M contains a copy of the Osprey (*Pandion haliaetus*) Management Plan for NCTAMSLANT DET Cutler.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

1.1 PURPOSE AND AUTHORITY

This Integrated Natural Resources Management Plan (INRMP) was prepared to comply with the Sikes Act, as amended, (16 United States Code [U.S.C.] §670 et seq.), Department of Defense Instruction (DoDI) 4715.03: Natural Resources Conservation Program (2011), Chief of Naval Operations Instructions (OPNAVINST) 5090.1D: Environmental Readiness Program Manual (2014), and Naval Facilities Engineering Command (NAVFAC) Real Estate Operations and Natural Resources Management Procedural Manual (NAVFAC P-73). These regulations require that the Secretary of Defense implement a program to provide for the conservation and rehabilitation of natural resources on military installations. The secretaries of each military department are authorized to carry out the program, consistent with the use of military installations, to ensure the preparedness of the United States (U.S.) Armed Forces. The Secretary of the Navy implements and maintains a balanced and integrated natural resources management program for all U.S. Department of the Navy (Navy) and U.S. Marine Corps installations.

To facilitate the Natural Resources Program (NRP), the secretary of each military department is directed to prepare and implement an INRMP for each installation that has significant natural resources. The INRMP must be prepared in cooperation with the Secretary of the Interior, acting through the Director of the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) and the head of the appropriate fish and wildlife agencies of the state in which the military installation is located. The INRMP must reflect the mutual agreement of these parties concerning conservation, protection, and management of fish and wildlife resources. Such mutual agreement and cooperation will support the principles of ecosystem management by improving the management of ecosystems that cross federal, state, and private boundaries. The Sikes Act acknowledges that the principal use of military installations is to ensure the preparedness of the U.S. Armed Forces. In accordance with the Sikes Act, the INRMP shall, to the extent appropriate and applicable, provide for the following:

- Implementation of an ecosystem-based program that provides for conservation and rehabilitation of natural resources consistent with the military mission
- Integration and coordination of all natural resources management activities
- Provision for sustainable multipurpose uses of natural resources
- Provision for public access for use of natural resources subject to safety and military security considerations
- Enforcement of applicable natural resource laws (including regulations)

The Sikes Act also requires that the INRMP be submitted for public review and comment before being finalized. To fulfill this requirement, appropriate documentation—an Environmental Assessment (EA)—was prepared with the initial INRMP in August 2012 to satisfy National Environmental Policy Act (NEPA) requirements, which is presented in **Appendix A**. There have been no significant changes to the INRMP that would warrant additional NEPA action during this review period.

DoDI 4715.03 and OPNAVINST 5090.1D state that the INRMP must incorporate the guidance for ecosystem management as the basis for natural resources management on Navy lands. In accordance with this policy, the Navy will strive to maintain healthy, contiguous ecosystems on its own lands; where ecosystem boundaries extend onto adjoining lands, the Navy will strive to work cooperatively with neighboring landowners to manage these ecosystems.

DoD Manual 4715.03 requires that an INRMP include a cross-references table to demonstrate how the INRMP sections of this document fulfill the requirements of the DoD INRMP template, which is presented in **Appendix B**.

1.2 Scope

An INRMP's scope comprises all lands, ranges, nearshore areas, and leased areas: (1) owned by the U.S. and administered by the Navy; (2) used by the Navy via license, permit, or lease for which the Navy has been assigned management responsibility; or (3) withdrawn from the public domain for use by the Navy for which the Navy has been assigned management responsibility (Navy 2006).

This INRMP encompasses three parcels of land totaling 3,006.65 acres: the Very Low Frequency (VLF), High Frequency (HF), and Howard Cove areas. The VLF area is a peninsula in the Gulf of Maine. The HF area is a small area near the VLF area that is set back from the nearby Holmes Bay. The Howard Cove area is on the west side of Machias Bay. Naval Support Activity Cutler (NSA Cutler) located in Cutler, Maine (also known as Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler [NCTAMSLANT DET Cutler] or Installation) does not have any leased properties or agricultural outleases, and as such, this INRMP does not cover management of leased areas.

This INRMP outlines conservation efforts and establishes procedures to ensure compliance with related environmental laws and regulations during INRMP implementation over the duration of the plan. Development of this INRMP included input from state and federal stakeholders. As required under the Sikes Act, this INRMP reflects mutual agreement of agencies concerned with the conservation, protection, and management of fish and wildlife resources, including the USFWS, NMFS, and the Maine Department of Inland Fisheries and Wildlife (MDIFW). This INRMP provides the direction for natural resources management at NCTAMSLANT DET Cutler NRP; however, it does not replace or affect any federal laws or state responsibility and authority for protecting fish and wildlife resources.

1.3 Goals

This INRMP is a long-term planning document that guides implementation of the NSA Cutler NRP to help ensure consistency with the Installation's military mission, while protecting and enhancing natural resources, to the extent practicable. In accordance with the Sikes Act and the Navy Environmental Readiness Program Manual (OPNAVINST 5090.1D), this plan must provide for the following, consistent with military operations at the Installation:

- Management of fish and wildlife, land, and forest resources.
- Identification of fish- and wildlife-oriented recreational use activities and areas.
- Enhancement or modification of fish and wildlife habitat.
- Protection, enhancement, and restoration of wetlands where necessary for support of fish, wildlife, or plants.

- Integration of, and consistency among, the various activities conducted under the INRMP.
- Establishment of specific natural resources management goals and programmatic objectives, and time frames for proposed actions.
- Sustainable use by the public of natural resources to the extent that such use is consistent with the needs of fish and wildlife management and subject to Installation safety and security requirements.
- Enforcement of natural resources laws and regulations.
- No net loss in the capability of military lands to support the military mission of the Installation.
- Regular review and update of this INRMP and its effects annually, and review for operation and effect no less often than every five years.
- Maintain awareness and be adaptive to issues associated with climate change to include shifts in species' ranges and distributions, changes in phenology, rising sea levels, and variations in ecological processes such as drought, fire, and flood.

An INRMP **guides** implementation of the natural resources program to help ensure **consistency with the installation's military mission**, while protecting and **enhancing natural resources.**

1.4 RESPONSIBILITIES

The Sikes Act requires a qualified professional to implement environmental management programs. The NRP at NSA Cutler is encompassed within a region-wide Navy NRP that is overseen by the Public Works Department Maine (PWD-ME) Natural Resources Manager (NRM) based at Portsmouth Naval Shipyard, Kittery, Maine, under the direction of the Portsmouth Naval Shipyard Commanding Officer (CO). The CO has delegated the authority to an Environmental Program Director within the Environmental Office to implement natural resources management activities through the Installation's NRM. The NAVFAC Mid-Atlantic Regional NRM also oversees natural resources management for all installations in the Mid-Atlantic's Area of Responsibility. The Installation NRM for NSA Cutler also serves as the NRM for the Great Pond Outdoor Adventure Center, Great Pond, Maine; NSA Prospect Harbor, Prospect Harbor, Maine; The Survival, Evasion, Resistance, and Escape School, Redington, Maine; and the Portsmouth Naval Shipyard, Kittery, Maine.

The Installation Commander for NSA Cutler, has primary responsibility for this INRMP, although various entities are involved in the development and implementation. Onsite management is handled by the site manager based at NSA Cutler. The NRM ensures compliance with applicable local, state, and federal regulations regarding the management and protection of natural resources. The NRM and NSA Cutler site manager also promote environmental awareness to staff and recreational users of NSA Cutler. The NSA Cutler NRP is broadly responsible for wetlands protection and mitigation, water quality protection, grounds maintenance, forest management, fish and wildlife management, threatened and endangered species management, migratory bird management, outdoor recreation management, and pest management. Cultural resources are managed by the NAVFAC PWD-ME Cultural Resources Manager (CRM) located at the Portsmouth Naval Shipyard in Kittery, Maine.

Each of these areas of responsibility must be managed to balance potential conflicts between different interests and the operational mission of NSA Cutler. The concept of integrated management of natural resources both justifies and requires that internal and external stakeholders contribute to the management of natural resources at the Installation.

The Installation CO's Environmental Policy (19 August 2016) has made commitments that include, but are not limited to:

- Integrate sound environmental practices into operations and business decisions that could impact the environment.
- Continually improve environmental performance through the use of effective environmental management and planning.
- Ensure implementation of pollution prevention measures and waste minimization programs.
- Develop objectives and targets and implement sustainable practices to reduce environmental impacts.
- Conduct regular environmental management system audits to continually assess progress towards environmental goals.
- Educate employees about their responsibilities to the environment.
- Report any environmental issues to the Environmental Compliance Manager, where present, or to PWD-ME and promptly implement corrective actions.
- Foster communication throughout appropriate levels of the organization about environmental commitments and performance.
- Sustain partnerships with local, state, and federal regulatory agencies and maintain continuous environmental compliance with existing and new regulations and guidelines.

1.4.1 Installation Stakeholders

OPNAVINST 5090.1D, Section 1.4 provides a detailed description of environmental responsibilities associated with different positions within the Navy. The Commander, Navy Region Mid-Atlantic (CNRMA), acts as a trustee for NSA Cutler NRP. At the installation level, the Portsmouth Naval Shipyard CO and the PWD-ME NRM are directly involved in implementation of this INRMP while ensuring successful accomplishment of the Facility mission. The Installation Commander is responsible for ensuring that Base personnel comply with the laws and requirements associated with the management of natural resources, and that funding and staffing are sufficient to accomplish the projects and programmatic objectives outlined in this INRMP. Additional requirements of the Installation stakeholders include performing annual reviews and revisions of the INRMP.

Although these positions hold the primary responsibilities, all personnel at the Installation—public works/civil engineering personnel, legal staff, public affairs, logistics, resource management, contracting, etc.—play important roles in supporting the plans and objectives laid out in the

INRMP, including ensuring environmental compliance within military operations. Other Navy stakeholders, including the Portsmouth Naval Shipyard Environmental Office, PWD, Morale, Welfare, and Recreation (MWR) Department, Navy contractors working at NSA Cutler, and the NSA Cutler tenant command, are responsible for sustaining natural resources for economic and recreational purposes, and for natural resources management and protection.

1.4.2 External Stakeholders

In accordance with Presidential Executive Order (EO) 13352 (26 August 2004), *Facilitation of Cooperative Conservation*, NSA Cutler natural resources staff will promote cooperative conservation with an emphasis on collaborative activities among federal, state, local, and tribal governments, non-governmental entities, and private citizens. The Sikes Act requires that this INRMP be prepared in cooperation with, and reflect mutual agreement of, the National Oceanic and Atmospheric Administration (NOAA) NMFS, USFWS, and MDIFW. This requirement affords them signatory authority as external stakeholders and approving officials of this INRMP. Cooperation and coordination with these agencies is an integral part of the Navy's NRP. This INRMP meets consistency requirements of the Coastal Area Management Act of 1974 for the preservation of natural land and water resources. The Maine Department of Agriculture, Conservation, and Forestry (MDACF) will be contacted for any action requiring a Coastal Zone Consistency Determination. The U.S. Army Corps of Engineers (USACE) has jurisdiction over waters of the U.S. and requires permits for projects in wetlands and waterbodies.

1.5 Installation History and Military Mission

NSA Cutler is located in the Town of Cutler, Maine, and was commissioned in 1961 (**Figure 1.1**). Construction of the Installation began in 1958, with services coming online on 23 June 1961. The primary mission of the military Installation is to provide communication services to ships and submarines operating in the North Atlantic, Arctic Ocean, and the Mediterranean Sea. From the time of inception until the end of the Cold War in 1989, NSA Cutler was considered pivotal in the Navy's master plan for instantaneous defense against Soviet Union aggression (NCTAMSLANT DET Cutler 2003). The official mission of NSA Cutler is to:

> "*Provide secure and reliable, Strategic and Tactical Command and Control (C2) Telecommunications services to U.S. and Coalition Submarine Services.*"

The Installation historically included an Administrative and Housing Area (51.3 acres), located on the opposite side of Maine Route 191 west of the HF area, and an approximately 20-acre water treatment and reservoir site. Both of these parcels were formerly part of the HF area; however, both parcels were transferred in 2003 to the Washington County Development Authority (Moore 2010). The Fire Station, located in the former Administrative Area, provides fire protection support to both the HF and VLF areas, and was retained under Navy ownership. The Fire Station and the Sprague Neck peninsula portion of the VLF (approximately 160 acres) are not used to fulfill the Installation's military mission.

The Sprague Neck peninsula has been retained in its natural state, with the exception of a recreational cabin that remains. Due to the peninsular location of the VLF area, and the rural character of the surrounding area, encroachment pressure is not an issue for NSA Cutler. The Navy

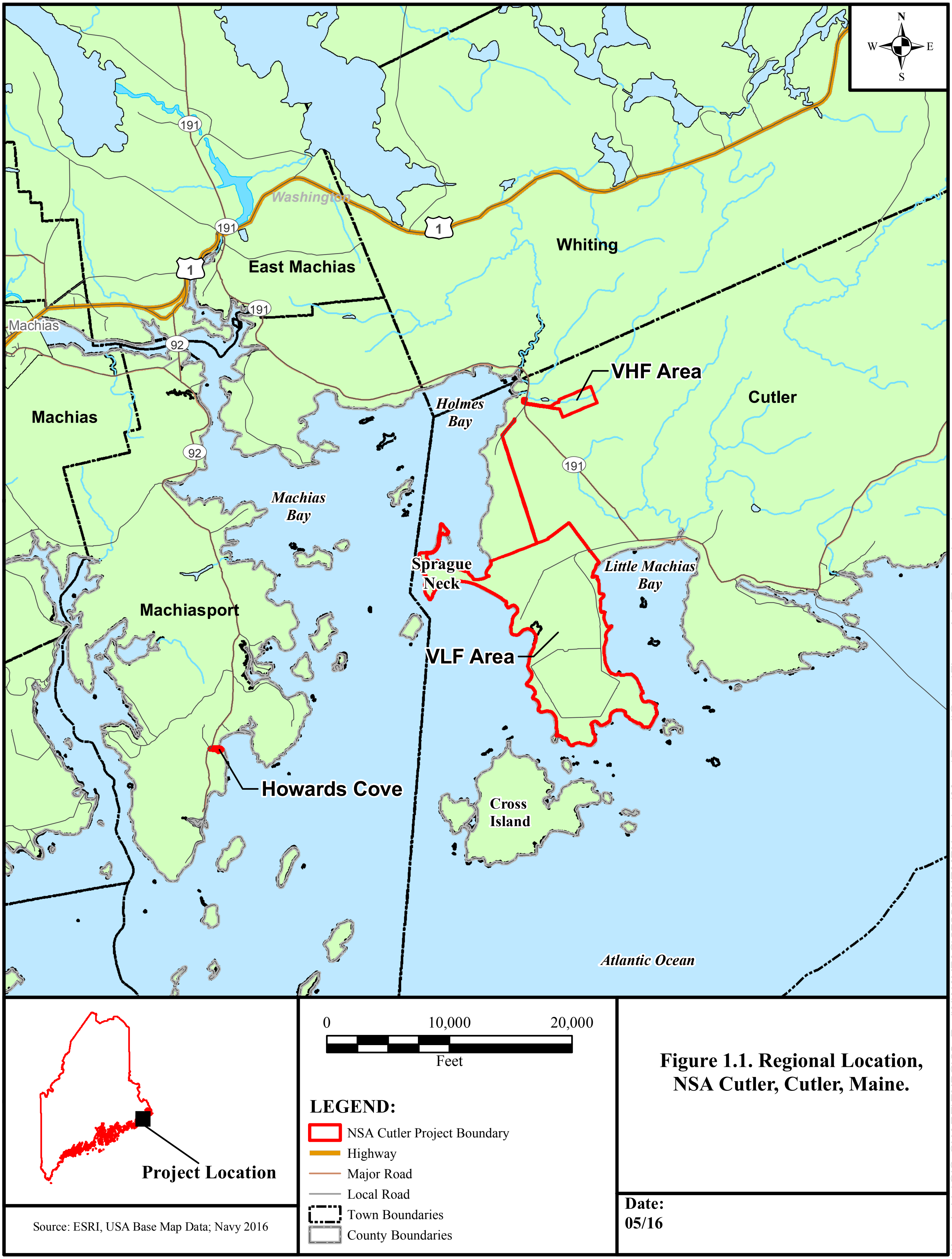

Figure 1.1. Regional Location, NSA Cutler, Cutler, Maine.

Date:
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designated Sprague Neck Bar as an Ecological Reserve Area (ERA[1]) in 1990. The site was selected as an ERA because it provides valuable habitat for a significant number of migratory shorebirds and waterfowl (DoD 1990).

The Navy coordinated designation of the ERA with several agencies including USFWS, MDIFW, University of Maine, and The Nature Conservancy (Conservancy). No active management of this site has occurred since the ERA designation.

The Howard Cove area, located on the west side of Machias Bay, was acquired in 2016 to provide NSA Cutler a continuous and dedicated power supply for the ocean-penetrating communication transmissions associated with the VLF area.

The NSA Cutler facility is managed by the Portsmouth Naval Shipyard Commanding Officer (Joy 2009a).

1.6 Overview of Natural Resources Management

1.6.1 Land Ownership and Responsibilities

All of the land covered by this INRMP is owned and maintained by the Navy. The NRP at NSA Cutler is encompassed within a region-wide NRP that is overseen by the PWD-ME NRM, based at Portsmouth Naval Shipyard, Kittery, Maine. Onsite management is handled by environmental staff based at the Installation. Program areas managed by the NRM and environmental staff include traditional resource issues such as forestry, and fish and wildlife management. In addition, the NRM ensures compliance with applicable local, state, and federal regulations regarding the management and protection of NSA Cutler natural resources. The NRM and environmental staff of the Installation also promote environmental awareness to military personnel. The NSA Cutler NRP is broadly responsible for wetlands protection and mitigation; watersheds; land (grounds and forest); general fish and wildlife; rare, threatened, and endangered species; habitat for birds and at-risk species; migratory birds; outdoor recreation resources; site restoration; and invasive or pest species management. Each of these areas of responsibility must be managed to balance potential conflicts among different interests and the military mission of the Installation. Programmatic objectives of the NRP for NSA Cutler listed in **Section 1.6.2**, and **Section 4.0** of this document provides detailed information on each of the programmatic objectives and associated INRMP projects.

1.6.2 NSA Cutler Natural Resources Programmatic Objectives

Natural resources management at NSA Cutler focuses on four programmatic objectives: land management, fish and wildlife management, forestry management, and outdoor recreation management. The following natural resources management areas have been identified as potentially relevant under each of the programmatic objectives for NSA Cutler.

1. **Land Management**
   - Water Resources Management
     - Watersheds and Floodplain Management

[1] An ERA is “a physical or biological unit in which current natural conditions are maintained insofar as possible. These conditions are ordinarily achieved by allowing natural, physical, and biological processes to prevail without human intervention. However, under unusual circumstances, deliberate manipulation may be utilized to maintain the unique feature which the ecological reserve areas was established to protect” (Navy 1990).

    - Surface Waters, Wetlands, Riparian Areas, and Groundwater Management
    - Water Quality Management
- Coastal Zone Management
    - Climate Change
- Vegetation Management
    - Natural Communities
    - Maintained Land
    - Invasive Plant Species Management
    - Wildland Fire Management
- Rare Communities and Significant Wildlife Habitat
- Land Management
    - Installation Restoration Program (IRP) Sites
    - Hazardous Waste Management
- Regional Conservation Lands
- Leases
- Cultural Resources Management
- Training of Natural Resource Personnel
- GIS Management, Data Integration, Access, and Reporting

2. Fish and Wildlife Management

- General Fish and Wildlife Management
    - Aquatic Species
    - Terrestrial Species
- Threatened and Endangered Species and Special Concern Species Management
- Migratory Bird Management
- Critical Habitat Management for Protected Species
- Invasive Species and Nuisance Wildlife Management
- Partnerships and Outreach
- Conservation Law Enforcement
- Training of Natural Resource Personnel
- GIS Management, Data Integration, Access, and Reporting

3. Forestry Management

- General Forestry Management
- Training of Natural Resource Personnel

- GIS Management, Data Integration, Access, and Reporting

4. <u>Outdoor Recreation Management</u>

- Outdoor Recreation Opportunities
- Partnerships and Outreach
- Special Natural Areas Management
    - Ecological Reserve Areas
    - Watchable Wildlife Areas
- Training of Natural Resource Personnel
- GIS Management, Data Integration, Access, and Reporting

The INRMP includes review of potential projects to be implemented over the duration of the plan, and it has been prepared to accommodate anticipated changes in land use and habitat management. Projects and actions to achieve INRMP goals, with measurable objectives, are described in **Sections 3.0** and **6.0**. **Appendix C** provides a summary table of projects and actions for quick reference. Minor updates to the INRMP should be completed and documented annually, including changes affected by environmental regulation and/or scientific advancement related to management of natural resources at the Facility, with any revisions coordinated with the USFWS, NMFS, and the MDIFW to reduce the need for more costly and time-consuming revision following the five-year review. This INRMP is scheduled to be reviewed for operation and effect every five years and revised as necessary. It will incorporate updates to natural resource projects and activities, and describe any changes to the military mission.

1.7 PARTNERSHIPS AND OUTREACH

Public access and partnerships with natural resource management organizations includes, but is not limited to, granting Base access to National Audubon Society representatives during the month of December to conduct the annual Christmas Bird Count (Fugger and Burns 2009), Department of Defense Partners in Amphibian and Reptile Conservation, USFWS, MDIFW, and the University of Maine (various programs). The management recommendations proposed in this INRMP include establishing future partnerships with the DoD Partners in Flight (PIF), Biodiversity Research Institute, Atlantic Salmon Federation, and other private organizations such as Ducks Unlimited and the Nature Conservancy.

1.8 COMPLIANCE AND STEWARDSHIP

Compliance in terms of an INRMP refers to actions that must be taken to abide by the statutes and regulations applicable to natural resources. These are actions that an installation is legally mandated or obligated to take to meet current or recurring natural resources conservation management requirements, and for which it must obtain funding. The Navy intends to implement this INRMP within the framework of regulatory compliance, mission obligations, anti-terrorism and force protection limitations, and funding constraints. Any requirement for the obligation of project funding in this INRMP shall be subject to availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable law, most notably the Anti-Deficiency Act (31 U.S.C. 1341 et seq.). This INRMP is intended to guide the natural resources management activities on the Installation. Examples of compliance actions include developing, updating, and revising INRMPs; conducting biological surveys to determine population status of endangered, threatened, and sensitive species; and conducting wetland surveys for planning, monitoring, and/or permit applications. Compliance is essential, so these projects are of the utmost priority.

Stewardship is the responsibility to inventory, manage, conserve, protect, and enhance the natural resources entrusted to one's care in a way that respects the intrinsic value of those resources and the needs of present and future generations (OPNAVINST 5090.1D). Installations are required to recognize and balance environmental stewardship with mission readiness in retaining control and use of Navy land, sea, and air space for the purpose of maintaining the military mission. Conscious and active concern for the inherent value of natural resources must be given in all Navy plans, actions, and programs (OPNAVINST 5090.1D). Stewardship projects and programs enhance an installation's natural resources, promote proactive conservation measures, and support investments that demonstrate Navy environmental leadership. Examples include education and public awareness projects, biological surveys or habitat protection for non-listed species, or management and execution of volunteer and partnership programs. Stewardship is an important component of the Navy's Environmental Readiness Program and, because stewardship projects can occur on an indefinite time scale, these projects are prioritized after compliance projects.

1.9 MISSION IMPACTS ON THE ENVIRONMENT

The mission of NSA Cutler is to provide communication services to ships and submarines operating in the North Atlantic, Arctic Ocean, and the Mediterranean Sea. Multiple large antenna arrays and support towers and associated support and operation facilities are required to achieve this mission. As such, operation activities have the potential to impact the environment and require precautions to avoid or minimize degradation or harm to natural resources. Potential impacts include invasive species introduction, erosion of nearshore areas and sedimentation to waterways, antenna and tower threat to migratory birds, and impact to natural habitats.

In spite of high level of use, NSA Cutler mission benefits local natural resources through its commitment to integrated, ecosystem-based, natural resource management, including education and outreach to facility staff, preservation of the Sprague Neck peninsula, continual monitoring and control of invasive species, and annual erosion control inspections and remedial measures plan.

Navy understands the role INRMPs play in identifying potential conflicts between installation mission and natural resources, and in identifying actions necessary to maintain the availability of mission-essential properties and acreage. An INRMP balances the management of natural resources unique to the installation with military mission requirements and other land use activities affecting an installation's natural resources (DoD and USFWS 2004). The NRM is responsible for ensuring the accomplishment of the military mission in a way that sustains and enhances the natural resources on the Installation. The NRM accomplishes this requirement by working in close cooperation with military organizations to ensure mutual support and understanding.

1.10 INRMP INTEGRATION WITH OTHER INSTALLATION PLANS:

The preparation and development of an INRMP must be coordinated with the development of other installation plans, planning processes, and NEPA documents as required by DoD guidance (Navy 2006). Examples of some of these plans include installation integrated cultural resource and pest management plans, and installation restoration plans. NSA Cutler has an Integrated Cultural Resources Management Plan (ICRMP) in place; historic buildings and archaeological resources are not covered within this INRMP, but they should be considered (and avoided) when carrying out future natural resources surveys or soil disturbing activities (e.g., planting). The "Maine Consolidated Integrated Pest Management Plan, 2012" covers the NSA Cutler pest program responsibilities. Other Plans available for NSA Cutler include the Spill Prevention Control and Countermeasures Plan (SPCC), and an Encroachment Action Plan.

NSA Cutler does not have any range complex management plans or other operation plans in place that would need to be coordinated with implementation of this INRMP. Planning for mission activities and natural resources activities are coordinated between the NRM and the Environmental Planning and Conservation Group. This ensures that the military mission is not compromised, and that the Installation is meeting the mandated environmental regulatory requirements. Environmental resources must be considered during the planning and development of future mission requirements and facilities at NSA Cutler, and prior to construction or development and paving of vegetated areas.

1.11 Encroachment and Adjacent Land Use

The DoD has established an Encroachment Partnering program, which was authorized under 10 U.S.C. §2684a (Agreements to Limit Encroachments and other Constraints on Military Training, Testing and Operations), and authorizes military services to enter into cost-sharing partnerships with states, their political subdivisions, and/or conservation minded non-governmental organizations (NGOs) to acquire lands from willing sellers. This serves to limit development or use of the acquired property, or preservation of habitat that supports military readiness requirements. Undeveloped habitat areas that border military installations present ideal opportunities for the Navy to establish buffers to separate the Installation from encroaching development.

The DoD Readiness and Environmental Protection Initiative supports cost-sharing partnerships authorized by Congress (10 U.S.C. §2684a), between the military services, private conservation groups, and state and local governments to protect military test and training capabilities and conserve land (DoD 2012). This initiative enables the military to work with willing partners who provide cost-sharing land conservation solutions to limit incompatible development and protect valuable open spaces and habitat around key test and training areas. The DoD Readiness and Environmental Protection Initiative provides funding for the military to work with state and local governments, NGOs, and willing land owners to help prevent encroachment. Successful projects have resulted in the expansion of easements and the preservation of land around DoD installations (DoD 2012).

Due to the peninsular location of the VLF area and the rural character of the surrounding area, encroachment pressure is not an issue for NSA Cutler. NSA Cutler has not identified any encroachment conflicts.

1.12 Training of Natural Resource Personnel

Section 107 of the Sikes Act requires sufficient numbers of professionally trained natural resources management personnel and natural resources law enforcement personnel to be available and assigned responsibility to perform tasks necessary to carry out Title I of the Sikes Act, including the preparation and implementation of integrated natural resource management plans." The effectiveness of this INRMP is greatly enhanced by the professional development of natural resources management staff through participation in training, conferences, and workshops.

NSA Cutler's Environmental Management System requires personnel to receive the appropriate job-specific education and training to perform their assigned tasks. NRMs shall receive, at a minimum, the following education and training:

1) Basic environmental law (completion of Naval Civil Engineer Corps Officers School (CECOS) Basic Environmental Law (A-4A-0058) will satisfy this requirement)
2) Natural resources compliance (completion of CECOS Natural Resources Compliance (A-4A-0087) will satisfy this requirement)
3) Environmental protection (completion of CECOS Environmental Protection (A-4A-0036) will satisfy this requirement)
4) Introduction to NEPA (completion of CECOS NEPA Application (A-4A-0077) will satisfy this requirement)
5) Environmental negotiation (completion of CECOS Environmental Negotiation Workshop (A-4A-0067) will satisfy this requirement)
6) Program funding (Environmental Program Requirements web (EPRWeb) online training will satisfy this requirement)

In addition to completing the above-listed required CECOS and EPRWeb training, natural resources personnel typically hold science-based degrees, and acquire professional skills by attending training through the Shipley Group, USFWS (National Conservation Training Center), USACE, the Wetland Training Institute, various university and non-governmental programs, and Defense Environmental Network and Information Exchange (DENIX).

Natural resources staff keep abreast of current issues by attending annual workshops or conferences held by various professional societies. Societies such as National Military Fish and Wildlife Association, The Wildlife Society, Society of American Foresters, and Society for Ecological Restoration host annual meetings focused on the management of natural resources. The NRM attends annual training programs, such as the National Military Fish and Wildlife Training, and maintains job-related certifications, such as Airport Biologist, Wildlife Biologist, Arborist, and DoD Pesticide Applicator.

1.13 Geographic Information System Management, Data Integration, Access and Reporting

GIS management is an integral part of natural resources and environmental protection and planning. The CNRMA's GeoReadiness Center is the single, authoritative source and distribution point for all geospatial information within the Area of Responsibility of the Navy Mid-Atlantic Region and is managed by the NAVFAC Mid-Atlantic GIS Division. The GeoReadiness Center houses the most current geospatial information (including aerial photography) for the entire Navy Mid-Atlantic Region and provides access to the comprehensive data set and analysis tools to Regional and DoD decision makers/managers, sponsored contractors, and other sponsored individuals via a secure government Internet site. GIS data for NSA Cutler, including the environmental layers used for the development of this INRMP, can be accessed by authorized individuals through the portal at:

https://portal.navfac.navy.mil/portal/page/portal/am/ mid-atlantic/am_ml_au/gis.

Baseline environmental data layers used to develop the figures for this INRMP include:

- Installation boundary and site details (e.g., buildings, infrastructure, recreation areas)
- Soils
- Aquatic resources from the National Wetlands Inventory, using USACE Jurisdictional wetlands, where data is available
- Flood zones
- Forested/natural areas
- Mowed/maintained areas
- Land cover types

Environmental planners, project managers, engineers, and sponsored contractors are encouraged to use the portal to access GIS data for analysis, development of maps, and project planning. In addition, the portal provides guidance documentation for the collection of new geospatial data.

1.14 ENVIRONMENTAL PLANNING

The proponent of any action at NSA Cutler that has the potential to impact natural resources or may require federal or state permits must coordinate the proposed actions with the NAVFAC Planning Department. The NAVFAC Planning Department is responsible for initiating the Environmental Checklist (**Appendix D**) through the NAVFAC PWD-ME NEPA Program Manager stationed at the Portsmouth Naval Shipyard in Kittery, Maine. Additional review of the proposed actions will also be conducted by the NRM for potential environmental impacts.

Advanced planning and coordination are required to ensure compliance with several federal environmental regulations including but not limited to:

- NEPA, 42 U.S.C. §4231 et seq.
- Sikes Act, as amended, 16 U.S.C. §670a-670o
- Clean Air Act, 42 U.S.C. §7401 et seq.
- Clean Water Act (CWA), 33 U.S.C. §1251-1387
- Migratory Bird Treaty Act (MBTA), 16 U.S.C. §703-712
- Endangered Species Act of 1973 (ESA) 16 U.S.C. §1531 et seq.

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2.0 EXISTING CONDITIONS

NSA Cutler occupies 3,003 acres in the Town of Cutler, Maine, and 3.65 acres in the Town of Machiasport, Maine. The VLF area (2,896 acres), and the HF area (107 acres) are in Cutler, Maine. The Howard Cove area (3.65 acres) is in the Town of Machiasport. The VLF area power line right-of-way (ROW) (approximately 11 acres) and the existing Howard Cove power line ROW, shown on **Figure 1.1,** were not included in field surveys conducted for this INRMP, because these ROWs are not managed by the Navy. The Town of Cutler and Town of Machiasport are in the easternmost region of Maine, in Washington County, approximately 30 miles southwest of the Canadian border and Campobello Island, New Brunswick, Canada (**Figure 1.1**). Estimated population for the Town of Cutler in 2016 was 432 (U.S. Census Bureau 2016). Estimated population for the Town of Machiasport in 2016 was 1,103 (U.S. Census Bureau 2016). The NSA Cutler employee population varies but generally includes approximately 80 civilian employees (Trefry 2018). The Installation does not provide onsite military housing.

> NSA Cutler occupies 3,003 acres in the Town of Cutler and 4 acres in the Town of Machiasport, Washington County, Maine.

2.1 SITE DETAILS

Very Low Frequency Area

> VLF contains two **13-tower** antenna arrays, the north and south antenna array, which each have the capability of **1-million-watt output**. The main transmitter is one of the Navy's most powerful transmitters and is capable of a 2-million-watt output.

The VLF area is approximately 2,896 acres and is situated on a peninsula extending into the Atlantic Ocean (**Figure 2.1**). The VLF area is located south of Route 191, and major access to this parcel is provided by Ridge Road. The VLF peninsula is surrounded on three sides by the following waters: Little Machias Bay to the east; Cross Island Narrows, Little Holly Cove, Big Holly Cove, and the Atlantic Ocean to the south; and Holmes and Machias bays to the west. Cross Island, which consists of the Cross Island National Wildlife Refuge, and several smaller islands are south of the VLF area. The panels in each antenna array are supported by 13 main towers, including a center tower surrounded by an inner circular array of six towers and an outer circular array of six towers. The main towers are approximately 800 to 1,000 feet (ft) tall. Each main tower is supported by one or two counterweights, which are supported by towers that are approximately 200 ft tall. Currently, 117 structures are located throughout the VLF area, including winch houses and electrical distribution buildings associated with the antennas and supporting towers, and support and operation facilities. The support and operation facilities include a centrally located transmitter building, two helix houses, a public works shop, a power plant building, and security and administrative buildings, all of which are structures contributing to the Cutler VLF and HF Communications Historic District (NAVFAC Mid-Atlantic 2012 and NCTAMSLANT DET Cutler 2003). The Cutler VLF and HF Communications Historic District is described in **Section 2.10**.

The northwestern portion of the VLF parcel is the Sprague Neck peninsula, located northwest of the antenna fields. Holmes Bay is north of Sprague Neck and Machias Bay is to the west and south. Sprague Neck Bar is a long cobble bar extending north from the tip of Sprague Neck peninsula,

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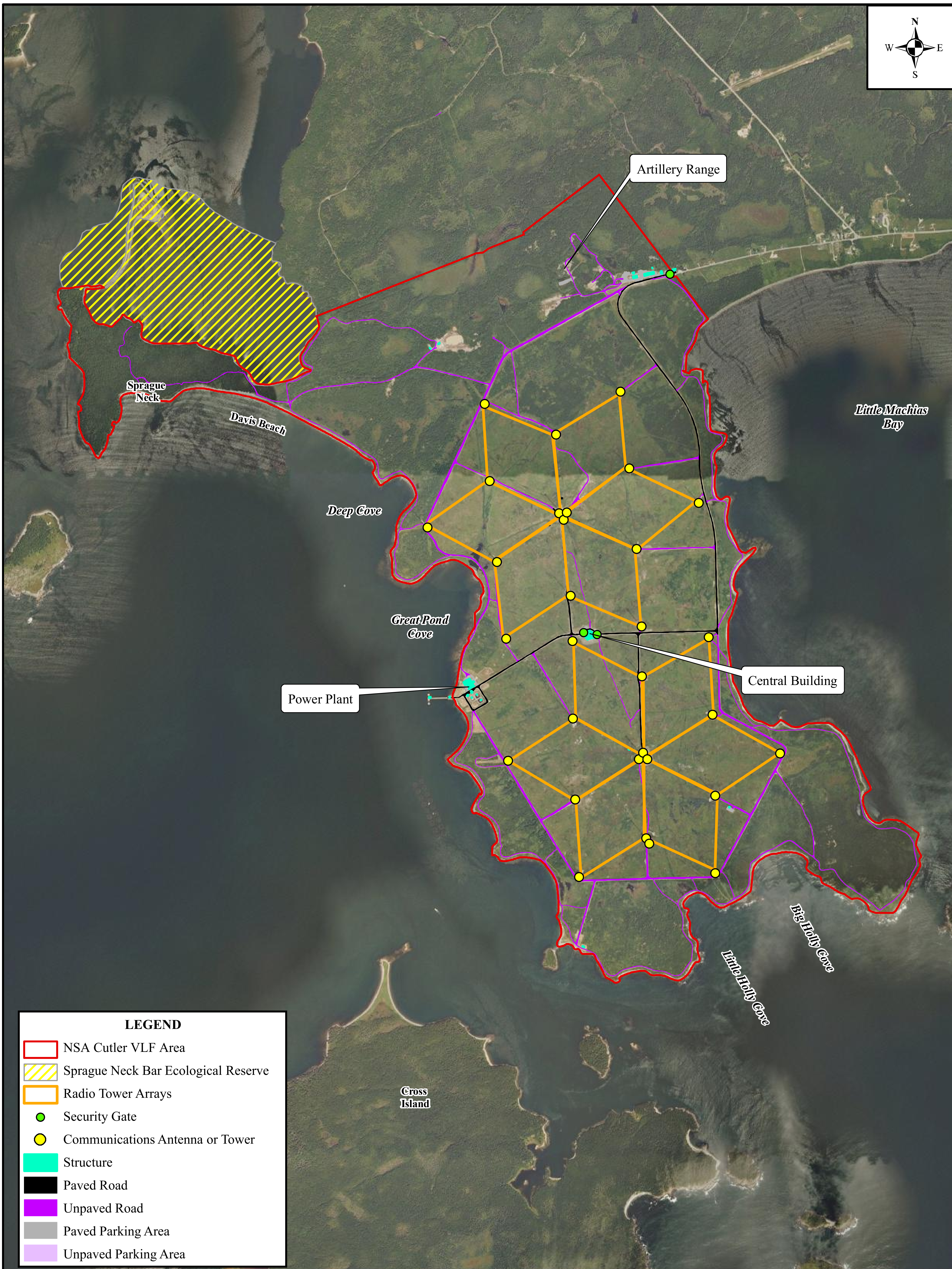

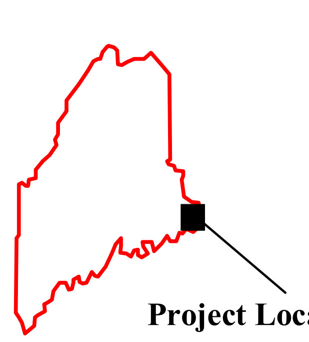

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy, 2009.

2,500 1,250 0 2,500
Feet

Figure 2.1. Very Low Frequency Area Site Details NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH

Date: 02/11

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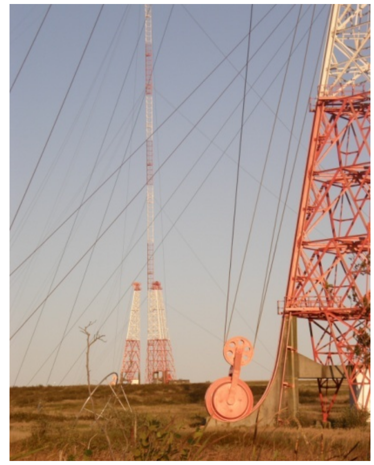
covering approximately 30 acres, and vegetated predominantly by grasses (**Figure 2.1**). The Sprague Neck peninsula does not support military activities and was used historically as a recreation area for military personnel and their families. The cabins and facilities on the peninsula are closed, although access to this site, which is restricted to military personnel, remains available for recreational fishing, hiking, or wildlife viewing. There is no public access to the Sprague Neck peninsula.

The VLF area of NSA Cutler (including Sprague Neck Bar and other areas of northeastern coastal Maine) has been designated as a globally important bird area due to its importance to thousands of nesting and wintering seabirds that concentrate on the Installation and surrounding regions. In addition, thousands of shorebirds use the Installation and regional coastal locations as a stopover site during migration (DoD PIF Important Bird Areas Program 2010).



VLF tower field.

Because of its importance to migrating shorebirds and waterfowl, Sprague Neck Bar was designated as a Navy ERA in 1990 (DoD 1990). The Navy coordinated designation of the ERA with several agencies including USFWS, MDIFW, University of Maine, and the Conservancy.

High Frequency Area

HF area antenna.

The HF area is approximately 107 acres and is approximately 2 miles north of the VLF parcel, off Route 191, and approximately 0.5 mile inland from the eastern edge of Holmes Bay (**Figure 1.1**). Primary access to the HF area is provided by the access road (Cutler Road) that extends east from Route 191. The reservoir adjacent to the western boundary of the HF site is privately owned.

The HF area historically served as a backup for the VLF areas in the event of a transmitter failure and it also supported other communication activities, such as shore-to-ship and ground-to-air transmissions. The HF mission was decommissioned in 2016, but as of 2018 the HR area remains equipped with 19 high frequency transmitters and supporting antennas (**Figure 2.2**). In addition to the antennas, the HF area includes two buildings: the main operations building and the building that formerly housed the emergency power generator. (Trefry, 2018)

Howard Cove Area

The Howard Cove area is approximately 4 acres and is approximately 5 miles west of the VLF area across Machias Bay in an inlet named Howard Cove (Figure 1.1). Access to the Howard Cove area is from Port Road. The surrounding lands consist of rural residential property, commercial property, and undeveloped forestland.

The Howard Cove area, which consists of undeveloped forestland bound on the east by a steep cliff with a dirt road leading to the cliff, was acquired to transition the subsea cable to an existing aerial transmission line (**Figure 2.3**). The subsea line, connected to the aerial transmission line via horizontal directional drill, is owned by the Navy but is beyond the scope of the INRMP. The aerial transmission line is owned and operated by the power company and is beyond the scope of the

INRMP. The connection process would disturb 0.20 acre of land at the western edge of Howard Cove parcel, with 0.19 acre allowed to naturally revegetate. (NCTAMSLANT DET Cutler 2014).

2.2 CLIMATE

The climate condition in the coastal region of NSA Cutler is generally humid with temperatures moderated by oceanic influences. Winters at this latitude are somewhat prolonged and last for approximately 5 months (November through March). The prevailing winter winds are from the north and northwest and bring snow, and cold, arctic air to the area. The summer season in this region produces prevailing winds from the south or southwest. Thunderstorms are relatively infrequent due to the cooling influence of the ocean. Hurricanes occasionally occur in late summer and have the potential to inundate most of the coastal areas of the Installation (MDACF 2016).

Temperature information is provided for Jonesboro, Maine, a coastal town approximately 13 miles west of the VLF and HF areas and 9 miles northwest of the Howard Cove area, because it is the closest town for which historical temperature data are available. July and August are normally the warmest months of the year with a mean maximum temperature of approximately 75 degrees Fahrenheit (°F). January tends to be the coldest month of the year with a mean minimum temperature of approximately 9°F. Mean annual temperature for the area is approximately 43°F. (U.S. Climate Data 2016)

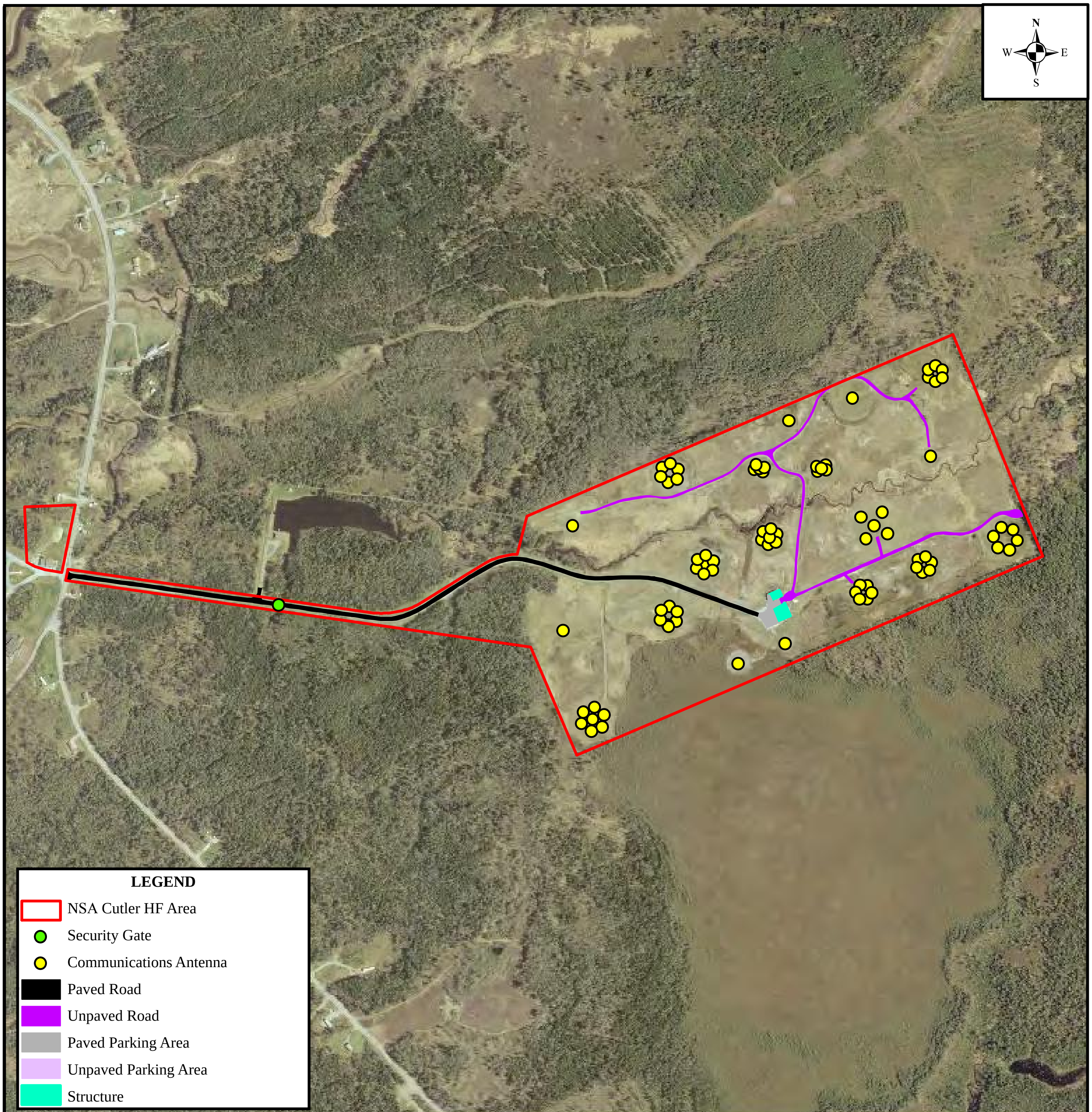
The transitional seasons of spring and fall are characterized by frequent precipitation events and dense fog. Historical precipitation data are also provided for Jonesboro, Maine. Average annual precipitation for the region is 51 inches, with an average annual snowfall of 62 inches (U.S. Climate Data 2016). Typically, this area of the country does not contain a dry season, with precipitation distributed throughout the calendar year. November tends to be the wettest month of the year in this region, with an average mean monthly rainfall of more than five inches.

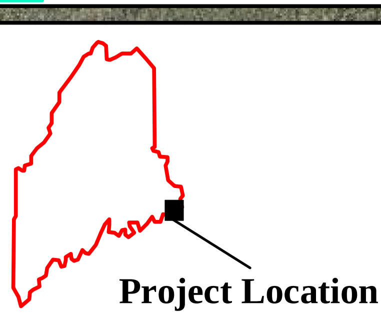
2.3 GEOLOGY, TOPOGRAPHY, AND SOILS

NSA Cutler is located within the Seaboard Lowland section of the New England physiographic province (USGS 1995). The elevation of the majority of the site and surrounding area is at or near mean sea level due to its location along the Atlantic seaboard. The geology, topography, and soils of the NSA Cutler area were largely shaped by past glacial activity, which created a landscape primarily of rolling to flat topography, punctuated by glacial debris. Geology, topography, and soils for the VLF, HF, and Howard Cove areas are described in the following sections.

2.3.1 Geology

The surficial geology of Maine was determined by repeated glaciations that eroded bedrock, shaped topography, and deposited glacial sediments (NCTAMSLANT DET Cutler 2003). The recession of the Wisconsin glacial ice sheet at Cutler occurred 14,000 years before present (BP), and accounts for most of the topography of the VLF, HF, and Howard Cove sites. Effects of past glacial events are evident along the northern portion of the VLF area where a large terminal moraine is located that stretches from Sprague Neck east to the intersection of Route 191 and the VLF area access road (NCTAMSLANT DET Cutler 2003). Since the beginning of the Holocene period 10,000 BP, the Maine landscape has been altered by several processes, including glacial rebound, which was the driving force of sea level rise and erosion.





Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

500 250 0 500 1,000

Feet

Figure 2.2. High Frequency Area Site Details NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH, INC.

Date: 04/10

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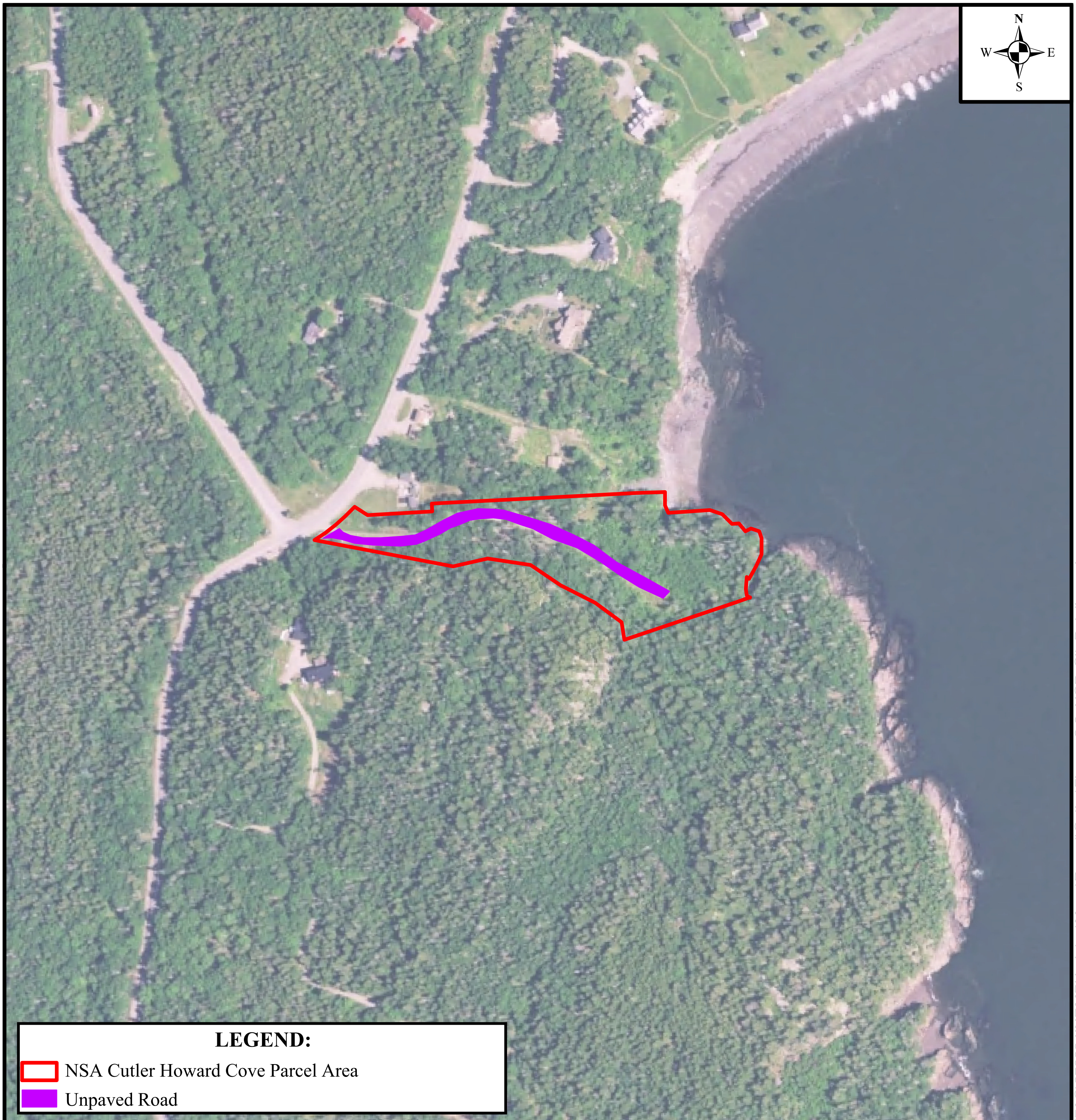

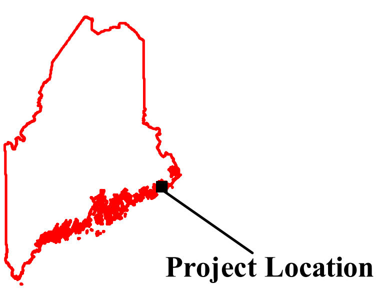

Source: Aerial NAIP, 2015; Navy 2017
Topo: Maine Office of GIS

Figure 2.3. Howard Cove Parcel Area Site Details NSA Cutler, Cutler, Maine.

Date:
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As temperatures began to rise over the past several thousand years, ice sheets began receding northwest. A massive amount of glacial wash was associated with the receding ice sheets, which deposited huge quantities of sand, gravel, and boulders. These deposits created various formations, including terraces, ridges, plains, and till (NCTAMSLANT DET Cutler 2003).

> The recession of the **Wisconsin glacial ice sheet** at Cutler occurred 14,000 years BP, and accounts for most of the topography of the VLF and HF sites.

The most common types of subsurface rock in New England are consolidated igneous, metamorphic, and sedimentary rocks, ranging in age from Precambrian to the early Mesozoic eras, with rocks from the Cambrian through Devonian periods most prevalent (USGS 1995). During the Pleistocene epoch, most of the area was covered by continental glaciers that removed the topsoil and weathered bedrock materials and redeposited these materials as a thin layer of glacial material on top of the bedrock surface. The bedrock of the area and surrounding Washington County consists primarily of volcanic and granitic deposits associated with the Silurian and Ordovician periods (USGS 1995). Intrusions of granite and gabbro are locally common, with most of the bedrock consisting of poorly metamorphosed flow breccias, tuff breccias, and tuffs (NCTAMSLANT DET Cutler 2003). Breccias rocks are composed of multiple types of mineral fragments or rocks held together by a matrix that may or may not be similar to the fragments. Tuff is composed of consolidated volcanic ash. The bedrock is volcanic in origin and has been partially metamorphosed through the physical and chemical alteration subsequent to deposition caused by the heat and pressure, usually by being buried and folded in mountain-building processes. Other types of rock associated with the local bedrock include sandstone, siltstone, and basalt flows (NCTAMSLANT DET Cutler 2003).

2.3.2 Topography

The topography of NSA Cutler is relatively flat, and is described for the VLF, HF, and Howard Cove areas, below.

Very Low Frequency Area

The VLF area has elevations ranging from sea level along the coastline to approximately 140 ft above sea level in the northeastern corner of the site where past glacial events left a large terminal moraine at the north end of the VLF area (**Figure 2.4**). The topography rises from sea level along the coast to between 20 and 80 ft above sea level in the inland areas of the tower fields, with the highest elevations (70 to 146 ft above sea level) occurring north of the tower fields in the northern section of the site. Elevations on the Sprague Neck peninsula range from sea level to 70 ft above sea level.

High Frequency Area

Elevations of the HF area range from 20 to 68 ft above sea level, with the higher elevations occurring along the northern, eastern, and southern site boundaries (**Figure 2.5**).

Howard Cove Area

Elevations of the Howard Cove area rise from sea level along the coast to between 110 and 125 ft above sea level in the inland areas of the parcel (NCTAMSLANT DET Cutler 2014). The higher elevations occur along the western and southwestern boundaries (**Figure 2.6**).

2.3.3 Soils

The immense weight of the glacial ice during the last ice age was enough to temporarily depress the surface of the land below sea level, resulting in a large portion of eastern and southern Maine, including all of Washington County, being covered by ocean water. Ocean water covered this area of Maine until just prior to the last glacial retreat, which occurred approximately 12,000 years BP (USGS 1995). As the glaciers melted and retreated to the north, the land surface rebounded to an elevation above sea level, resulting in ocean waters retreating to the present day coastline. These lowlands that were once covered by ocean waters contain marine clay and silt deposits overlaying the till and other fine- and coarse-grained glacial deposits. Soils associated with both the VLF and HF areas are predominantly poorly drained and somewhat poorly drained. Soils associated with the Howard Cove area are well-drained or excessively drained. The VLF, HF, and Howard Cove area soils are described below.

Very Low Frequency Area

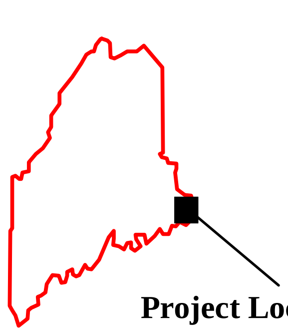
A large terminal moraine runs east-west across the north end of the VLF site, and is composed of well-drained sand, gravel, and boulders and is mostly overlain by excessively drained soil types. However, soils on the north side of the moraine are very wet and covered by extensive bogs and fens. Soils downslope on the south side of the moraine support a mosaic of wetland and upland habitats.

Twenty-one soil types have been identified for the VLF area (**Figure 2.7** and **Table 2.1**). The primary soil type, comprising 22.9 percent of the soils within the VLF area, is Brayton fine sandy loam. The Brayton component that makes up this soil type is located on till plains on uplands with slopes of 0 to five percent. This component is derived from mica schists and/or coarse-loamy lodgement (U.S. Department of Agriculture, Natural Resources Conservation Service [USDA NRCS] 2009). These soils are poorly drained and meet the hydric soil criteria. Brayton fine sandy loam soils are located throughout the VLF area but are concentrated in the central portion of the site, where the tower fields are located.

The Scantic silt loam, 0 to three percent slopes, comprises approximately 18.3 percent of the soils in the VLF area. The Scantic component that makes up this soil is located on coastal plains. These soils are poorly drained and derived from glaciolacustrine and/or fine glaciomarine deposits (USDA NRCS 2009). Scantic silt loam soils are located throughout the VLF area.

The Bucksport and Wonsqueak soils comprise approximately 10.8 percent of soils in the VLF area. The Bucksport component of this soil is derived from organic material, occurs in swamps with slopes of 0 to 1 percent, and is a very poorly drained soil that meets the hydric soil criteria. The Wonsqueak component of this soil is derived from organic material, occurs in swamps with slopes of 0 to 2 percent, and is a very poorly drained soil that meets the hydric soil criteria (USDA NRCS 2009). This soil type is generally located in the northern portion of the VLF area.

The Rawsonville-Hogback-Abram complex with 3 to 15 percent slopes and very stony texture comprises approximately 10.2 percent of the soils in the VLF area. The Rawsonville soil component is well-drained, derived from coarse-loamy supraglacial meltout till from mica schist, and is located on hills on uplands. The Hogback soil component is also well-drained and is derived from coarse-loamy supraglacial melt-out till from mica schist. This component is also located on hills on uplands. The Abram soil component is excessively drained, from coarse-loamy supraglacial melt-out till derived from granite and gneiss. This soil type occurs on the southwestern tip of the VLF peninsula.



Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy, 2009.

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Figure 2.4. Very Low Frequency Area Topography NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH, INC.

Date: 03/10

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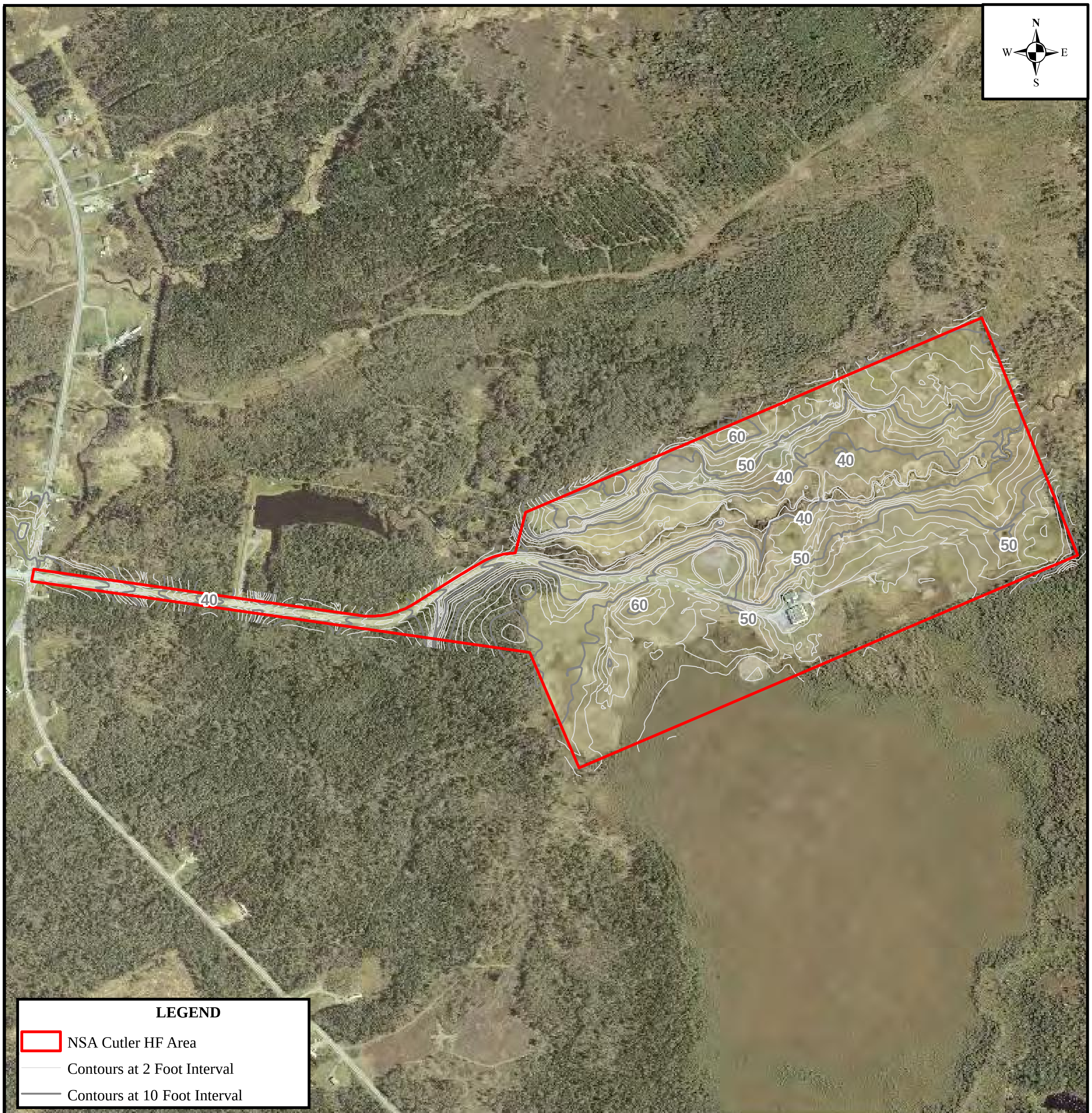

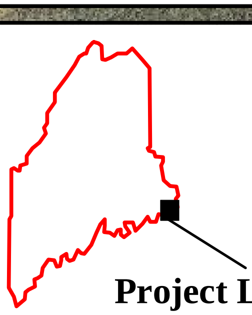

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

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Figure 2.5. High Frequency Area Topography NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH, INC.

Date: 03/10

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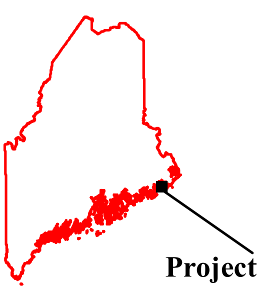

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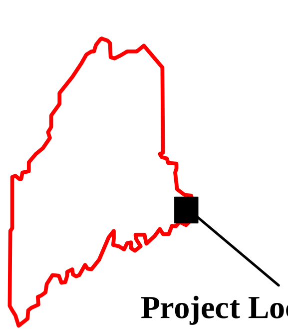
Figure 2.6. Howard Cove Parcel Area Topography NSA Cutler, Cutler, Maine.

Source: Aerial NAIP, 2015; Navy 2017
Topo: Maine Office of GIS

Date:
02/18

Soil Descriptions

AaE - Abram-Hogback complex, 15-45% slopes
BnB - Brayton fine sandy loam, 0-5% slopes, very stony
BW - Bucksport and Wonsqueak soils
CoB - Colton gravelly sandy loam, 3-8% slopes
CoC - Colton gravelly sandy loam, 8-15% slopes
DfC - DixField fine sandy loam, 8-15% slopes, very stony
DgB - Dixfield-Colonel complex, 3-8% slopes
HXC - Hogback-Rawsonville-Abram complex, 3-15% slopes, very stony
Kn - Kinsman sand
LaB - Lamoine silt loam, 0-6% slopes
LbB - Lamoine-Buxton complex, 0-8% slopes
LmB - Lamoine-Scantic complex, 0-5% slopes
MaC - Marlow fine sandy loam, 8-15% slopes
MmB - Masardis fine sandy loam, 3-8% slopes
NBB - Naskeag-Rawsonville-Hogback complex, 0-8% slopes, very stony
Pg - Pits, sand and gravel
RhB - Rawsonville-Hogback complex, 3-8% slopes
RhC - Rawsonville-Hogback complex, 8-15% slopes
RmC - Rawsonville-Hogback-Abram complex, 3-15% slopes, very stony
Sa - Scantic silt loam
SF - Scantic-Biddeford association, 0-3% slopes
W - Water



Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; USDA, NRCS, SSURGO Digital Soils data, Washington County, Maine, 2008

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LEGEND

NSA Cutler VLF Area
USDA Soils Boundaries

Figure 2.7. Very Low Frequency Area USDA Soil Types NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH, INC.

Date: 03/10

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Table 2.1 Very Low Frequency Area USDA Soil Types, NSA Cutler

Map Unit Symbol	Soil Series	Drainage Class	Farmland Classification (P/S)[1]	Area (Acres)	Percent Total
AaE	Abram-Hogback complex, 15–45% slopes, very stony	Excessively Drained to Well Drained	–	16.3	0.6
BnB	Brayton fine sandy loam, 0–5% slopes, very stony	Poorly Drained	–	662.7	22.9
BW	Bucksport and Wonsqueak soils, 0–1% slopes	Very Poorly Drained	–	312.7	10.8
CoB	Colton gravelly sandy loam, 3–8% slopes	Excessively Drained	S	102.5	3.5
CoC	Colton gravelly sandy loam, 8–15% slopes	Excessively Drained	–	37.9	1.3
DfC	Dixfield fine sandy loam, 8–15% slopes, very stony	Moderately Well Drained	–	8.8	0.3
DgB	Dixfield-Colonel complex, 3–8% slopes	Moderately Well Drained to Poorly Drained	P	117.8	4.1
HXC	Hogback-Rawsonville-Abram, 3–15% slopes, very stony	Excessively Drained to Well Drained	–	74.5	2.6
Kn	Kinsman sand	Poorly Drained	–	73.3	2.5
LaB	Lamoine Silt Loam, 0–6% slopes	Somewhat Poorly Drained	S	75.2	2.6
LbB	Lamoine-Buxton complex, 0–8% slopes	Somewhat Poorly Drained to Moderately Well Drained	S	32.7	1.1
LmB	Lamoine-Scantic complex, 0–15% slopes	Somewhat Poorly Drained to Poorly Drained	S	14.2	0.5
MaC	Marlow fine sandy loam, 8–15% slopes	Well Drained	S	33.3	1.2
MmB	Masardis fine sandy loam, 3–8% slopes	Excessively Drained	S	8.0	0.3

Table 2.1 Very Low Frequency Area USDA Soil Types, NSA Cutler

Map Unit Symbol	Soil Series	Drainage Class	Farmland Classification (P/S)[1]	Area (Acres)	Percent Total
NBB	Naskeag-Rawsonville-Hogback complex, very stony	Poor Drained to Well Drained	–	15.4	0.5
Pg	Pits, sand and gravel	N/A	–	66.9	2.3
RhB	Rawsonville-Hogback complex, 3–8% slopes	Well Drained	P	290.2	10.0
RhC	Rawsonville-Hogback complex, 8–15% slopes	Well Drained	S	85.7	3.0
RmC	Rawsonville-Hogback-Abram complex, 3–15% slopes, very stony	Well Drained to Excessively Drained	–	295.6	10.2
Sa	Scantic silt loam, 0–3% slopes	Poorly Drained	–	530.6	18.3
SF	Scantic-Biddeford association, 0–3% slopes	Poorly Drained	–	3.3	0.1
W	Surface Water or Wetland	NA	NA	38.0	1.3
Total			**–**	**2,866.2**	**100**

[1]P=Prime Farmland, S=Farmland of Statewide Importance
Source: USDA NRCS 2009.

The Rawsonville-Hogback complex with 3 to 8 percent slopes comprises approximately 10 percent of the VLF area. This soil is similar to the previous soil type except it does not include the Abram soil component. This soil type generally occurs in the central and southern portions of the VLF area.

The remaining 16 soil types and surface water or wetlands comprise the final 27.8 percent of the soils in the VLF area, ranging from 0.1 to 4.1 percent coverage of the VLF area. Surface water and wetlands cover 1.3 percent of the VLF area. The soil types are briefly described in **Table 2.1**.

Erosion is a significant issue within portions of the VLF area, especially in areas along the perimeter roads, antenna field access roads, and many of the roads leading to individual towers. The locations that are most prone to erosion are areas associated with heavy vehicle use or areas susceptible to coastal erosion from wave and storm action, especially at the southwest end of the peninsula. The primary areas experiencing soil erosion and sedimentation issues are associated with areas of ground disturbance, or sections of roadways located within 75 ft of existing wetlands, waterbodies, and coastal areas.

Two soils types encompassing 408 acres of the VLF area are considered prime farmland soils: the Dixfield-Colonel complex, 3 to 8% slopes, and Rawsonville-Hogback complex, 3 to 8% slopes. Several other soil types located throughout the VLF area are considered farmland of statewide importance and encompass 351.6 acres of the VLF.

There are two soils types in the VLF area that are considered prime farmland soils: the Dixfield-Colonel complex, 3 to 8 percent slopes, and Rawsonville-Hogback complex, 3 to 8 percent slopes. Prime farmland, as defined by the USDA, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses (USDA NRCS 2009). Because the supply of high quality farmland is in limited supply in the U.S., prime farmland is identified to ensure that a long-term supply of food and fiber is available. In general, soils that meet prime farmland criteria have sufficient water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and low rock content (7 Code of Federal Regulations [CFR] §657). These soils comprise approximately 408 acres of the VLF and are generally located within the area of the tower fields (**Table 2.1** and **Figure 2.7**).

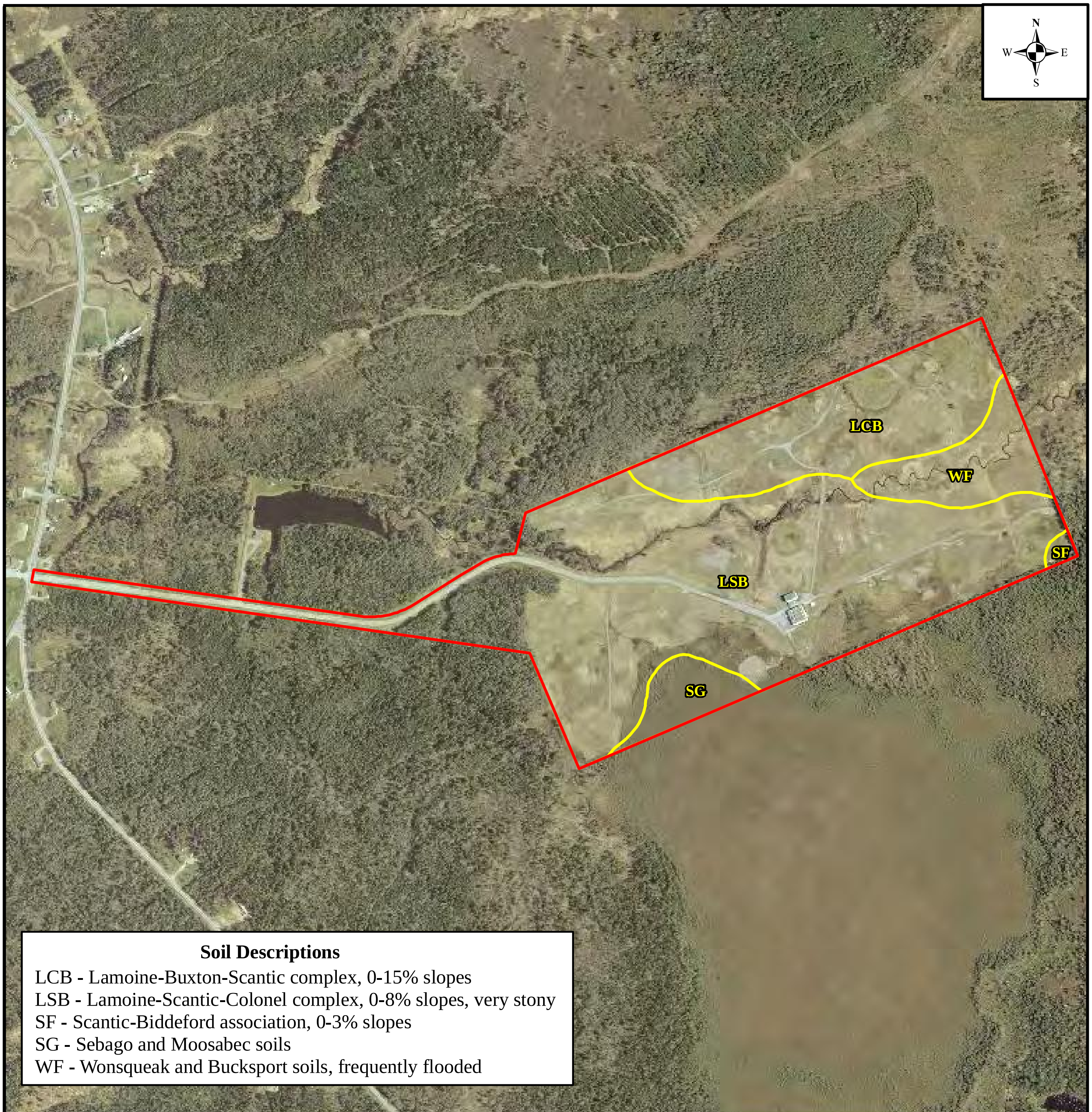
Several other soils located throughout the VLF area are considered farmland of statewide importance (approximately 351.6 acres), but are not considered prime farmland, including: the Colton gravelly sandy loam, 3 to 8 percent slopes; Lamoine silt loam, 0 to 6 percent slopes; Lamoine-Buxton complex, 0 to 8 percent slopes; Lamoine-Scantic complex, 0 to 5 percent slopes; Marlow fine sandy loam, 8 to 15 percent slopes; Masardis fine sandy loam, 3 to 8 percent slopes; and Rawsonville-Hogback complex, 8 to 15 percent slopes (**Table 2.1**). None of the VLF area soils are being farmed and, based on their use as operations areas necessary to meet the military mission for NSA Cutler, no portion of the VLF area is available for farming.

High Frequency Area

Five soil types have been identified for the HF area (**Figure 2.8** and **Table 2.2**). The primary soil type, covering 67.7 percent of HF area soils, is Lamoine-Scantic-Colonel complex, 0 to 8 percent slopes. This soil is derived from glaciolacustrine deposits, glaciomarine deposits, and lodgement till from gneiss and granite deposits (USDA NRCS 2009). This soil type is hydric, poorly drained, with a seasonal zone of saturation of approximately 6 to 12 inches (USDA NRCS 2009). Lamoine-Scantic-Colonel complex is located throughout the HF area.

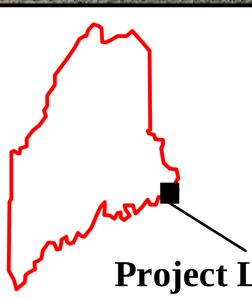
The Lamoine-Buxton-Scantic complex, 0 to 15 percent slopes, comprises approximately 20.3 percent of the HF area. Lamoine-Buxton-Scantic complex is derived from glaciolacustrine and glaciomarine deposits (USDA NRCS 2009), and is a poorly drained, hydric soil that occurs on coastal plains. Lamoine-Buxton-Scantic complex soils are located in the northern portion of the HF area.

The Wonsqueak and Bucksport soils comprise approximately 7.5 percent of the HF area. The Wonsqueak and Bucksport soil is very poorly drained soil derived from organic material and occurs in swamps. This soil is considered hydric and is frequently flooded, with a seasonal zone of saturation of approximately 3 inches (USDA NRCS 2009). This soil type is located in the eastern portion of the HF area. The remaining soils, the Scantic-Biddeford association, 0 to 3 percent slopes, and Sebago and Moosabec, 0 to 1 percent slopes, comprise approximately 4.5 percent of the soils in the HF area.



Soil Descriptions

LCB - Lamoine-Buxton-Scantic complex, 0-15% slopes
LSB - Lamoine-Scantic-Colonel complex, 0-8% slopes, very stony
SF - Scantic-Biddeford association, 0-3% slopes
SG - Sebago and Moosabec soils
WF - Wonsqueak and Bucksport soils, frequently flooded



Project Location

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

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LEGEND

NSA Cutler HF Area
USDA Soils Boundaries

Figure 2.8. High Frequency Area USDA Soil Types NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH, INC.

Date: 03/10

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Table 2.2 High Frequency Area USDA Soil Types, NSA Cutler

Map Unit Symbol	Soil Series	Drainage Class	Farmland Classification (P/S)1	Area (Acres)	Percent Total
LCB	Lamoine-Buxton-Scantic complex, 0 to 15% slopes	Poorly Drained	S	21.7	20.3
LSB	Lamoine-Scantic-Colonel complex, 0 to 8% slopes	Poorly Drained	–	72.3	67.7
SF	Scantic-Biddeford association, 0 to 3% slopes	Poorly Drained	–	0.5	0.5
SG	Sebago and Moosabec soils, 0 to 1% slopes	Very Poorly Drained	–	4.2	4.0
WF	Wonsqueak and Bucksport soils, 0 to 2% slopes	Very Poorly Drained	–	8.0	7.5
Total				**106.8**	**100**

[1]P=Prime Farmland, S=Farmland of Statewide Importance
Source: USDA NRCS 2009.

The Sebago and Moosabec soils are very poorly drained soils, derived from organic material, and occur in bogs.

The Sebago and Moosabec soils are located in the southwest portion of the HF area. The Scantic-Biddeford association is derived from glaciolacustrine and glaciomarine deposits, and is a poorly drained, hydric soil that occurs on coastal plains (USDA NRCS 2009). This soil type is located in the southeastern corner of the HF area.

Similar to the VLF area, erosion issues at the HF area are associated with road shoulders. Erosion is especially problematic along access roads in the southeast and northwest corner of the HF area. The topography of this section of NSA Cutler is gentle with generally low slopes throughout the area, with the exception of the banks of Huntley Creek, which are steep in some locations. The slopes of the shoulders of the access road where it crosses Huntley Creek are similarly steep and therefore prone to erosion.

Lamoine-Buxton-Scantic complex, 0 to 15% slopes, is considered farmland of statewide importance and encompasses approximately 21.7 acres in the northern portion of the HF area.

None of the soils within the HF area are considered prime farmland soils. However, the Lamoine-Buxton-Scantic complex, 0 to 15 percent slopes, is considered farmland of statewide importance, and encompasses approximately 21.7 acres in the northern portion of the HF area (**Table 2.2**). There are no plans to farm any portion of the HF area due to its use in support of the military mission of NSA Cutler.

Howard Cove Area

Two soil types have been identified for the Howard Cove area (**Figure 2.9** and **Table 2.3**). The primary soil type, covering 86.8 percent of the Howard Cove area soils, is Hogback-Abram-

Rawsonville complex, 15 to 60 percent slopes and very stony. This soil complex occurs on ridges and hills. The Hogback soil component is well-drained, derived from coarse-loamy supraglacial melt-out till from mica schist. The Abram soil component is excessively drained, from coarse-loamy supraglacial melt-out till derived from granite and gneiss. The Rawsonville soil component is also well drained, derived from coarse-loamy supraglacial meltout till from mica schist (USDA NRCS 2016). This soil complex extends from the coast line westward past the middle of the property.

The Hogback-Rawsonville-Abram complex with 3 to 15 percent slopes and very stony texture comprises approximately 13.2 percent of the soils in the Howard Cove area. This soil complex occurs on till plains, ridges, and hills. The Hogback soil component is well-drained, derived from coarse-loamy supraglacial melt-out till from mica schist. The Rawsonville soil component is also well-drained, derived from coarse-loamy supraglacial meltout till from mica schist. The Abram soil component is excessively drained, from coarse-loamy supraglacial melt-out till derived from granite and gneiss (USDA NRCS 2016).This soil complex is located in the western portion of the Howard Cove area.

Table 2.3 Howard Cove Area USDA Soil Types, NSA Cutler

Map Unit Symbol	Soil Series	Drainage Class	Farmland Classification (P/S)1	Area (Acres)	Percent Total
HWE	Hogback-Abram-Rawsonville complex, 15 to 60% slopes, very stony	Excessively Drained to Well Drained	–	3.3	86.8
HXC	Hogback-Abram-Rawsonville complex, 3 to 15% slopes, very stony	Excessively Drained to Well Drained	–	0.5	13.2
Total				**3.8**	**100**

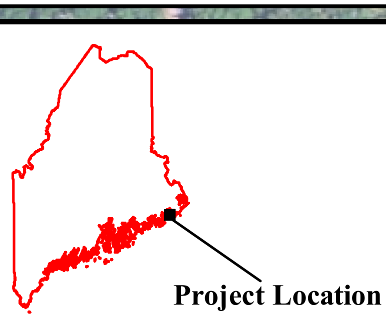
[1]P=Prime Farmland, S=Farmland of Statewide Importance
Source: USDA NRCS 2016

Similar to the VLF area, erosion could be a significant issue, especially in areas along the field road or in areas susceptible to coastal erosion from wave and storm action (such as the eastern edge of the parcel). The primary areas of concern in regard to soil erosion and sedimentation are associated with areas of ground disturbance, or sections of roadways located within 75 ft of existing wetlands and waterbodies.

None of the soils located within the Howard Cove area are considered prime farmland soils, farmland of statewide importance, or hydric soils (USDA NRCS 2016). There are no plans to farm any portion of the Howard Cove area due to its use in support of the military mission of NSA Cutler.

2.4 WATER RESOURCES

Water resources of the Installation described in this section include watersheds and floodplains,



Source:Aerial NAIP, 2015; Navy 2017
Soils: USDA, SSURGO

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LEGEND:

NSA Cutler Howard Cove Parcel Area

USDA Soils Boundaries

Figure 2.9. Howard Cove Parcel Area USDA Soil Types NSA Cutler, Cutler, Maine.

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\\brookside\GIS_SHARE\ENBG\00_Proj\N\NAVFAC\676834INRMPUpdates\Maps\Report\Cutler\Figure_2-9_HCP_Soils.mxd surface waters, wetlands, groundwater, and water quality.

2.4.1 Watersheds and Floodplains

NSA Cutler is located in Hydrologic Unit Code (HUC) Subregion 0105 and Accounting Unit HUC 010500, Maine Coastal, which totals 7,130 square miles and includes the drainage and associated waters extending from Maine's border with New Brunswick, Canada, south to Cape Small, Maine, and includes the St. Croix River Basin within the U.S. (USGS 2016). The Coastal Washington and Hancock Drainage (HUC 01050002) encompasses the area of Maine coast from approximately Rockland north to the Canadian border. Waters associated with NSA Cutler (VLF, HF, and Howard Cove parcels) are part of the Maine Coastal Watershed Roque Bluffs Coastal Hydrologic Unit (HUC 010500020602).

Very Low Frequency Area

Most of the VLF area is not within the 100-year floodplain. However, coastal sections are inundated by 100-year flooding with velocity hazard (wave action) (**Figure 2.10**). The VLF area is subject to tidal fluctuations of approximately 14.5 ft during an average tidal cycle (NCTAMSLANT DET Cutler 2003). A minimum height of -1.97 ft and a maximum height of 15.45 ft were recorded for the period of January–December 2009 (Mobile Geographics 2009). Most of the coastal sections of the VLF area are subject to inundation due to Category 1, 2, 3, or 4 hurricanes at mean high tide (MDACF 2016).

High Frequency Area

The HF area is located within the Huntley Creek watershed and is outside of the 100-year floodplain (**Figure 2.11**). A portion of the HF area is located directly adjacent to Huntley Creek. The low volume of water that typically is associated with this creek does not pose any short-term flood dangers to the HF area. The HF area is not subject to inundation due to Category 1, 2, 3, or 4 hurricanes at mean high tide (MDACF 2016).

Howard Cove Area

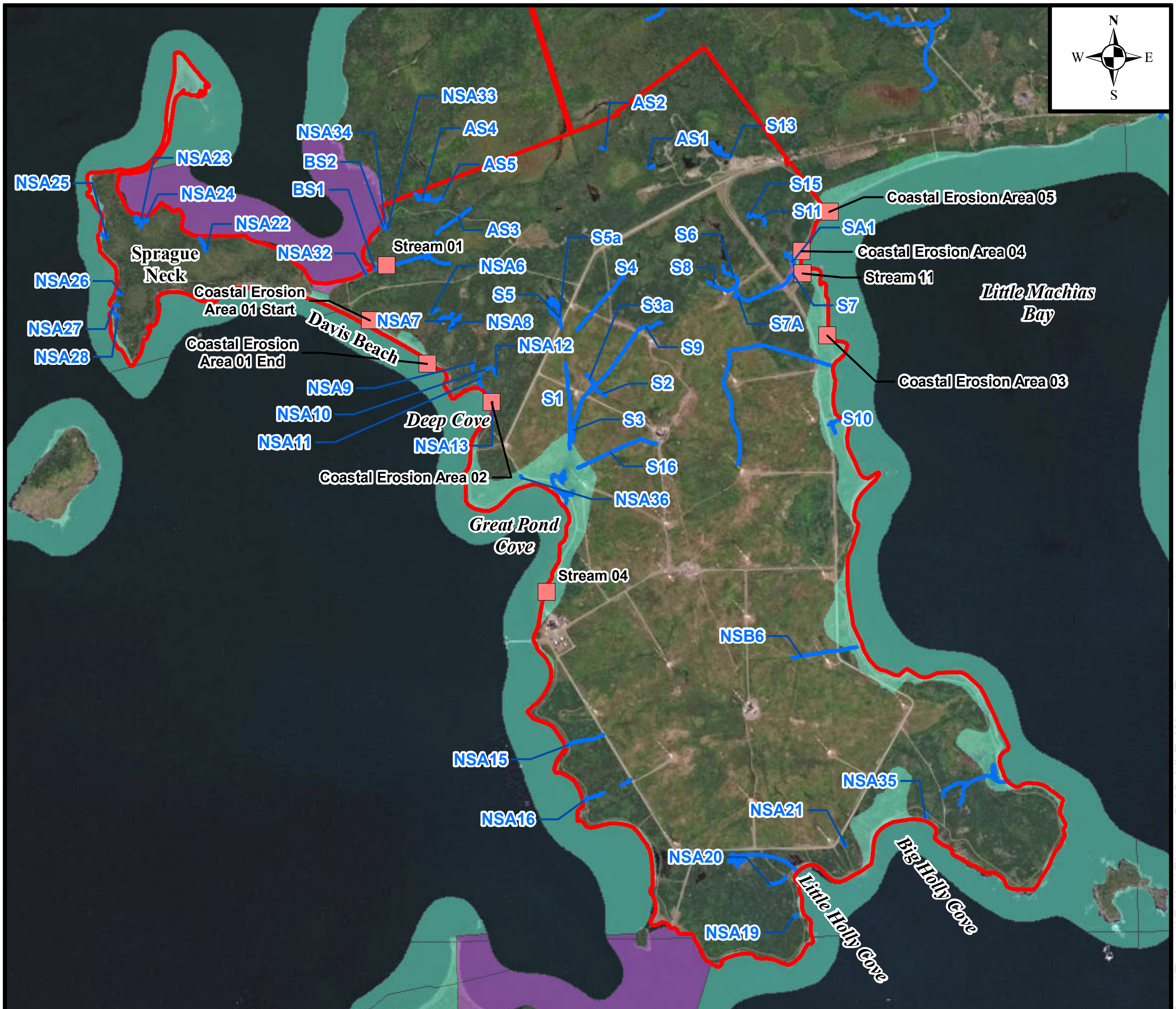
Most of the Howard Cove area is not within the 100-year floodplain. However, the coastal section along the eastern edge is inundated by 100-year flooding with velocity hazard (**Figure 2.12**).

2.4.2 Surface Waters

Surface waters located on and adjacent to the Installation include the Atlantic Ocean, bays, coves, ponds, intermittent drainages, perennial drainages, ephemeral drainages, and ditches. A wetland delineation was conducted within the VLF area and HF area that identified 30,386 linear feet of streams and an additional 15,531 linear feet of ditches (**Figure 2.10** and **Figure 2.11**). These features connect to other aquatic resources inside and outside the Installation. (Tetra Tech, Inc. 2014b). Installation wetlands are described in **Section 2.4.3**.

Very Low Frequency Area

The VLF peninsula is surrounded on three sides by the following ocean waters: Little Machias Bay to the east; Cross Island Narrows, Little Holly Cove, Big Holly Cove, and the Atlantic Ocean to the south; and Holmes and Machias bays to the west. Several natural and built ponds, totaling approximately 34 acres, are located throughout the VLF area (**Figure 2.10**). Several of the ponds of the VLF area are adjacent to, or in proximity to, the VLF perimeter access road, and are natural or were created as a result of blocking drainage patterns along the constructed roads.

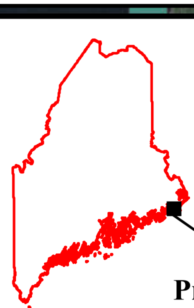


LEGEND:

- NSA Cutler Project Boundary
- Surface Water (Ponds and Streams)
- Problem Areas

FEMA FIRM Zone

- An area inundated by 100-year flooding, for which Base Flood Elevations (BFES) have been determined; IN Special Flood Hazard Area (SFHA).
- An area inundated by 100-year flooding with velocity hazard (wave action); Base Flood Elevations (BFES) have been determined; IN Special Flood Hazard Area (SFHA).



Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS
USGS, NHD

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Feet

Project Area is within USDA NRCS HUC 12 010500020602, Roque Bluffs Coastal.

Figure 2.10. Very Low Frequency Area Water Resources NSA Cutler, Cutler, Maine.

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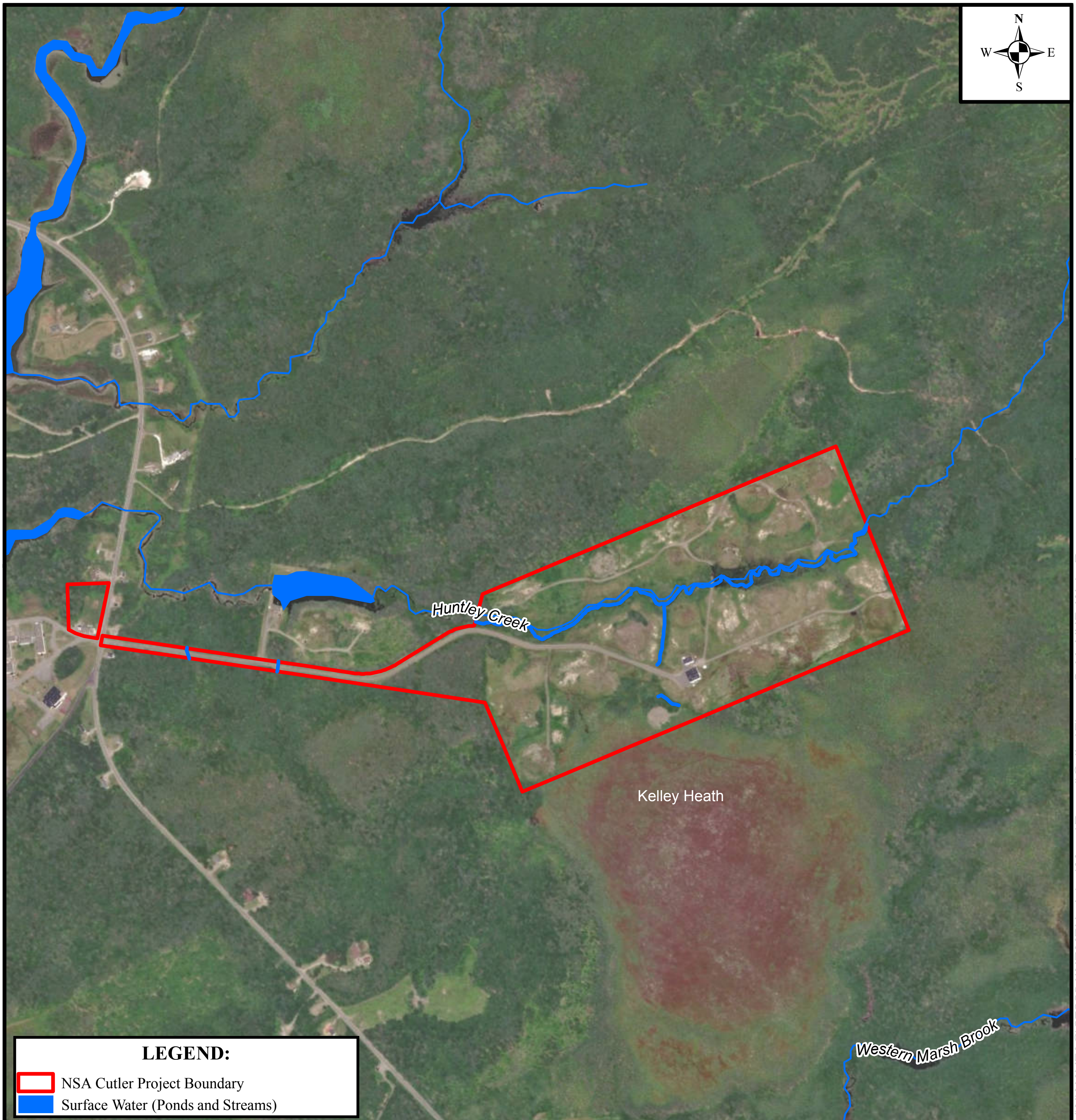

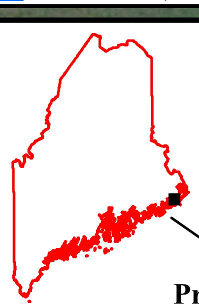

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Feet

Figure 2.11. High Frequency Area Water Resources NSA Cutler, Cutler, Maine.

Source: ESRI, USA Base Map Data;
Navy 2016, 2017,
USGS, National Hydrography Dataset (NHD)

Date:
08/18

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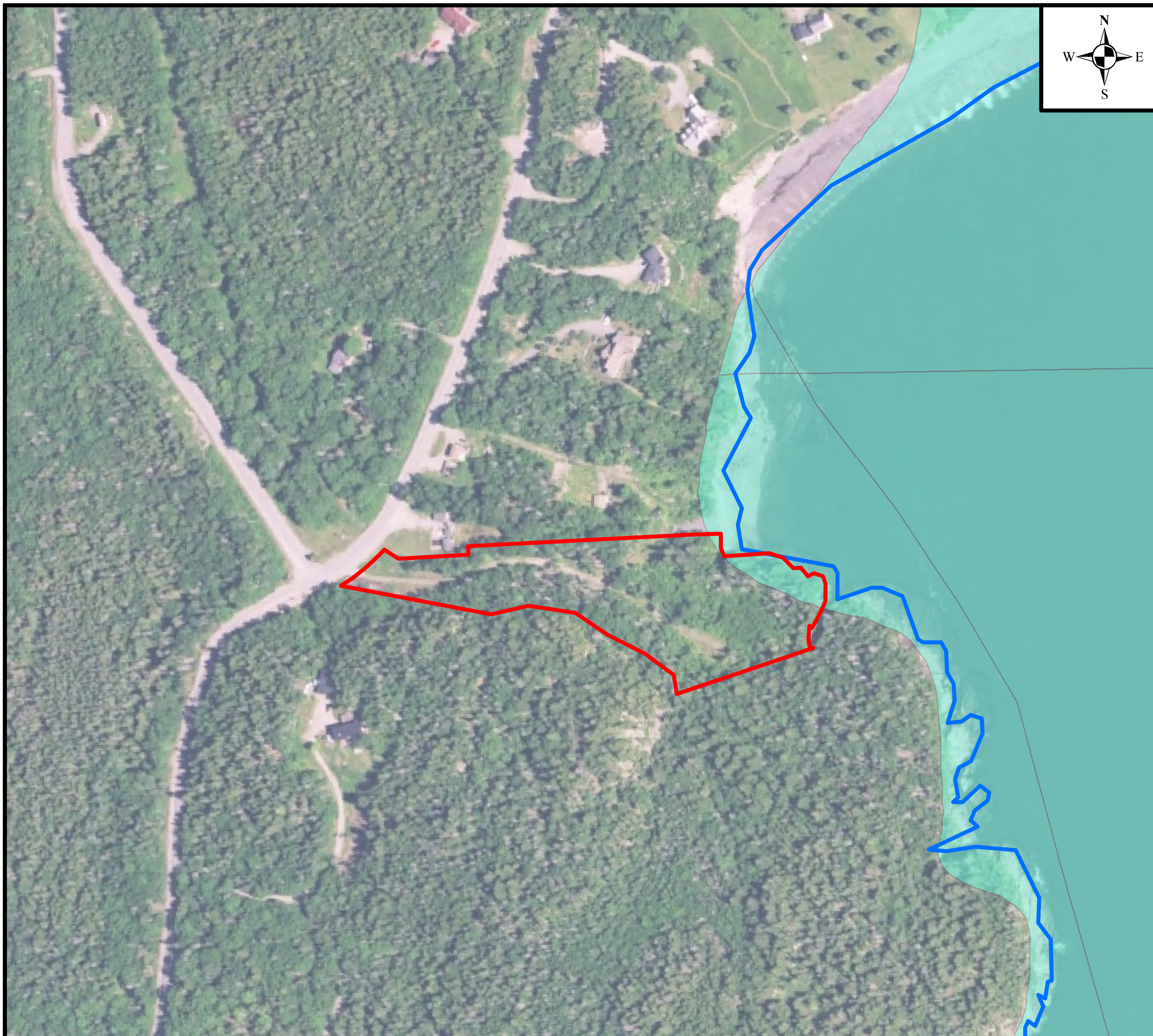


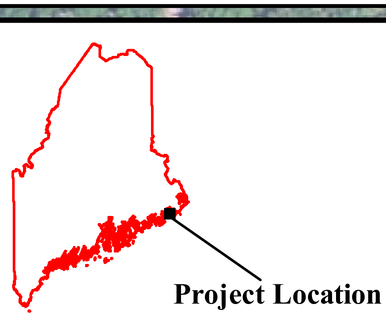
LEGEND:

NSA Cutler Howard Cove Parcel Area

Surface Water (Ponds and Streams)

FEMA FIRM Zone

An area inundated by 100-year flooding with velocity hazard (wave action); Base Flood Elevations (BFES) have been determined; IN Special Flood Hazard Area (SFHA).



Source: Aerial NAIP, 2015; Navy 2017
Maine Office of GIS

Project Area is within USDA NRCS
HUC 12 010500020701,
Machias Bay Frontal Drainagesl.

Figure 2.12. Howard Cove Parcel Area Water Resources
NSA Cutler, Cutler, Maine.

Date:
02/18

In addition, a large complex of natural ponds is located within the gravel pit area, located at the northern end of the VLF area. A series of fire ponds, in the northern section of the VLF area, southwest of the gravel pit, supply a water source to emergency personnel in the event of a fire in the VLF area.

Most of the ponds within the VLF area are small, ranging in size from less than 0.1 acre to approximately 1.8 acres. The largest pond is located on both sides of the perimeter road of the north tower field. This pond periodically receives an influx of salt water during the highest spring tides and storm surges via a culvert that passes under the perimeter road. The tidal influence is relatively minor, as evidenced by the non-halophytic flora observed near the culvert and along the edges of the pond. Another approximately 1.8 acre pond in the southeastern section of the VLF peninsula is inhabited by beavers and contains a beaver lodge.

Ephemeral drainages and constructed drainage ditches associated with roadways occur throughout the VLF area. There are approximately 12 intermittent or perennial channels in the VLF area that drain to the bays or to wetlands. There is a surface water drainage in the north tower field, and several drainages are associated with the beaver pond in the southeastern corner of the VLF peninsula (**Figure 2.10**). Palustrine wetlands are distributed within the VLF area as described in **Section 2.4.3.1**.

High Frequency Area

The HF area is located inland and east of Holmes Bay, within the Huntley Creek watershed (**Figure 2.11**). Huntley Creek traverses the HF area from east to west, discharging into a dammed impoundment located offsite to the west, and north of the HF area access road.

Huntley Creek drains into Holmes Bay after passing under Route 191 to the west of the HF area. Within the HF area, Huntley Creek is approximately 3 to 6 ft wide and water depth ranges from 0.5 to 3 ft. The substrate consists of cobble and gravel, with scattered patches of finer grain material. The velocity of the stream within the HF area is relatively low with mostly runs and glides and a few small riffles. The stream is incised with steep banks that are approximately 2 to 4 ft high and sparsely vegetated with various species of graminoids. The surrounding community type is mixed shrub/grass. Constructed drainages occur along the roadways of the HF area, and palustrine wetlands are distributed within the HF area as described in **Section 2.4.3.1**.

Howard Cove Area

The Howard Cove area is bordered by Howard Cove to the east. A discontinuous perennial stream is located north of the field road in the northern part of the parcel (**Figure 2.12**). A palustrine wetland is located on the eastern side of the parcel at the end of the field road as described in Section 2.4.3.1 (NCTAMSLANT DET Cutler 2014).

2.4.3 Wetlands

Wetlands on the Installation were classified using the USFWS system for the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Wetland delineations were conducted on the VLF and HF areas from 2012 through 2014, and approved by the USACE in 2014. These results are discussed below and include a total of 1,426.75 acres of jurisdictional wetlands (subject to regulation under CWA) with 339 acres determined to be Maine Wetlands of Special Significance (Tetra Tech, Inc. 2014b and USACE 2015). Maps showing the approved preliminary jurisdictional wetlands NSA Cutler are provided in **Appendix E**. Natural community types are described in **Section 2.5**.

2.4.3.1 Palustrine Wetlands

Palustrine wetlands occur throughout NSA Cutler. Many different palustrine wetland classes occur within the VLF and HF areas (**Appendix F**). Palustrine wetlands cover approximately 1,231 acres in the VLF area and 58 acres in the HF area.

Very Low Frequency Area

Based on the information in the preliminary jurisdictional wetland determination, there are four primary wetland types located throughout the VLF area: palustrine scrub shrub (PSS), palustrine emergent (PEM), palustrine forested (PFO), and palustrine unconsolidated bottom (PUB) wetlands (**Table 2.4** and **Appendix F**).

> The **most common wetland** type in the VLF is **palustrine emergent (PEM) wetland** containing some **palustrine scrub shrub wetland (PSS)**, comprising approximately 638 acres.

The most common wetland type is emergent wetland containing some scrub shrub wetland (PEM/PSS). Common species within these wetlands include green alder (*Alnus viridis*), speckled alder (*Alnus incana*), sweetgale (*Myrica gale*), meadow sweet (*Spiraea alba*), sedges (*Carex* spp.), field horsetail (*Equisetum arvense*), bluejoint (*Calamagrostis canadensis*), willows (*Salix* spp.), bulrushes (*Scirpus* spp.), and sensitive fern (*Onoclea sensibilis*). These wetlands comprise approximately 503 acres of the VLF. There are approximately 16 wetlands of this type scattered throughout the VLF tower fields. (Tetra Tech, Inc. 2014b)

The second most common wetland type is forested wetland containing some scrub shrub wetland, emergent wetland, and unconsolidated bottom (pond). Common species within these wetlands include [PFO] spruce (*Picea* sp.), fir, sphagnum, [PSS] alders (*Alnus* spp.), spiraea (*Spiraea* spp.), [PEM] bluejoint, sedges, and cane fruit [*Rubus* spp.]). This wetland type comprises approximately 118 acres of the VLF. This extensive wetland complex extends from the northeastern corner of the VLF area across the Sprague Neck parcel westward to the ocean. (Tetra Tech, Inc. 2014b)

Table 2.4 Very Low Frequency Area Wetlands, NSA Cutler

Wetland Code	Wetland Type	VLF (acres)
Palustrine		
PEM1	Palustrine Emergent, Persistent	637.8
PEM2	Palustrine Emergent, Non-Persistent	
PEM1/PSS1	Palustrine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous	
PEM1/PFO1	Palustrine Emergent, Persistent/ Palustrine Forested, Broad-leaved Deciduous	

Table 2.4 Very Low Frequency Area Wetlands, NSA Cutler

Wetland Code	Wetland Type	VLF (acres)
PEM1/PSS1/PFO1	Palustrine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Forested, Broad-leaved Deciduous	
PEM1/PSS1/PFO1/PUB4	Palustrine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Forested, Broad-leaved Deciduous/ Palustrine Unconsolidated Bottom, Organic	
PSS1	Palustrine Scrub Shrub, Broad-leaved Deciduous	238.7
PSS1/PEM1	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Emergent, Persistent	
PSS1/PEM1/PUB	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Emergent, Persistent/Palustrine Unconsolidated Bottom	
PSS1/PEM1/PSS1	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous	
PSS1/PEM2	Palustrine Scrub Shrub, Broad-leaved Deciduous, Saturated/ Palustrine Emergent Wetland, Non-Persistent	
PSS1/PF01/PEM1/PUB	Palustrine Scrub Shrub, Broad-leaved Deciduous/Palustrine Forested, Broad-leaved Deciduous/Palustrine Emergent, Persistent/Palustrine Unconsolidated Bottom	
PSS1/PUB4/PEM1	Palustrine Scrub Shrub, Broad-leaved Deciduous/Palustrine Unconsolidated Bottom, Organic/ Palustrine Emergent, Persistent	
PFO1	Palustrine Forested, Broad-leaved Deciduous	334.6
PFO1/PSS1	Palustrine Forested, Broad-leaved Deciduous/ Palustrine Scrub Shrub, Broad-leaved Deciduous	
PFO1/PSS1/PEM1	Palustrine Forested, Broad-leaved Deciduous/ Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Emergent, Persistent	
PFO1/PSS1/PEM1/PUB	Palustrine Forested, Broad-leaved Deciduous/ Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Emergent, Persistent/ Palustrine Unconsolidated Bottom	
PFO4	Palustrine Forested, Needle-leaved Evergreen	
PFO4/PEM1/PSS1	Palustrine Forested, Needle-leaved Evergreen/ Palustrine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous	
PFO4/PEM1/PSS1/PUB	Palustrine Forested, Needle-leaved Evergreen/ Palustrine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Unconsolidated Bottom	
PUB with PSS fringe	Palustrine Unconsolidated Bottom / Palustrine Scrub Shrub	20.1

Table 2.4 Very Low Frequency Area Wetlands, NSA Cutler

Wetland Code	Wetland Type	VLF (acres)
PUB3/PSS1	Palustrine Unconsolidated Bottom, Mud/ Palustrine Scrub Shrub, Broad-leaved Deciduous	
PUB3/PEM1/PSS1/PFO4	Palustrine Unconsolidated Bottom, Mud/ Palustrine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Forested, Needle-leaved Evergreen	
Total Palustrine Wetland Area		**1,231.1**
Palustrine/Estuarine/Marine		
PSS1/EAB/EEM1/PUB/PFO1	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Estuarine Aquatic Bed/ Estuarine Emergent, Persistent/ Palustrine Unconsolidated Bottom/ Palustrine Forested, Broad-leaved Deciduous	86.7
PSS1/EEM1/E2US1/M2US1	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Estuarine Emergent, Persistent/ Estuarine Unconsolidated Shore, Cobble-gravel/ Marine Unconsolidated Shore, Cobble-gravel	
PSS1/EEM1/EAB3	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Estuarine Emergent, Persistent/ Estuarine Aquatic Bed, Rooted Vascular	
EAB3/EEM1/PSS1/PFO1/PUB	Estuarine Aquatic Bed, Rooted Vascular/ Estuarine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Forested, Broad-leaved Deciduous/ Palustrine Unconsolidated Bottom	
EEMI/EUS1/PSS1/M2US1	Estuarine Emergent, Persistent/ Estuarine Unconsolidated Shore, Cobble-gravel/Palustrine Scrub Shrub, Broad-leaved Deciduous/ Marine Unconsolidated Shore, Cobble-gravel	
Total Palustrine/Estuarine/Marine Wetland Areas		**86.7**
Estuarine		
E2AB3	Estuarine Aquatic Bed, Rooted Vascular	5.5
EUS1	Estuarine Unconsolidated Shore, Cobble-gravel	
Total Estuarine Wetland Area		**5.5**
Marine		
M2US1/M2RS1	Marine Unconsolidated Shore, Cobble-gravel/ Marine Rocky Shore, Bedrock	45.3
Total Marine Wetland Area		**45.3**
Total Wetland Area		**1,368.7**

The third most common wetland type is emergent wetland. Common species within these wetlands include willows, cattail (*Typha latifolia*), alders, sedges, bulrushes, rushes (*Juncus* spp.), field horsetail, sensitive fern, and bluejoint. This wetland type comprises approximately 96 acres of the VLF. The largest of these wetlands is an approximately 46-acre wetland located north-northwest of the cluster of three radio towers in the northern part of the VLF area. (Tetra Tech, Inc. 2014b)

The fourth most common wetland type is scrub shrub wetland. Common species within these wetlands include alders, tamarack (*Larix laricina)*, paper birch (*Betula papyrifera* var. *cordifolia*), grey birch (*B. populifolia*), quaking aspen (*Populus tremuloides*), spiraea, grasses, sedges, cattails, reeds, and iris. These wetlands comprise approximately 80 acres of the VLF. The largest of these wetlands is an approximately 37-acre wetland located to the north-northeast of the central building. (Tetra Tech, Inc. 2014b)

Forested wetlands and areas that are predominantly forested wetlands with some scrub shrub occupy approximately 61 acres of the VLF area. These include needle-leaved and broad-leaved trees. Common species that occur within forested wetlands on NSA Cutler include black spruce (*Picea mariana*), red maple (*Acer rubrum*), paper birch, balsam fir (*Abies balsamea*), *Spiraea* sp., alders, and *Sphagnum* sp. Forested wetlands are located in several areas of the VLF, primarily in the northern section of the site, which includes areas within the Sprague Neck peninsula, and along or near the coast. The larger stature vegetation, including trees and tall shrubs, occurs within the more lightly managed and unmanaged areas of the VLF area, and mowed herbaceous vegetation and mostly stunted shrubs dominate the heavily managed areas within the VLF tower field. (Tetra Tech, Inc. 2014b)

Palustrine unconsolidated bottom wetlands and those that are predominantly forested wetlands with some scrub shrub (PFO/PSS) occupy only 20 acres of the VLF area. These non-vegetated or sparsely vegetated wetlands are primarily ponds with organic substrates. Many of these wetlands contain submerged aquatic plant species as well as well-developed rooted floating aquatic plant communities dominated by pondweeds. While PUB wetlands are important ecologically for birds, aquatic invertebrates, several mammals, amphibians and vascular plant species diversity, the aerial coverage of these wetlands in the VLF was very low (< 1 percent). (Tetra Tech, Inc. 2014b)

The remaining wetlands have varying compositions of emergent wetlands, scrub shrub wetlands, forested wetlands, or unconsolidated bottoms. In addition, there are wetland complexes that have elements of palustrine wetlands, estuarine wetlands, and marine wetlands. These combination wetland complexes are along the edges of the peninsula. (Tetra Tech, Inc. 2014b)

The wetland delineation identified 1,368.18 acres of wetlands within the VLF area and 1,368.06 acres were confirmed to be jurisdictional wetlands. Approximately 580 acres of the jurisdictional wetlands in the VLF area are mowed and an additional approximately 180 acres are partially mowed (Tetra Tech, Inc., 2014b). Portions of the northeastern corner of the VLF tower field located between the open fields and the paved inner perimeter field were less managed, primarily due to the more rugged topography that occurs in this area.

There are many wetlands, or areas of wetlands, that are categorized as Maine Wetlands of Special Significance (**Appendix F**). Within the VLF area, the Maine Wetlands of Special Significance include approximately 1,106 acres of freshwater wetlands that have one or more of the following characteristics: (1) critically imperiled (S1) or imperiled (S2) community; (2) significant wildlife habitat; (3) location near (within 250 ft) a coastal wetland; (4) aquatic vegetation, emergent marsh vegetation, or open water occurring under normal circumstance in areas of at least 20,000 square feet; (5) wetlands subject to 100-year flood event; (6) peatland wetland or contains peatlands; (7) is within 25 ft of a river, stream, or brook. Significant wildlife habitats present in the VLF area include Tidal Wading Waterfowl Habitat and shorebird areas. VLF has the potential to contain significant vernal pools or deer wintering areas. There are an additional 86 acres of wetlands that are a mixture of palustrine, estuarine, and marine that have one or more of the characteristics above and that are categorized as Maine Wetlands of Special Significance. (Tetra Tech, Inc. 2014b)

There are wetlands in the VLF area that could include rare vegetation communities and that would then meet the critically imperiled or imperiled community characteristic. Such wetlands include the Heath–Crowberry Maritime Slope Bog and the Deer-hair Sedge Bog Lawn. Rare vegetation communities are described in more detail in Section 2.8.

High Frequency Area

Based on the preliminary jurisdictional wetland determination, the three wetland types located throughout the HF area are PSS, PEM, and PFO wetlands (**Table 2.5**).

The most common wetland type is scrub shrub wetland containing emergent wetland. Common species within these wetlands include green alder, speckled alder, willows, meadow sweet, bluejoint, sedges, rushes, and bluejoint. These wetlands comprise approximately 22.3 acres of the HF. There are approximately three wetlands of this type in the HF area. (Tetra Tech, Inc. 2014b)

The second most common wetland type is emergent wetland. Common species within these wetlands includes multiple types of orchids, stunted ericaceous shrubs, green alder, meadow sweet, bluejoint, sedges, and rushes. These wetlands comprise approximately 16.8 acres of the HF area. There are approximately 10 wetlands of this type and they primarily occur along either side of the Huntley Creek. (Tetra Tech, Inc. 2014b)

The third most common wetland type is a wetland complex containing emergent wetland; scrub shrub wetland, needle-leaved and broad-leaved deciduous; and forested wetland, needle-leaved deciduous and needle-leaved evergreen. This wetland is the northern edge of a large raised plateau bog complex, with approximately 11.76 acres of this bog complex within the HF area. The wetland is dominated by stunted ericaceous shrubs, black spruce, black crowberry (*Empetrum nigrum*), cloudberry (*Rubus chamaemorus*), tufted bulrush (*Trichophorum cespitosum*), and more than 90 percent *Sphagnum* spp. cover. It also contains peat soils (histosols) up to 10 ft deep over marine clays. This wetland complex is not mowed. (Tetra Tech, Inc. 2014b) This wetland complex, located along the southern boundary of the HF area, is associated with the 225-acre Kelley Heath, a Coastal Plateau Bog. This rare community type is described in more detail in **Section 2.8**

The remaining wetlands have varying compositions of emergent wetlands, scrub shrub wetlands, and forested wetlands. (Tetra Tech, Inc. 2014b)

The wetland delineation identified 58.12 acres of wetlands within the HF area and all were confirmed to be jurisdictional. Approximately 39 acres of the jurisdictional wetlands in the HF area are mowed and an additional approximately one acre is partially mowed (Tetra Tech, Inc. 2014b).

There are many wetlands, or areas of wetlands, that are categorized as Maine Wetlands of Special Significance (**Appendix F**). Within the HF area, the Maine Wetlands of Special Significance include approximately 46.4 acres of freshwater wetlands that have one or more of the following characteristics: 1) critically imperiled (S1) or imperiled community (S2); 2) significant wildlife habitat; 3) peatland wetland or contains peatlands; and 4) is located within 25 ft of a river, stream, or brook. Significant wildlife habitat in the HF area is Inland Wading Waterfowl Habitat. (Tetra Tech, Inc. 2014b)

Table 2.5 High Frequency Area Palustrine Wetlands, NSA Cutler

Wetland Code	Wetland Type	HF (acres)
PEM1	Palustrine Emergent, Persistent	30.9
PEM1/PSS1	Palustrine Emergent, Persistent/Palustrine Scrub Shrub, Broad-leaved Deciduous	
PEM1/PSS2	Palustrine Emergent, Persistent/Palustrine Scrub Shrub, Needle-leaved Deciduous	
PEM1/PSS1/PSS2/PFO4/PFO2	Palustrine Emergent, Persistent/ Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Scrub Shrub, Needle-leaved Deciduous/Palustrine Forested, Needle-leaved Evergreen/ Palustrine Forested, Needle-leaved Deciduous	
PFO2/PFO4	Palustrine Forested, Needle-leaved Deciduous/ Palustrine Forested, Needle-leaved Evergreen	3.5
PF04 with PSS inclusion	Palustrine Forested, Needle-leaved Evergreen/ Palustrine Scrub Shrub	
PSS1	Palustrine Scrub Shrub, Broad-leaved Deciduous	23.7
PSS1/PEM1	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Emergent, Persistent	
PSS1/PFO2	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Forested, Needle-leaved Deciduous	
PSS1/PSS2	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Scrub Shrub, Needle-leaved Deciduous	
PSS1/PSS4	Palustrine Scrub Shrub, Broad-leaved Deciduous/ Palustrine Scrub Shrub, Needle-leaved Evergreen	
PSS4/PEM1	Palustrine Scrub Shrub, Needle-leaved Evergreen/ Palustrine Emergent, Persistent	
Total		**58.1**

Howard Cove Area

One small palustrine emergent wetland occurs in a small cleared area in the Howard Cove Area. This wetland has not been delineated or assessed by the USACE. This wetland is dominated by cottongrass bulrush (*Scirpus cyperinus*), lamp rush, sensitive fern, wrinkle-leaf goldenrod, and steeplebush (*Spiraea tomentosa*) (NCTAMSLANT DET Cutler 2014).

2.4.3.2 Estuarine and Marine Wetlands

Estuarine and marine intertidal wetlands occur between the normal high tide and normal low tide levels and only occur in the VLF area at NSA Cutler.

Very Low Frequency Area

The estuarine intertidal aquatic bed wetland with rooted vascular plants was a small marsh area with alders along the shore. The estuarine intertidal unconsolidated shore wetland was characterized by a cobble-gravel intertidal beach with narrow bands of salt marsh vegetation. These wetlands cover approximately 6.8 acres in the VLF area. (Tetra Tech, Inc. 2014b)

There are wetland complexes, briefly touched on in the palustrine section, that have elements of palustrine wetlands, estuarine wetlands, and marine wetlands which are along the edges of the peninsula. These dynamic wetland complexes cover approximately 85.4 acres in the VLF area and are dominated by a variety of species. The palustrine portions of these wetland complexes include narrow leaf cattail, alders, meadow sweet, sensitive fern, and species of Sphagnum. The estuarine portions include saltmarsh bulrush (*Bolboschoenus robustus*), saltmarsh spike rush (*Eleocharis parvula*), chaffy sedge (*Carex paleascea*), arctic rush (*Juncus arcticus*) and seaside arrow grass (*Triglochin maritima*). The marine portions include seaside crowfoot (*Ranunculus cymbalaria*). (Tetra Tech, Inc. 2014b)

The marine intertidal unconsolidated shore, cobble-gravel and marine intertidal rocky shore, bedrock wetlands are the intertidal marine areas between the highest average tide line and the Installation boundary. These areas include approximately 45.29 acres of wetlands along the VLF shoreline. (Tetra Tech, Inc. 2014b)

High Frequency Area

No marine or estuarine tidal wetlands are associated with the HF area.

Howard Cove Area

No marine or estuarine tidal wetlands are associated with the Howard Cove area.

2.4.4 Riparian Habitat

Riparian habitat is characterized as the land and vegetated zone that forms the interface between terrestrial and aquatic ecosystems (USDA NRCS 1996). Typically, these areas are associated with the banks and margins of streams and rivers; however, this term has expanded in recent years to include areas located adjacent to all waterbodies, including lakes, ponds and wetlands. Riparian habitat at the Installation occurs along the small ponds, streams, and wetland areas of the VLF area, in areas along Huntley Creek at the HF area, and along the unnamed tributary at the Howard Cove area. The riparian habitat of the Installation is mostly comprised of low growing grasses and shrubs, with few trees.

2.4.5 Groundwater

The primary types of groundwater aquifers within Washington County are consolidated bedrock aquifers, consisting of crystalline rocks (USGS 1995). Although these types of aquifers are not considered major productive aquifers in relation to the major aquifer systems located throughout New England and New York, they are important sources of domestic water supply, especially where other major groundwater aquifers or sources of surface water are not present. Well yields typical of crystalline rock aquifers range from 2 to 10 gallons per minute, which generally only are adequate for domestic, and small commercial or public, water supplies, although some wells have exceeded 500 gallons per minute (USGS 1995). Groundwater is the source of drinking water for the Installation.

Water quality in the major aquifers of the area is considered suitable for human consumption; however, water quality differs among aquifers due to natural conditions and human activities. Water quality is affected by mineral composition and solubility of rocks that surround the aquifer and the time the water is in contact with the rock (USGS 1995). Water quality of an aquifer also can be affected by the amount of surface area that is exposed to rock, the chemistry of the water moving into the aquifer from other aquifers, and introduction or induced movement of contaminants. The concentration of dissolved solids in groundwater generally increases with depth, with some aquifers containing saltwater or brine within their deepest sections. Crystalline aquifers consist of almost insoluble igneous and metamorphic rock that is characterized by shallow fracture systems that store and transmit water. This shallow fracture system allows only minimal dissolution of rocks due to the rapid water movement along short flow paths (USGS 1995).

2.4.6 Water Quality

No water quality data were available for waterbodies on the Installation for inclusion in this INRMP. Erosion has the greatest potential to impact water quality at the Installation.

Very Low Frequency Area

NSA Cutler operates under a 2016 Maine Pollutant Discharge Elimination System (MPDES) Permit (expires June 10, 2021) to discharge up to 150,000 gallons per day (GPD) of cooling waters associated with the VLF power plant (MDEP 2016). Wastewater, including contact and non-contact cooling water, boiler blowdown, air compressor waters, waste from a reverse osmosis unit, and other miscellaneous non-process waste wasters, as well as stormwater and groundwater, are discharged into Machias Bay via Outfall 001 located in the VLF area. Quarterly water quality sampling at this outfall is required under the 2016 MPDES (MDEP 2016). Outfall 003 is authorized to discharge non-contact cooling waters associated with an emergency generator into Machias Bay. Daily water quality sampling during a discharge event at this outfall is a requirement of the MPDES permit (MDEP 2010).

A streambank assessment in the VLF area identified areas experiencing active erosion (problem areas) and areas that, if not stabilized, have the potential for erosion to occur (potential problem areas). The streambank and coastline assessment identified three streams and five coastline segments as problem areas or potential problem areas that could negatively affect water quality (See **Figure 2.10**). Streams identified as having problem or potential problem areas were tidally influenced and were located along the east side of Alley's Flat Road, the east side of Hudson Boulevard, and the west side of Ridge Road.

The coastlines identified as problem or potential problem areas were located south of Sprague's Neck Road, along Deep Cove, and the northeast side of Little Machias Bay. Along Sprague's Neck Road, periodic high storm surge events have resulted in severe scouring of portions of Bay View Road. Erosion along Deep Cove has resulted in slumping of roadside fill on the west side of Bay View Road. Erosion along the northeast side of Little Machias Bay has resulted in the loss of vegetative cover with the potential to threaten the stability of Fog Harbor Road and to contribute to slumping of roadside fill on the east side of Fog Harbor Road (Tetra Tech, Inc. 2013).

Maine has surface water classifications for estuarine and marine waters. The receiving waters of Machias Bay, including Holmes Bay and Little Machias Bay, are classified as Category 5B-1(a), which are estuarine and marine waters impaired for bacteria and requiring a total maximum daily load report. The waters are impaired due to elevated fecal indicators and most, with the exception of a portion of Little Machias Bay, are classified as Class SB, which is a general purpose water that is managed to attain good quality water and can receive discharge of well-treated pollutants with ample dilution. A portion of the waters of Little Machias Bay are classified as Class SA, which is an outstanding natural resource into which direct discharges of pollutants is not allowed.

High Frequency Area

No MPDES permits are associated with the HF area. Water quality data for Huntley Creek were not available at the time this INRMP was prepared.

Howard Cove Area

No MPDES permits are associated with the Howard Cove area. Water quality data for the unnamed perennial creek was not available at the time this INRMP was prepared.

2.4.7 Nearshore Environment

The Navy's nearshore areas, as defined in DoDI 4715.03 and OPNAVINST 5090.1D for natural resources management, include all submerged lands titled to the Navy and all other submerged lands that are adjacent to the installation that extend from the mean high water level, offshore to the boundary of any secure areas that are controlled by the Navy.

The VLF area is surrounded on three sides by estuarine and marine waters. The Howard Cove parcel is bounded by marine waters on the west. NSA Cutler does not have any secured submerged land areas.

A biological and nearshore survey utilizing side scan sonar and underwater imagery characterized and identified the nearshore environment within 820 ft (250 meters) of the VLF area. Cutler's nearshore environment is representative of a healthy Maine ecosystem with good water quality with a high concentration of total suspended solids and a variety of habitat types. The side scan sonar imagery determined dominant primary and secondary habitats within the subtidal areas to comprise rock outcrops, smooth sediment and vegetation cover. The nearshore surface composition reflected 51 percent hardbottom with submerged aquatic vegetation (SAV), 37 percent sand, 6 percent mud, 4 percent SAV, and 2 percent gravel. During the spring, the percentage of silt and clay size was 69.92 percent, and in the summer it was 74.74 percent. Seven different bottom types were observed and characterized, and one SAV area, eight different types of vegetation, four organisms and a metal bar and lobster pot were identified. See **Table 2.6** for details (Tetra Tech, Inc. 2016d).

2.5 VEGETATION

The three parcels associated with NSA Cutler are in the Laurentian Mixed Forest Province of the Warm Continental Division, within the Humid Temperate Domain Ecoregion of the U.S. (Bailey 1995). This transitional province grades between boreal forest and broadleaf deciduous forest and is a mixture of deciduous and coniferous forest types. The Installation is within the Fundy Coastal and Interior Section, and the Maine Eastern Coastal Subsection of the Province, in which forest vegetation is predominately spruce-fir and maple-beech-birch community types (USDA 2005). Although the Maine Eastern Coastal Subsection predicts the forest composition to include maple-beech-birch, the Installation contains no sugar maple (*Acer saccharum*) or American beech (*Fagus grandifolia*).

Table 2.6 Habitat and Biological Characteristics Observed in Underwater Imagery, NSA Cutler

Bottom Types
Rocky outcrop
Sandy bottom
Gravel with oyster shells
Mussel bed
Cobble
Boulder
Silt bottom with shell hash (including mussel and scallop shells)
SAV
Eelgrass (*Zostera* sp.)
Other Vegetation
Seaweed (*Gracilaria* sp.)
Sea lettuce (*Ulva* sp.)
Coralline algae
Kelp (some with urchin holes)
Dulse (*Palmaria* sp.)
Bladder wrack (*Fucus* sp.)
Purple laver (*Porphyra* sp.)
Live rock (*Lithothamnion* sp.)
Organisms
Sponge (*Halichondria* sp.)
Mussels (*Mytilus* sp.)
Bryozoans
Boreal topsnail (*Calliostoma occidentale*)
Other
Metal or wood bar with drilled holes
Lobster pots

Source: Tetra Tech, Inc., 2016d

The vegetation types described in this section were determined to occur at NSA Cutler through a combination of desktop research, interviews with local and regional experts, and field surveys. Rare plant species associated with the Installation are discussed in **Section 2.7.1**. Nearly 500 plant species have been identified for NSA Cutler, including 87 species that are considered nonnative (**Appendix G**).

The residual natural vegetation cover of the Installation primarily consists of spruce-fir forests, open peatlands, and spruce-dominated forested wetlands. Examination of pre-development aerial photographs indicated that the developed sections of the Installation were formerly covered by similar vegetative communities. The Installation is within a band of boreal forest that extends southwest along the Maine coast into northern Hancock County, after which it extends along outer islands into Knox County. The most abundant birch is mountain paper birch, with gray birch occurring in disturbed soils in both upland and wetland areas. Yellow birch (*Betula alleghaniensis*) occurs but is uncommon in the Sprague Neck area.

A timber cruise in November 2014 by Prentiss & Carlisle Management Company (PCMC) estimated the timber volume on forested acres on the VLF and HF areas (PCMC 2015). The study covered 3,016 acres, which included 494 forested acres.

2.5.1 Upland Natural Communities

Maine Natural Areas Program (MNAP) has developed a classification system for Maine's natural community types. This classification includes 98 distinct community types that are described in *Natural Landscapes of Maine* (Gawler and Cutko 2010). The descriptions of the natural community types that occur on NSA Cutler generally follow the MNAP classification system.

Very Low Frequency Area

The vegetation of NSA Cutler VLF area is typical of what is generally associated with this area of Downeast Maine. An exception is the large, maintained grassland area, which makes up a majority of the VLF area. This area provides suitable habitat for a number of plant and wildlife species, including grassland birds. Several of these species are rare, threatened endangered, or species of special concern, and are described in **Section 2.7**.

The predominant community type at NSA Cutler is Mixed Maritime Spruce-Fir Forest (**Table 2.7**). Other community types that occur on the Installation include Managed Grassland, Crowberry-Bayberry Headland, Green Alder Shrub Thicket, Green Alder/Spruce Shrub Thicket, Upper Beach, Altered Land, and Maritime Spruce-Fir Forest (Immature). These communities, as well as approximately 29 acres of undetermined community type, are presented in the community type maps provided in **Appendix E**.

Maritime Spruce-Fir Forest

The mature stands of Maritime Spruce-Fir Forests are dominated by red spruce (*Picea rubens*), balsam fir, hybrid spruce (*Picea rubens* x *P. mariana*), white spruce (*Picea glauca*) with lesser amounts of mountain paper birch, yellow birch, mountain ash (*Sorbus americana*), and black spruce. Successional spruce-fir forest is also present, and is dominated by mountain paper birch, mountain ash, balsam fir, and red spruce.

Managed Grasslands

The second most abundant upland community type is managed grasslands. This community is dominated by numerous grass species (*Calamagrostis canadensis*, *Poa compressa*, *Danthonia spicata*, *Festuca rubra*) and rushes (*J. effuses, J. buffonius, J. balticus*). Common forbs that occur within this community include goldenrods (*Solidago* spp.) and three-toothed cinquefoil (*Sibbaldiopsis tridentata*) and common shrubs include lowbush blueberry (*Vaccinium angustifolium*), green alder (*Alnus viridis*), and black crowberry. Managed grasslands occur within the central portion of the VLF area in the tower fields. The managed grassland community is mowed on a regular basis and is interspersed within emergent wetland.

Crowberry-Bayberry Headlands

The crowberry-bayberry headland community occurs along the immediate coast and is characterized by a predominance of rock outcrop. Vegetation is present but sparse.

Table 2.7 Upland Vegetation Community Types, NSA Cutler

Upland Community Type	Area (acres)
VLF Area	
Mixed Maritime Spruce-Fir Forest	432
Managed Grasslands	322
Crowberry-Bayberry Headland	120
Green Alder Shrub Thicket	77
Green Alder/Spruce Shrub Thicket	70
Upper Beach	33
Altered Land	15
Maritime Spruce-Fir Forest (Immature)	8
Undetermined	29
Total Upland Area	**1,106**
HF Area	
Altered Land	34
Total Upland Area	**34**

Common species include black crowberry, lowbush blueberry, cancer root (*Conopholis americana*), seaside goldenrod (*Solidago sempervirens*), silver rod (*Solidago bicolor*), three-toothed cinquefoil, Hooker's iris (*Iris setosa* var. *canadensis*), roseroot sedum (*Rhodiola rosea*), glaucous bluegrass (*Poa glauca*), and seaside plantain (*Plantago maritima*).

Green Alder Shrub Thicket

This community is dominated by green alder. Other common species include meadowsweet (*Spiraea* sp.), willows, witherod (*Viburnum nudum* var. *cassinoides*), scattered gray and mountain paper birches, mountain ash, bluejoint, flat-topped white aster, cinnamon fern (*Osmunda cinnamomea*), and rough-stemmed goldenrod (*Solidago rugosa*). Scattered red and white spruce and balsam fir are present. Shrubs typically are dense and meadowsweet tends to be very robust (up to 8 feet (2.5 meters [m]) tall). Large anthills covered with grasses are common and provide forage for deer. This community type has developed in response to a long history of prescribed burns that occurred on the tower field for managing unwanted vegetation.

Green Alder / Spruce Shrub Thicket

This community is similar to the previous community but contains 25 to 50 percent cover by red, black, and white spruce trees that are between 6.5 to 26 feet (2 and 8 m) tall. This community occurs in areas with higher water tables and somewhat poorly drained soils and contains more wetland inclusion. Mountain ash, witherod, willows, speckled alder, and mountain paper birch are more abundant.

Upper Beach

The name of this community refers to its physical position within the landscape. Vegetation is generally sparse within this community and the species that dominate are tolerant of constant salt spray, course soils, and desiccating winds. The dominant species within the upper beach zone at NSA Cutler include seaside angelica (*Angelica lucida*), Scotch lovage (*Ligusticum scoticum*), beach pea (*Lathyrus japonicus*), rough-stemmed goldenrod, yarrow (*Achillea millefolium*), and harlequin blueflag (*Iris vesicular*).

Altered Land

Altered land includes largely non-vegetated areas such as gravel pits, antenna pads, roads, buildings, and other areas that have been cleared to accommodate for development.

Undetermined

Areas on the community type map that are designated as "Undetermined" could not be accurately assessed on aerial photographs and were not ground-truthed due to time constraints or because they were difficult to access.

High Frequency Area

The only upland community type identified in the HF area is Altered Land (**Table 2.7** and **Appendix E**). Altered land is associated with the tower and building locations, as well as paved and unpaved roads that traverse the HF area (34 acres).

Howard Cove Area

The upland community types in the Howard Cove area are Altered Land and Undetermined. Altered land is associated with the unpaved road that traverses much of the site from east to west. While there has been no assessment to determine the community type, vegetation is primarily upland forest containing balsam fir, red maple, paper birch, striped maple (*Acer pensylvanicum*), pin cherry (*Prunus pensylvanica*), and false spiraea (*Sorbaria sorbifolia*) (NCTAMSLANT DET Cutler 2014).

2.5.2 Wetland Natural Communities

Wetland community types for the VLF and HF areas are described in **Section 2.4.3**, and wetland and community type maps are provided in **Appendix E**. Both the VLF area and HF area contain examples of Coastal Plateau Bogs. In the VLF area the Coastal Plateau Bogs are located north of the perimeter road, and in the HF area the Coastal Plateau Bog habitat is associated with the Kelley Heath that extends inside the site boundary (Tetra Tech, Inc. 2014b). Coastal Plateau Bogs are described in more detail in **Section 2.8**.

Very Low Frequency Area

Non-tidal wetland communities that occur within the VLF area include wet meadows dominated by herbaceous plants, speckled alder–dominated thickets, and peatlands. Plant species that that occur in these communities are listed in **Section 2.4.3**. The five peatlands within the VLF area include examples of rare natural communities including Heath-Crowberry Maritime Slope Bogs and Deer Hair Sedge Meadow.

High Frequency Area

Non-tidal wetland communities of the HF area are limited to emergent meadow and scrub shrub wetlands that are dominated by herbaceous plants, sphagnum, and ericaceous species. Plant species that that occur in these communities are listed in **Section 2.4.3**. The dominant peatland habitat of the HF area includes the scrub shrub habitat that is associated with the Kelley Heath, of which approximately eight acres of wetlands extends into the HF area from the south.

Howard Cove Area

Non-tidal wetland communities of the HF area are limited to one emergent wetland that is dominated by cottongrass bulrush, lamp rush, sensitive fern, wrinkle-leaf golden rod, and steeplebush (NCTAMSLANT DET Cutler 2014).

2.5.3 Forest Inventory

The estimated timber volume on the 494 acres of forested land was 15 cords per acre in the forested areas of the VLF and HF areas, with young hardwood stands and wet mixed hardwood/pine stands (encompassing only 18.2 acres of forest) having less harvestable timber (**Figure 2.13**; **Table 2.8**). The majority of the forested land on the installation is mixed hardwood/pine. Typical harvestable hardwood species include birch, maple and aspen. The softwood forested areas consist of spruce, fir and larch, with some birch included in these areas as well (PCMC 2015).

Table 2.8 Overall Forest Types and Acreages at VLF and HF Areas

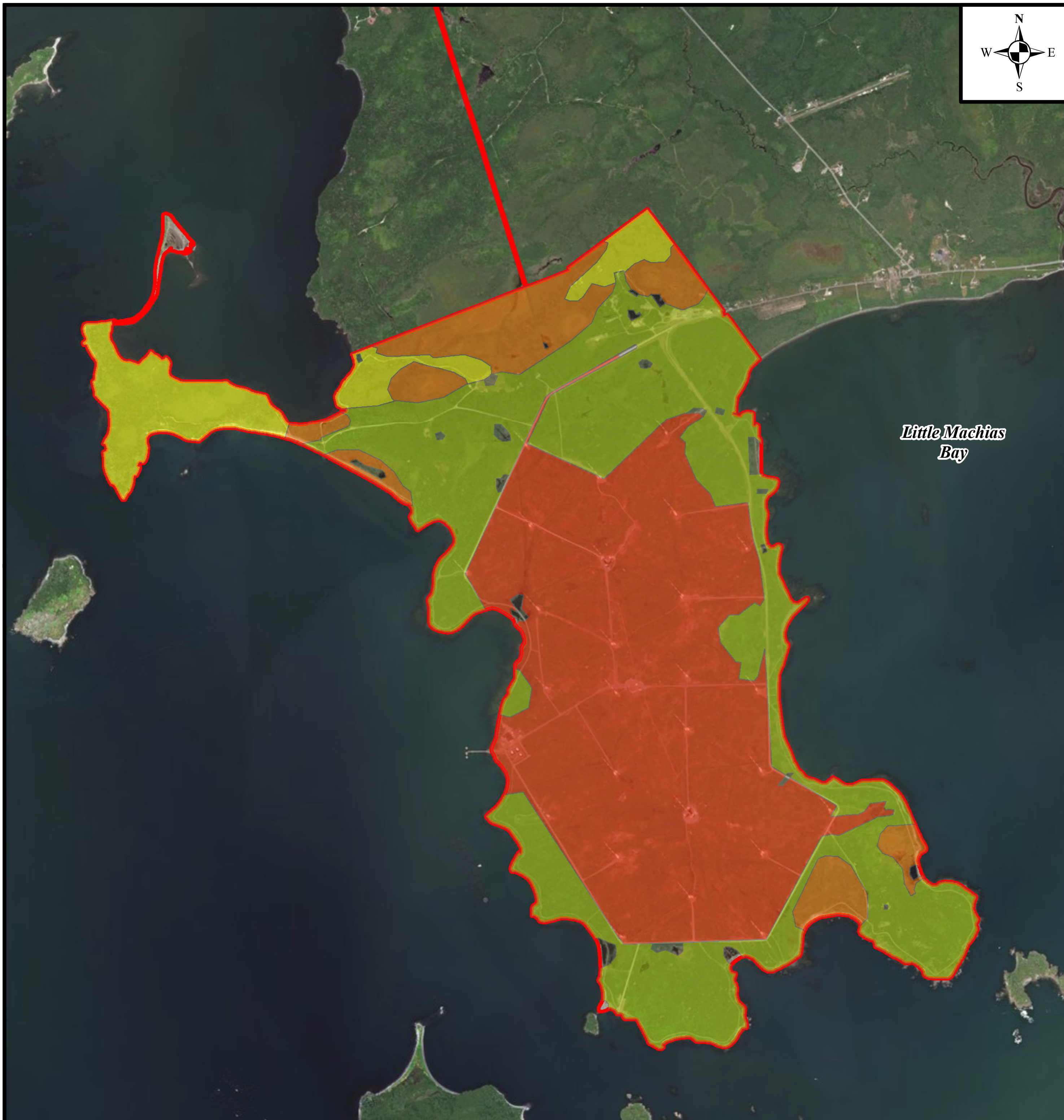
Forest Type	Acres
Hardwood	23.7
Upland Mixed Hardwood/Pine	313.4
Wet Site Mixed Hardwood/Pine	9.2
Upland Softwood	96.2
Wet Site Softwoods	51.8

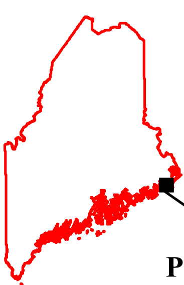
Source: PCMC 2015

A forest inventory has been conducted and acreage within cover type as well as the product level by species is described below and shown in **Table 2.9 and Table 2.10.** Timber volume was calculated by measuring the tree diameters at breast height and graded by eight-foot sections to a four-inch diameter using the following grading specifications:

- Stand Composition (classification code)
    - Softwood (S)
    - Mixedwood (M)
    - Hardwood (H)
    - Cedar (CS)
- Volume Class (classification code)
    - 0 cords/acre (0)
    - 0 – 5 cords/acre (1)
    - 5 – 15 cords/acre (C)
    - 15+ cords/acre (B)

197 sample plots of 2.5 acres were measured. The results of the timber cruise were 15.0 cords per acre with a standard error of +/- 6.75%. (PCMC 2015).





Project Location

Source: ESRI, USA Base Map Data; Navy 2016, 2017

0 3,000 6,000

Feet

LEGEND:

NSA Cutler Project Boundary

Coniferous Mixed Forest

Grassland and Low Shrub

Peat Land

Shrubland and Open Forest

Figure 2.13. Very Low Frequency Forest Areas NSA Cutler, Cutler, Maine.

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Table 2.9 Acreage Within Cover Type

Forest Type	Cords/ Acre	Acres	Softwood Cords/Acre	Hardwood Cords/Acre	All Cords/Acre
Hardwood	15+	14.7	1.97	7.60	9.56
Hardwood	5 – 15	9.0	3.01	8.95	8.95
Mixed	15+	313.4	9.31	12.21	12.21
Mixed (wet condition)	5 – 15	9.2	3.21	3.21	3.21
Softwood	15+	96.2	22.37	25.16	25.16
Softwood (wet condition)	15+	51.8	17.54	17.96	17.96
	Total	**494.3**	**12.27**	**2.76**	**15.03**

Source: PCMC 2015

Table 2.10 Product Level by Species, NSA Cutler

Species	Veneer	Sawlogs (mbf)	Tie/Pallet (mbf)	Boltwood (cords)	Growing Stock (cords)	Pulpwood (cords)	Total (cords)
Spruce	0	531	0	0	936	1,151	3,387
Fir	0	204	0	0	377	1,152	2,037
Larch	0	5	0	0	111	512	636
Total Softwoods	**0**	**740**	**0**	**0**	**1,424**	**2,816**	**6.060**
W Birch	0	4	5	46	122	864	1,055
SF Maple	0	2	1	0	0	66	72
Aspen	0	0	0	0	31	169	200
Other	0	0	0	0	0	37	37
Total Hardwoods	**0**	**6**	**6**	**46**	**153**	**1,136**	**1,364**
Total	**0**	**746**	**6**	**46**	**1,577**	**3,952**	**7,424**

Source: PCMC 2015
mbf = thousand board foot

2.5.4 Forest Insects and Disease

No evidence of forest insect or disease damage has been found in the forests at NSA Cutler. However, based on the composition of the Installation forests, several insects or diseases have been identified that could damage existing forest resources. Potential forest insect pests include spruce budworm (*Choristoneura fumiferana*), forest tent caterpillar (*Malacosoma disstria*), eastern tent caterpillar (*Malacosoma americanum*), balsam woolly adelgid (*Adelges piceae*), spruce beetle (*Dendroctonus rufipennis*), and larch sawfly (*Pristiphora erichsonii*). (Tetra Tech, Inc. 2015).

Potential forest diseases include root rot, which can be caused by a variety of fungi; European larch canker (*Lachnellula willkommii*); and beech bark disease caused by fungi (*Nectria coccinea* or *Nectria galligena*). (Tetra Tech, Inc. 2015)

Additional details on each disease are provided below:

- Root Rot: Enters through wounded lower parts of a tree or directly penetrates the roots. This woody decay disease is caused by Basidiomycota fungi that kills the cambium at the root collar. Most of the fungi attacks the roots and then attacks the cambium of woody older roots. Balsam fir is highly susceptible to root rot. Other trees in the area are also susceptible to the disease through the expanding mycelium. (Tetra Tech, Inc. 2015)
- European Larch Canker: This disease has the ability to affect all species of *Larix* and *Pseudolarix*. This disease forms cankers on branches in bark of young and mature trees and primarily on the stems of younger trees. The canker area will exude resin with a white fruiting structure which is how the spores are spread. (Tetra Tech, Inc. 2015)
- Beech Bark Disease: The discovery of the beech scale (*Cryptococcus fagisuga*) occurred in 1890. This insect has the ability to cause significant mortality and defects in the American beech (*Fagus grandifolia*) (Houston and O'Brien, 1998). The beech scale helps introduce the Nectria pathogen into the bark of beech trees. A sign of infection is a white wax secreted from the trunk of the tree. The tree will become weak from insects feeding on the bark cells, but the most devastating damage is from the fungal infection. (Tetra Tech, Inc. 2015)

2.5.5 Invasive Species

Introduced plant species are nonindigenous species that do not naturally occur within the region, and that have either accidentally or purposefully become established. While not all introduced species become invasive, many introduced species that become established outside of their native area are not subject to normal predation pressures, and will spread, often times forcing out or replacing native species. Invasive species are those that persist, proliferate, and cause economic or environmental harm (Ecological Society of America 2004).

Invasive terrestrial plant species surveys were performed on the VLF and HF areas in 2013 and 2015. The survey was conducted during flowering season from existing roads and trails. The 2015 survey revisited the 2013 survey locations to document population changes and the data were used to develop a five-year (2016 to 2020) invasive terrestrial plant species management plan. **Section 3.1.4** addresses management of invasive species (Tetra Tech, Inc. 2016b).

Very Low Frequency Area

Seven introduced plant species have been identified as occurring at the VLF: reed canary grass (*Phalaris arundinacea*), Japanese knotweed (*Polygonum cuspidatum*), ornamental jewelweed (*Impatiens glandulifera*), spotted knapweed (*Centaurea maculosa*), Canada thistle *(Cirsium arvense)* and bittersweet nightshade (*Solanum dulcamara),* and common reed (*Phragmites australis*). Reed canary grass was identified within the disturbed areas along the south side of the road leading to Sprague Neck, within artillery area near the IRP sites, and in areas along the tower field. Japanese knotweed was identified in two small areas plus a larger population along Sprague

Neck Road. This species has not spread since the construction of the facility and is not known to spread readily in eastern Maine (Famous 2010a). A small area of ornamental jewelweed was identified on Sprague Neck Road and is considered a valuable late summer food for migrating hummingbirds. Common reed is known to occur in a few small areas in and around the tower field peninsula.

Similar to the 2013 survey, the 2015 survey focused on six target species but only identified four of the six species. Purple loosestrife (*Lythrum salicaria)* and Russian olive (*Elaeagnus angustifolia)* were not identified within either area of the installation in 2015. Most invasive species were identified in the northern portions of the VLF area, except for the common reed, which was found near the center of the South Tower Field (Tetra Tech, Inc. 2016b).

A population of common reed occurs in South Tower Field and appeared to have increased by approximately 25 percent from 2013 to 2015. Mowing on this portion of the installation in 2013 may have temporarily reduced the population size.

Four populations of Himalaya balsam occur along Alley's Flat Road and Sprague Neck Road in the northeastern part of the VLF property (**Figure 2.14**). The southernmost population did not change appreciably between 2013 and 2015. The westernmost population was first observed during the 2015 survey. The remaining two populations are on a hillside on the south side of the Oil and Gas Disposal Area IRP site. The southern hillside population approximately doubled in size between 2013 and 2015, while the northern hillside population was a new population observed during the 2015 survey. One population observed in 2013 was not observed in 2015 (Tetra Tech, Inc., 2016b).

Seven populations of the Japanese knotweed were identified in the 2015 survey in the northern area of the VLF (**Figure 2.14**). Four populations were identified in both 2013 and 2015, with three of the populations increasing in size between 2013 and 2015 (Tetra Tech, Inc., 2016b).

Four populations of reed canary grass were identified north of Hudson Boulevard during the 2015 survey. While not observed in the 2013 survey, this several populations of this species were observed prior to 2013 in the bottom third of the VLF area and along a road on Sprague Neck. The four populations were mapped in the VLF area as indicated on **Figure 2.14** (Tetra Tech, Inc. 2016b).

Spotted knapweed was identified throughout the Salvage Yard Area during the 2015 survey but this species had not been observed previously (Tetra Tech, Inc. 2016b).

Canada thistle was identified at eight locations with seven populations occurring along the VLF shoreline and the remaining population on an interior road (See **Figure 2.14**). The populations exhibited the aggressive, dense growth associated with invasive species (Tetra Tech, Inc. 2016b).

Bittersweet nightshade was identified in the Oil and Grease Disposal Area IRP site during the 2015 survey (Tetra Tech, Inc. 2016b).

High Frequency Area

Two invasive species, reed canary grass and Canada thistle, occur in the HF area (Tetra Tech, Inc. 2016b). Three small scattered populations of the reed canary grass were identified in the 2013 survey, but only one small population was detected in 2015, adjacent to the southernmost building in the HF area. The small population of Canada thistle exhibited aggressive and dense growth (Tetra Tech, Inc. 2016b).

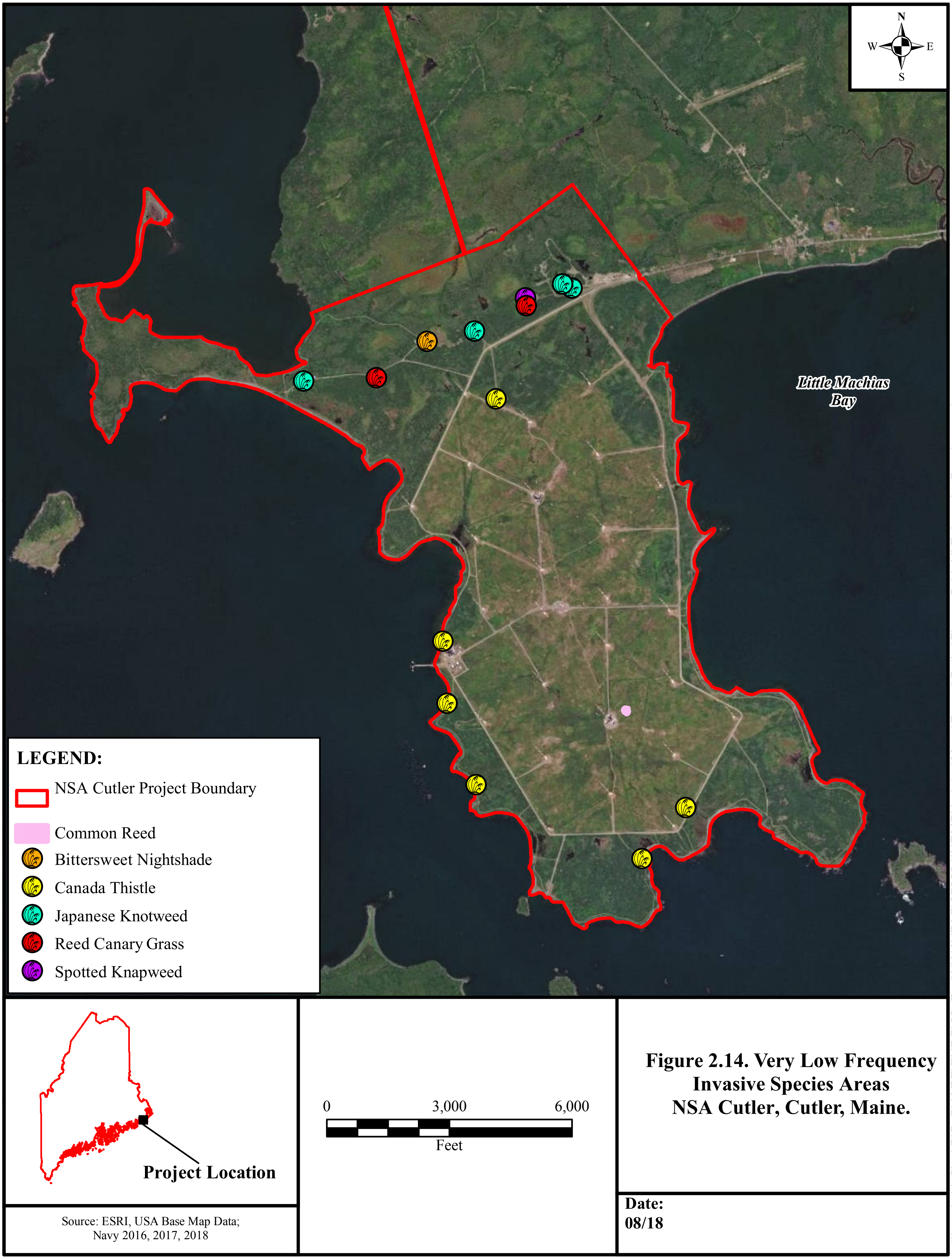

Figure 2.14. Very Low Frequency Invasive Species Areas NSA Cutler, Cutler, Maine.

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Howard Cove Area

No invasive species surveys have been conducted on the Howard Cove parcel.

2.6 WILDLIFE

The wildlife of NSA Cutler generally are typical of eastern Maine. One unique aspect of the Installation is the habitat within the extensive, maintained grassland associated with the VLF tower field, which is the second most abundant upland community type within VLF area. This area provides suitable habitat for a number of species, some of which are rare. The wildlife species described in this section were determined to occur at NSA Cutler using the following methods: field surveys; interviews with local and regional experts, Navy personnel including riggers that maintain the VLF towers and antennas, present and former Installation security guards, and other Navy staff; input from MDIFW regional biologists and USFWS biologists; and through desktop research. **Figure 2.15** and **Figure 2.16** provide information on wildlife observations and habitats for NSA Cutler.

2.6.1 Mammals

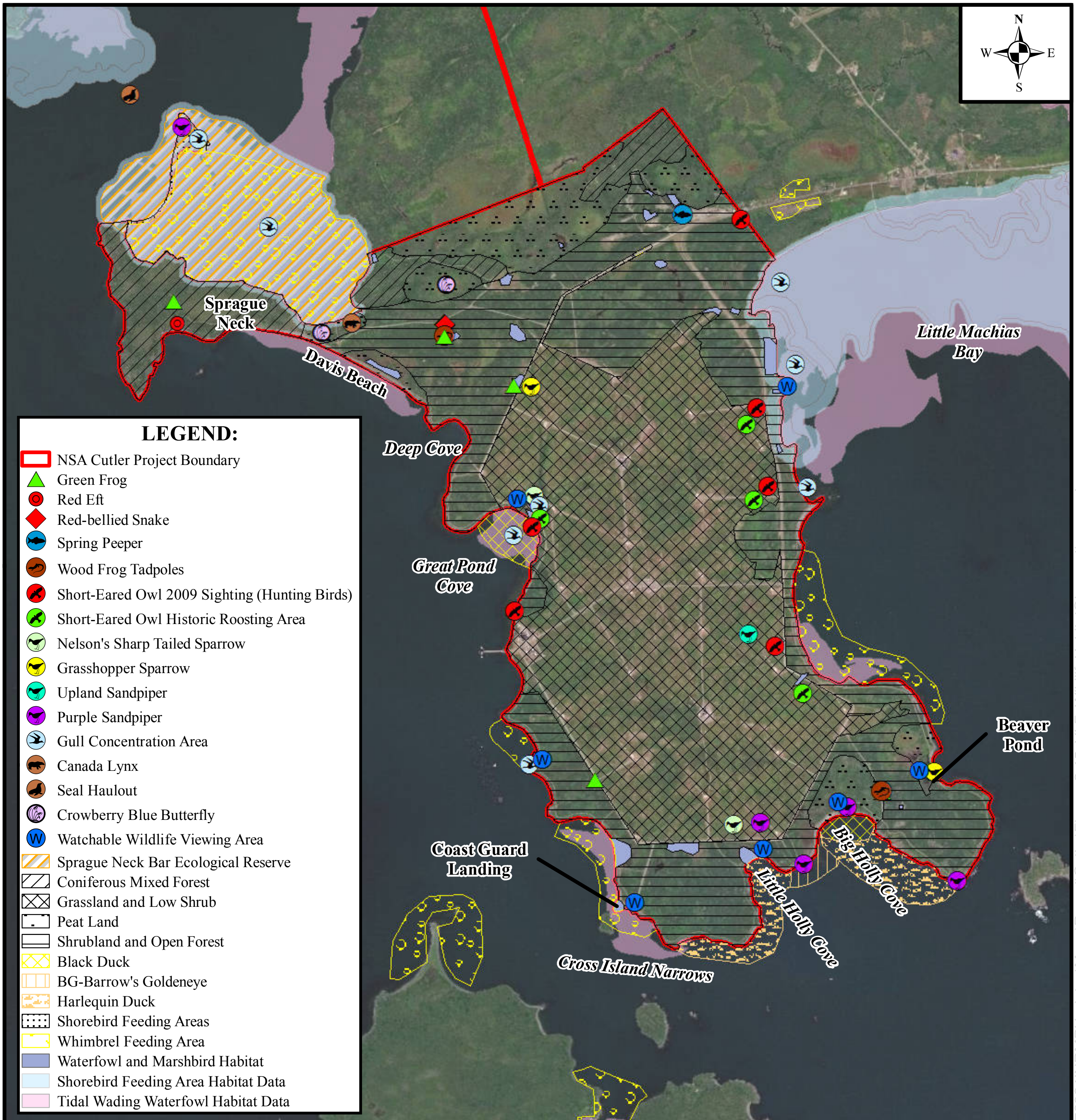
Porcupine at Sprague Neck.

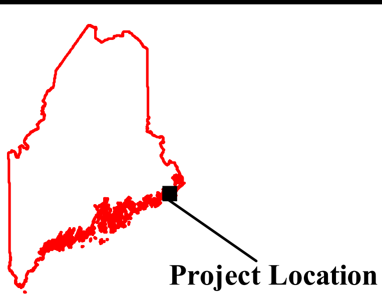
Small and large mammal utilization of the VLF and HF areas were assessed by visual observations (including scat), staff interviews, and Installation surveys including small mammal trapping and winter track counts. Small mammal trapping was conducted using a combination of live traps and snap traps that were placed in linear transects associated with roadways to target different habitat types. Traps were set up just prior to sunset and retrieved the following morning. A total of 12 surveys were conducted during October and November 2009.

Winter track counts were conducted during the months of January, February, and March 2009, during daylight hours. Surveys were conducted within 48 hours of fresh snowfall accumulating at least two inches. Three full day winter track count surveys were conducted with three observers for each survey, and three partial day surveys with two or three observers were conducted.

An acoustic survey for bats was conducted from spring to fall in 2013 and 2016 (Tetra Tech, Inc., 2014a; 2018). Mist net surveys to determine presence/absence of bats were conducted on the north side of Sprague Neck in summer 2015 (Biodiversity Research Institute [BRI] 2015).

Surveys were conducted to assess the white-tailed deer population and availability of winter habitat, including deer wintering areas and primary winter shelter or secondary winter shelter, on the VLF and HF areas. Pellet, browse, and spotlight/infrared surveys were conducted in 2015. The snow tracking surveys were conducted during the winter of 2016-2017 due to a mild winter the previous year. Results are discussed below. (Tetra Tech, Inc. 2017a)





Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

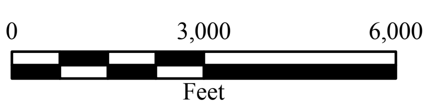


Figure 2.15. Very Low Frequency Area Wildlife Habitat and Observations NSA Cutler, Cutler, Maine.

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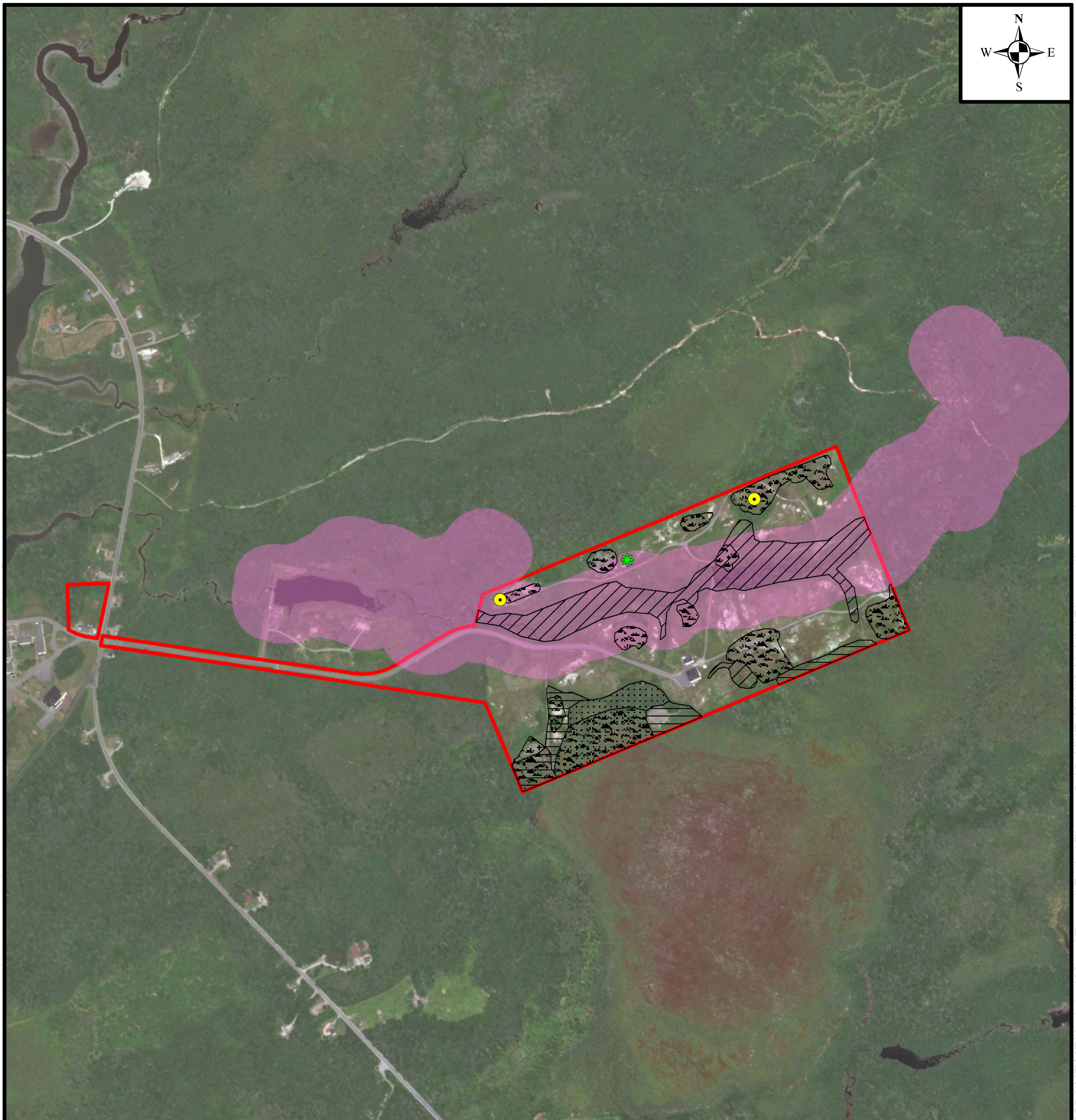

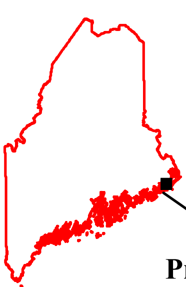

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, Maine Office of GIS

0 1,000 2,000
Feet

LEGEND:

- NSA Cutler Project Boundary
- Water Bird and Marsh Bird Habitat (N. Famous)
- Plateau Bog
- Black Crowberry
- Former Plateau Bog
- Inland Wading Waterfowl Habitat
- Osprey Nest
- Houstonia longifolia

Figure 2.16. High Frequency Area Wildlife Habitat and Observations NSA Cutler, Cutler, Maine.

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Very Low Frequency Area

Twenty-four terrestrial and four marine mammal species were detected at NSA Cutler in 2009 (**Table 2.11**). Four additional marine mammals have been observed from the Installation in outer Little Machias Bay. Eight bat species were detected at NSA Cutler in 2013 and 2016. With the exception of the marine mammals, most of the mammal species associated with the VLF area also are associated with the HF area.

Table 2.11 Mammal Observations at VLF and HF, NSA Cutler

Common Name	Scientific Name	VLF[1]	HF[1]	Observation[2]
American beaver	*Castor canadensis*	COM	PRESENT	OB
Black bear	*Ursus americanus*	UNC	UNC	OB
Big Brown Bat	*Eptesicus fuscus*	PRESENT	PRESENT	AD
Bobcat	*Lynx rufus*	COM	UNC	OB
Canada lynx	*Lynx canadensis*	RARE	N/A	OB
Chipmunk	*Tamias striatus*	UNC	INDETERMINATE	OB
Common muskrat	*Ondatra zibethicus*	UNC	INDETERMINATE	OB
Common porcupine	*Erethizon dorsatum*	ABU	PRESENT	OB
Deer mouse	*Peromyscus maniculatus*	PRESENT	INDETERMINATE	TR
Eastern coyote	*Canis latrans*	COM	COM	OB
Eastern red bat	*Lasiurus cinereus*	PRESENT	PRESENT	AD
Eastern small-footed bat	*Myotis leibii*	PRESENT	PRESENT	AD
Finback whale	*Balaenoptera physalus*	RARE	N/A	OB (Offshore and mouth of LMB)
Gray seal	*Halichoerus grypus*	UNC	N/A	OB (Breeding in CIN)
Harbor porpoise	*Phocoena phocoena*	UNC	N/A	OB (CIN)
Harbor seal	*Phoca vitulina*	ABU	N/A	OB
Hoary bat	*Lasiurus cinereus*	PRESENT	PRESENT	AD
Humpback whale	*Megaptera novaeangliae*	UNC	N/A	OB (Mouth of LMB)
Jumping mouse	*Zapus hudsonius*	PRESENT	INDETERMINATE	OB
Little brown bat	*Myotis lucifugus*	PRESENT	PRESENT	AD
Masked shrew	*Sorex cinereus*	PRESENT	INDETERMINATE	OB

Table 2.11 Mammal Observations at VLF and HF, NSA Cutler

Common Name	Scientific Name	VLF[1]	HF[1]	Observation[2]
Meadow vole	*Microtus pennsylvanicus*	COM	PRESENT	OB
Mink	*Mustela vison*	COM	PRESENT	OB
Minke whale	*Balaenoptera acutorostrata*	UNC	N/A	OB (CIN)
Moose	*Alces alces*	UNC	UNC	TR
Northern long-eared bat	*Myotis septentrionalis*	PRESENT	PRESENT	AD
Pine martin	*Martes martes*	RARE	INDETERMINATE	WT
Raccoon	*Procyon lotor*	PRESENT	PRESENT	TR
Red fox	*Vulpes vulpes*	COM	UNC	TR
Red squirrel	*Sciurus vulgaris*	COM	UNC	TR
Redback vole	*Clethrionomys gapperi*	COM	INDETERMINATE	TR
Right whale	*Eubalaena glacialis*	RARE	N/A	OB (outside of LMB)
Short-tailed shrew	*Blarina brevicauda*	PRESENT	INDETERMINATE	OB
Silver-haired bat	*Lasionycteris noctivagans*	PRESENT	PRESENT	AD
Snowshoe hare	*Lepus americanus*	COM	PRESENT	HI
Striped skunk	*Mephitis mephitis*	UNC	INDETERMINATE	HI
Tri-colored bat	*Perimyotis subflavus*	PRESENT	PRESENT	AD
Weasel	*Mustela frenata*	COM	PRESENT	HI
White-sided dolphin	*Lagenorhynchus obliquidens*	RARE	N/A	HI (outside of LMB)
White-tailed deer	*Odocoileus virginianus*	ABU	COM	OB

[1] Expected Frequency: ABU–Abundant; COM–Common; UNC–Uncommon; RARE–Rare; PRESENT–species was observed but frequency cannot be determined based on field data; INDETERMINATE–species was not observed but is suspected to occur.

[2] Observation Type: OB-Observed; WT-Winter Track Count Only; TR-Small mammal trap; HI-Historically known to occur at Installation; CIN-Cross Island Narrows; LMB-Little Machias Bay; AD – Acoustically Detected.

Species identified visually or through direct evidence (e.g., scat, winter mammal track counts, small mammal trapping, acoustic monitoring) are presented in **Table 2.11**. The most abundant mammal species observed at the VLF included white-tailed deer, common porcupine (*Erethizon dorsatum*), and harbor seals (*Phoca vitulina*). Other common species included snowshoe hare (*Lepus* *americanus*), meadow vole (*Microtus pennsylvanicus*), redback vole (*Clethrionomys gapperi*), red squirrel (*Tamiasciurus hudsonicus*), American beaver (*Castor canadensis*), eastern coyote (*Canis latrans*), bobcat (*Lynx rufus*), mink (*Mustela vision*), and weasel (*Mustela frenata*). Eight species of bats (order Chiroptera) have been observed, as discussed below. Uncommon and rarely occurring species include moose (*Alces alces*), black bear (*Ursus americanus*), striped skunk (*Mephitis mephitis*), pine martin (*Martes americana*), common muskrat (*Ondatra zibethicus*), and small rodents such as chipmunks (*Tamias* spp.) and deer mice. Other mammals not observed, but expected to occur, include eastern gray squirrel (*Sciurus carolinensis*), fisher (*Martes pennant*), southern flying squirrel (*Glaucomys volans*), eastern gray squirrel (*Sciurus carolinensis*), harp seal (rare) (*Pagophilus groenlandicus*), small mammal species (i.e., rodents), and a variety of other small mammals.

Spotlight and infrared surveys were conducted in late summer and fall 2015 to assess deer population density. A combined approach was used to increase the detection rate, particularly in the open and shrub habitats of the tower fields. Fewer bucks were observed during the fall surveys. Combined survey counts yielded 119 observations over four survey dates. The calculated deer density in the VLF area is 10.6 to 15.3 deer per square mile. (Tetra Tech, Inc. 2017a)

Deer population surveys and deer winter habitat surveys were conducted to assess the forested communities at NSA for potential deer wintering habitat. A desktop review of conifer-dominated forest types was completed, and the appropriate forest stands were identified along the northern VLF area boundary and in the Sprague Neck peninsula. These forest stands, most closely aligned with preferred primary winter habitat, were sampled for pellet groups and browse intensity to estimate the relative deer activity. (Tetra Tech, Inc. 2017a)

The pellet group surveys identified pellets in approximately one-third of the plots. A deer density calculation from these pellet surveys estimated the population at 1.09 deer per square mile on the Installation, which is much lower than the estimated deer density of between 10.6 and 15.3 deer per square mile and indicative that pellet counts are not an accurate method to calculate deer density or population on the Installation. Browse intensity surveys determined that the preferred browse species include balsam fir, mountain ash, birch, and shrubs, with a clear preference shown for American mountain ash and balsam fir. Both the pellet count and browsing intensity surveys indicated that deer wintering areas with the heaviest use are on the northern portion of the Sprague Neck peninsula. (Tetra Tech, Inc. 2017a)

Snow tracking surveys were conducted to identify primary locations of deer yards on the Installation in the VLF and HF areas. Very few deer tracks were found during the HF area surveys. The VLF area surveys indicated that the deer use increases within softwood stands on the Sprague Neck peninsula as the snow depth increases. In addition, it was noted that a group of deer traveled down to the shore and potentially fed on seaweed along the shore of Davis Beach. (Tetra Tech, Inc. 2017a)

It is unclear how much of the summer population remains on the Installation during a heavy snow year. Primary winter shelter and secondary winter shelter may be a limiting factor on the Installation during heavy snow years. The grassland and shrubland habitat in the VLF tower fields provide abundant forage and solar exposure for deer during low to no snow periods. (Tetra Tech, Inc. 2017a)

A Canada lynx (*Lynx canadensis*), a federally threatened mammal species, was observed in February 2009 during winter mammal track count surveys. More details for this special status species are provided in **Section 2.7.2**.

An acoustic bat monitoring survey was conducted in 2013 in the VLF area and in 2016 in the VLF and HF areas to determine the presence or absence of bat species, known to occur in Maine which include the little brown bat (*Myotis lucifugus)*, northern long-eared bat (*Myotis septentrionalis*), eastern small-footed bat (*Myotis leibii*), tri-colored bat (*Perimyotis subflavus*), silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), and hoary bat (*Lasiurus cinereus*). The VLF area contains suitable habitat for all eight species and each species was identified during the passive acoustic monitoring. Six of the eight bat species are Maine Department of Inland Fish and Wildlife species of special concern. In addition, the eastern small-footed bat is a Maine threatened species; the little brown bat is a Maine endangered species and is under consideration for listing by USFWS; and the northern long-eared bat is a Maine Endangered Species and a federally threatened species. More details for these special status species are provided in **Section 2.7.2**. (Tetra Tech, Inc. 2014a, 2018)

The VLF area provides suitable foraging habitat as bats typically forage along riparian areas, waterbodies, and forest edges. The VLF area also provides potential water sources for bats with areas of riparian habitat and freshwater ponds. (Tetra Tech, Inc. 2014a)

During the 2013 surveys the most frequently detected species across the VLF area was the little brown bat followed by the eastern red bat (Tetra Tech, Inc. 2014a). During the 2016 surveys the most frequently detected species was the eastern red bat followed by the hoary bat (Tetra Tech, Inc. 2018a). The eastern small-footed bat was documented only in 2013 and the northern long-eared bat had only one confirmed detection in 2016 (Tetra Tech, Inc. 2014a; Tetra Tech, Inc. 2018a).

The installation provides habitat for *Myotis* and migratory/and or tree-roosting species. In low number resident *Myotis* species may be present year round along forested edge habitat or the cabin located on the installation. Migratory bat species occur on the Installation during the summer months, which indicates that long-distance migratory tree-roosting bats spend summer residency time at the installation, but most activity comprised non-migratory species before white-nose syndrome became prevalent in the region. By 2016, migratory bat species made up to 88 percent of all bats recorded in 2016 with activity extending into November. (Tetra Tech, Inc. 2014a; Tetra Tech, Inc. 2018a).

Mist net surveys to determine the presence/absence of bats were conducted on Sprague Neck approximately 0.15 mile south of the tidal flats for three days in summer 2015. No bat species were collected at Cutler during the mist net surveys (BRI 2015). Summer mist netting completed in 2016 captured two eastern red bats (Tetra Tech, Inc. 2018a).

Avian radar survey data collected during spring and fall of 2013 and 2016 surveys were used to determine migration patterns of bats, landbirds, and shorebirds. It was inferred that the majority of the passage species were landbirds and shorebirds. Detailed passage rates are included in the Bird subsection (**Section 2.6.3**). (Tetra Tech, Inc., 2014a; Tetra Tech, Inc. 2018a)

Fatality surveys were initiated at the VLF area in 2015 and were continued through 2017 to determine if any bird and bat fatalities resulted from collisions with structures at the Installation, such as the communication towers and guy wires. The surveys also determined whether any of those fatalities were federal or state-listed species. The hazardous area of the VLF area was defined as the 800-acre area beneath all towers and guy wires. The helix houses or zero towers, which can produce dangerous levels of radioactivity when transmitting, also were a concern for fatalities. The surveys consisted of carcass persistence trials, searcher efficiency trials, and standardized carcass searches in plots established for these surveys. No bat fatalities were found during the study.

Migratory tree-roosting bats have been found during fatality surveys at wind energy projects which suggests bats are not colliding with the towers and guy wires at NSA Cutler. (Tetra Tech, Inc. 2018b)

High Frequency Area

Although not sampled as intensively as the VLF, the HF area likely supports most of the same species that were detected at the VLF site. **Table 2.6** presents a summary of mammals observed, an estimate of their expected frequency at the HF site, and the type of observation. None of the species observed were unique to the HF area, and the dominant small mammal collected during trapping was the masked shrew (*Sorex cinereus*).

The HF area provides suitable foraging habitat for bats, as many species forage along riparian areas, waterbodies, and forest edges. An acoustic bat monitoring survey was conducted at one location in 2016 in the HF area to determine the presence or absence of eight bat species known to occur in Maine. The results were described above in the VLF Area Subsection (Tetra Tech, Inc. 2014a)

Black bear, moose, and coyote sign appeared to be more abundant in the HF area than in the VLF area. White-tailed deer, red squirrel, chipmunk, and porcupine densities were lower in the HF area based on winter mammal track counts and sign.

Howard Cove Area

This area was not sampled for mammals, but the Howard Cove area likely supports many of the same species that were detected at the VLF site. White-tailed deer tracks were observed during a 2013 field survey (NSA Cutler 2014).

2.6.2 Amphibians and Reptiles

MDIFW, in cooperation with Maine Audubon and the University of Maine, conducted the Maine Amphibian and Reptile Atlasing Project (MARAP) throughout the State from 1986 to 1990 (Hunter et al. 1992 and MDIFW 2009a), and updated in 1999 (Hunter et al. 1999). The objective of this project was to take advantage of numerous volunteers throughout the state to document the distribution of amphibians and reptiles in Maine (Hunter et. al 1992). A species identification card was submitted for each MARAP observation that included the location (including township, if applicable) in which the amphibian or reptile was observed. Based on photographic records, field observations and collections, or vocalizations from the data collected, the MARAP identified nine amphibian and reptile species for the Township of Cutler. These are identified as MARAP in **Table 2.12** and are considered species likely to occur on the Installation.

Table 2.12 Amphibian and Reptile Species Known to Occur at or in the Vicinity of NSA Cutler

Common Name	Scientific Name	NSA Cutler (VLF or HF) or Regional (MARAP) Observation
	Amphibians	
Eastern American toad	*Anaxyru* [formerly Bufo] *americanus*	HF, VLF
Eastern newt	*Notophthalmus viridescens*	MARAP

Table 2.12 Amphibian and Reptile Species Known to Occur at or in the Vicinity of NSA Cutler

Common Name	Scientific Name	NSA Cutler (VLF or HF) or Regional (MARAP) Observation
Green frog	*Lithobates* [formerly Rana] *clamitans melanota*	VLF, HF, MARAP
Gray tree frog	*Hyla versicolor*	VLF
Red-spotted newt	*Notophthalmus viridescens*	VLF
Spotted salamander	*Ambystoma maculatum*	VLF, HF, MARAP
Spring peeper	*Pseudacris crucifer*	VLF and HF
Two-lined salamander	*Eurycea bislineata*	MARAP
Wood frog	*Lithobates sylvaticus* [formerly Rana sylcatica]	VLF, HF, MARAP
Reptiles		
Eastern garter snake	*Thamnophis sirtalis sirtalis*	VLF, HF, MARAP
Eastern painted turtle	*Chrysemys picta picta*	MARAP
Northern redbelly snake	*Storeria occipitomaculata*	VLF, MARAP
Ringneck snake	*Diadophis punctatus edwardsii*	MARAP

MARAP Source: Hunter et al. 1992 and Hunter et al. 1999

In addition to the background document review, site-specific data on amphibians were collected during various field surveys; however, a formal, Installation-wide, vernal pool survey was not conducted. Surveys included amphibian vocalization surveys and vernal pool searches. Potential vernal pools were identified based on frog vocalization and the data collected primarily were limited to species presence/absence. If egg masses were observed, they were counted. Amphibian and reptile presence data were also collected during aquatic sampling and vegetation sampling. During these field efforts, eight species were documented to occur within ponds and streams located at NSA Cutler. Species that were actually observed on the Installation during field activities are indicated by the area (VLF or HF) within which they were observed in **Table 2.12**.

A reptile and amphibian (herpetofauna) baseline survey was conducted in 2013 by NAVFAC personnel at the VLF area. The VLF area contains ponds, wetlands, and forested habitat that provides appropriate habitat for amphibians and reptiles (NAVFAC 2013).

Very Low Frequency Area

The most frequently documented amphibian in the VLF area, identified from both visual observations and vocalizations, was spring peeper (*Pseudacris crucifer*). A formal vernal pool survey was not conducted; however, several areas of the Installation were noted to have higher densities of frog vocalization. The south side of the road leading from the tower field to Sprague Neck had a high volume of frog vocalization near the shore, especially around dusk. Many spring peepers and wood frogs (*Lithobates sylvaticus*) could be heard calling from the wetland areas located along the northeast side of the tower field, and in the southwestern end of the tower field along the road leading to the Coast Guard landing. Spring peeper vocalizations were heard throughout the field season, until mid-November. Historically, spring peepers have been noted vocalizing in the VLF tower field in early December 1997 (Famous 2009a).

A yellow-spotted salamander (*Ambystoma maculatum*) egg mass and adult red-spotted newt (*Notophthalmus viridescens*) were collected during aquatic surveys of the pond located east of the gravel pit and firing range, in the northern section of the VLF area. The egg mass was nearly hatched out at the time it was observed in late May 2009. The most prevalent amphibians encountered during aquatic sampling surveys were tadpoles of an unidentified species. Although identification was not confirmed, they were most likely wood frogs and spring peepers.

Five species of herpetofauna (four amphibians and one reptile) have been documented on the VLF area and are identified in **Table 2.13. L**ocations of observations are depicted on **Figure 2.15** (NAVFAC 2013).

Table 2.13 Amphibian and Reptile Species Confirmed to Occur at VLF Area

Amphibians	
Spring Peeper	*Pseudacris crucifer*
Northern Green Frog	*Lithobates clamitans melanota*
Wood Frog	*Lithobates sylvatica (sylvaticus)*
Red-spotted Newt	*Notophthalmus viridescens viridescens*
Reptiles	
Northern Red-bellied Snake	*Storeria occipitomaculata occipitomaculata*

Source: NAVFAC 2013

The red-spotted newt, red eft stage, and the northern red-bellied snake were newly documented occurrences on the Installation. The frog species were identified within PSS wetlands at several locations in the VLF. The red-spotted newt, in the red eft stage, was observed under wood debris in Sprague Neck. The northern red-bellied snake was observed under a fallen branch in an early successional field (NAVFAC 2013).

High Frequency Area

Three vernal pools were identified at the HF site, and surveys of these areas detected yellow-spotted salamanders and wood frogs. The number of egg masses per pool ranged from eight to 23. Due to access constraints and the relatively small acreage of the HF area, this site was sampled less intensively than the VLF.

Howard Cove Area

No amphibian and reptile species surveys have been conducted at the Howard Cove Area. Common amphibian species that may occur at this site include the spring peeper, wood frog, American toad, American bullfrog (*Anaxyru catesbeiana*), green frog, northern leopard frog (*Anaxyru pipiens*), pickerel frog (*Anaxyru palustris*), and a variety of salamanders (NSA Cutler 2014). Common reptile species that may occur at this site include the eastern garter snake, eastern painted turtle, northern red-bellied snake, and northern ringneck snake (NSA Cutler 2014).

2.6.3 Birds

NSA Cutler is an Important Bird Area (IBA) recognized both in Maine and globally (Gallo et al. 2008 and DoD PIF Important Bird Areas Program undated). Maine is part of the Mid-Atlantic/New England/Maritimes and the Atlantic Northern Forest bird conservation region (BCR) 14 (Tetra Tech, Inc. 2014a). Maine Audubon, with assistance from MDIFW staff, identified sites across the state that provided important habitat for one or more species of breeding, wintering, or migrating birds (Gallo et al. 2008). These sites were then organized as IBAs based on their proximity to other sites or by the ecosystem in which they occur (Gallo et al. 2008). The Machias Bay IBA includes the Sprague Neck, Machiasport, Old Man Island, and Libby Island sites.

The Installation also represents one of the most species-rich areas for nesting bird species in the northeastern U.S. in terms of its size, with 123 species of confirmed breeders plus an additional 15 species classified as probable breeders. There have been 149 bird species observed as migrants, either at NSA Cutler or within offshore areas within 500 ft of the Installation. Six species of seabirds have been observed within one mile of the Installation. Unidentified ducks (subfamily Anatinae) have been observed in the VLF area (Tetra Tech, Inc. 2016c). Since 1978, 287 bird species (**Appendix G**) have been identified at the Installation, with 218 of these species identified during 2009 field surveys. No new species were identified during the 2015 survey. However, during the 2015 survey, an unknown peep (Calidris sp.) species was observed in the VLF area (Tetra Tech, Inc. 2016c). This list was generated with data collected during bird surveys as well as incidental observations by field biologists, desktop analysis, and informational interviews. In addition to incidental field observations, bird surveys conducted during 2009 included breeding season point count surveys, grassland bird surveys, shorebird surveys, and focus species surveys. Incidental observations were documented during other biological surveys including but not limited to small mammal trapping, vegetation sampling, and vernal pool searches.

NCTAMSLANT DET Cutler is one of the most species-rich areas in the Northeast and has been designated a **Maine Important Bird Area** as well as an **International Important Bird Area**.

Of the breeding bird species associated with NSA Cutler, 123 species were detected at NSA Cutler in 2009 (**Appendix G**). No additional breeding bird species were detected at NSA Cutler in 2015 (Tetra Tech, Inc. 2016c). In addition, appropriate habitat for another six more secretive species occurs on the Installation. The high number of nesting species is likely due to of the structural diversity created by moderate-sized blocks of specialized habitat types that include spruce and mixed deciduous forests, open tall shrub-dominated woodlands, dense tall shrublands, extensive peatlands (bogs and fens), managed open grasslands, and a large array of wetland types. In addition to providing important breeding habitat, NSA Cutler is an important stopover area for many regionally rare and accidental species including a variety of gulls, shorebirds, and waterbirds.

Avian radar surveys during spring and fall of 2013 and 2016 were conducted for much of the VLF area. Avian data were collected from an onshore sector and nearshore sector at a range of 0.75 to 2 nautical miles and up to 10,000 ft elevation to determine migration patterns. The results of this survey are discussed in the *Migrating Landbirds* section below. An avian acoustic survey was conducted from spring to fall in 2013 and 2016 for the VLF area. The avian acoustic results likely include both migratory and wintering landbirds, and the results are discussed below under the *VLF Area*. (Tetra Tech, Inc. 2014a)

Initial surveys in 2015 to support a five-year Monitoring Avian Productivity and Survivorship (MAPS) study were conducted in the VLF area and are discussed in detail below. The establishment of one or more MAPS stations at the Installation will provide valuable information on utilization of these forests by neotropical migrants, and the information can be added to the long-term avian productivity and survivorship database maintained by the Institute for Bird Populations (IBP). (BRI 2016)

Raptor migration surveys during spring and fall migration periods were conducted for the VLF area to establish baseline raptor migration information including migratory movements. The results of this survey area discussed in the *Migrating Landbirds* section below. (Tetra Tech, Inc. 2017b)

Fatality monitoring surveys of the antenna arrays in the VLF area were conducted over a three-year period (2015–2017) to establish baseline information. The results of this survey are discussed below. (Tetra Tech, Inc. 2018b)

Very Low Frequency Area

Bird species associate with one or more of the habitat types of the VLF area and habitat associations have been determined for some species as follows: 30 species utilize the VLF area grassland habitat, 50 species utilized the shrub habitat, 40 species utilize the Maritime Spruce-Fir Forest habitat, 49 species utilize the peatland habitat; 38 species utilize the shoreline and intertidal flat habitat; and 19 species utilize the nearby offshore pelagic habitat (Famous 2009b).

Neotropical migrant species such as black-throated green warbler (*Setophaga* [formerly *Dendroica*] *virens*) occur in high nesting densities within the forest community of Sprague Neck. The tall shrub dominated habitats that surround the VLF tower field support populations of willow flycatcher (*Empidonax trailii*) and alder flycatcher (*Empidonax alnorum*), chestnut-sided warbler (*Setophaga pensylvanica*), and American redstart (*Setophaga ruticilla*).

> The large **grassland community** associated with the VLF antenna field supports **high densities** of birds of prey, including rough-legged hawk, and short-eared owl (Famous 2009a).

Nesting northern harriers (*Circus cyaneus*) and osprey (*Pandion haliaetus*) are also associated with the VLF tower field. The former campground at Sprague Neck was the site for a nesting long-eared owl (*Asio otus*) documented in the early 1980s, and this same area contained the first confirmed nesting merlin (*Falco columbarius*) in the eastern U.S. in the mid-1980s (Famous 2009). Grassland songbird species that occur in this community include eastern bluebird (*Sialia sialis*), eastern meadowlark (*Sternalla magna*), field sparrow (*Spizella pusilla*), grasshopper sparrow (*Ammodramus savannarum*), bobolink (*Dolichonyx oryzivorus*), and upland sandpiper (*Bartramia longicauda*). These species may also nest in the grassland habitat.

The intertidal sand, gravel, and mud flats, intertidal rocky shoreline and ledges, and subtidal habitats provide habitat for significant numbers of migratory shorebirds, waterfowl, and waterbirds, described in the following sections.

The most abundant species, based on a manual review of the acoustic survey recordings, were the American crow (*Corvus brachyrhymchos)* followed by the American robin (*Turdus migratorius).*

Species richness varies among survey sites and years. **Table 2.14** identifies the species detected during each survey. **Figure 2.17** depicts the acoustic survey sites on the VLF. (Tetra Tech, Inc. 2014a; 2018)

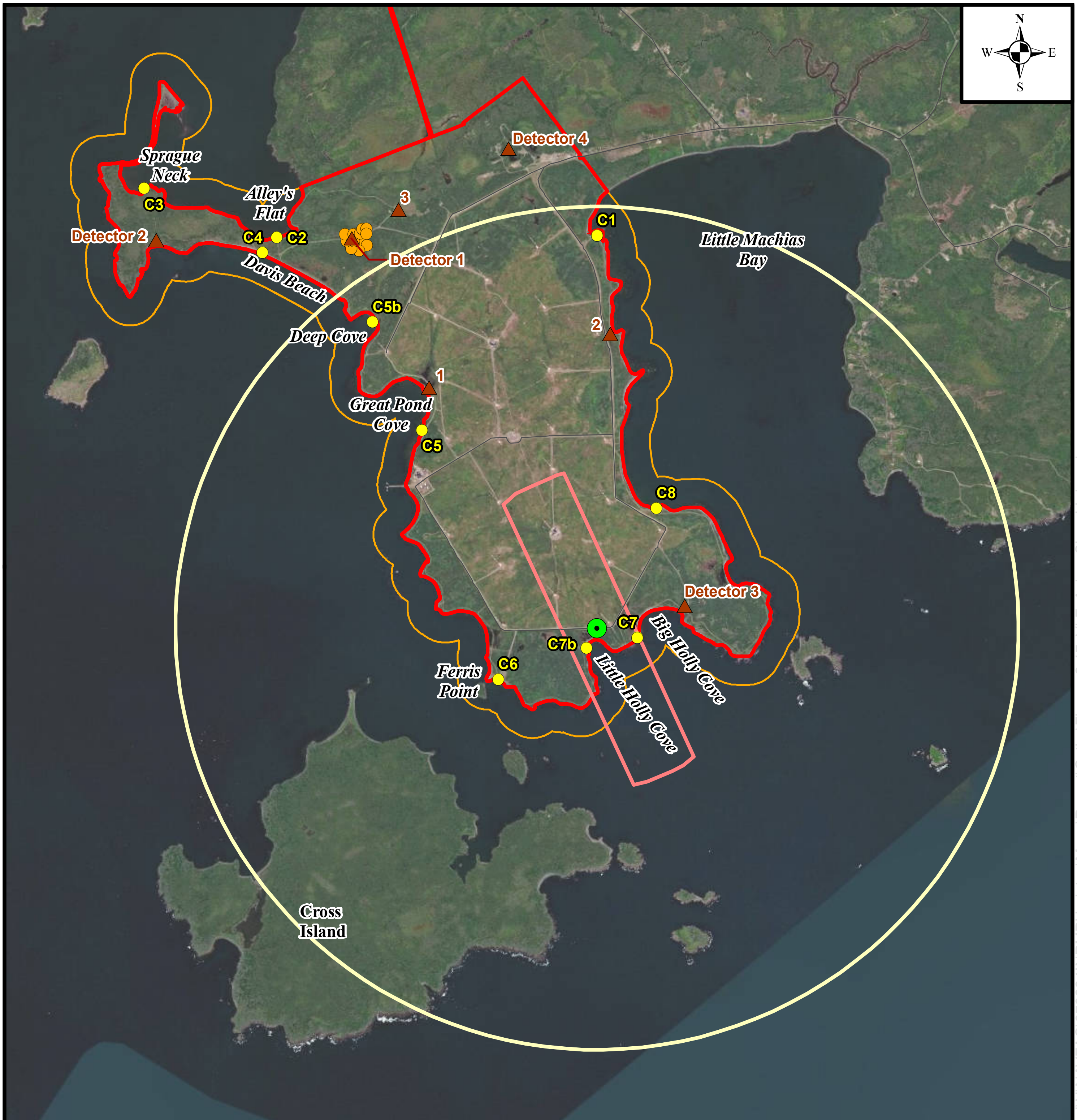
Table 2.14 Number of Individuals Detected by Species Based on Review of Acoustic Recording Subsample in the VLF Area

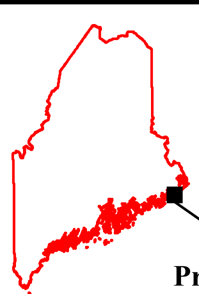
Common Name	Scientific name	2013 Survey	2016 Survey
Alder flycatcher	*Empidonax alnorum*	11	10
American black duck	*Anas rubripes*	-	3
American bittern	*Botaurus lentiginosus*	-	2
American crow	*Corvus brachyrhynchos*	74	34
American goldfinch	*Spinus tristis*	-	7
American redstart**	*Setophaga ruticilla*	-	8
American robin	*Turdus migratorius*	22	27
Black-capped chickadee	*Poecile atricapillus*	19	20
Black-and-white warbler**	*Mniotilta varia*	6	-
Belted kingfisher	*Megaceryle alcyon*	4	-
Blue-headed vireo	*Vireo solitarius*	4	4
Blue jay	*Cyanocitta cristata*	2	2
Black-throated green warbler	*Setophaga virens*	10	15
Canada goose	*Branta canadensis*	-	12
Canada warbler	*Cardellina canadensis*	9	-
Cedar waxwing	*Bombcyilla cedrorum*	-	6
Chipping sparrow	*Spizella passerina*	-	2
Common loon	*Gavia inmer*	-	1
Common raven	*Corvus corax*	3	-
Common yellowthroat	*Geothlypis trichas*	18	15
Dark-eyed junco	*Junco hyemalis*	18	2
Downy woodpecker	*Picoides pubescens*	-	4
Eastern phoebe	*Sayornis phoebe*	1	-
Great black-backed gull	*Larus marinus*	3	-
Gray catbird	*Dumetella carolinensis*	-	2
Golden-crowned kinglet	*Regulus satrapa*	9	5

Table 2.14 Number of Individuals Detected by Species Based on Review of Acoustic Recording Subsample in the VLF Area

Common Name	Scientific name	2013 Survey	2016 Survey
Herring gull	*Larus argentatus*	14	-
Hairy woodpecker	*Picoides villosus*	-	2
Hermit thrush	*Catharus guttatus*	-	19
Killdeer	*Charadrius vociferus*	1	-
Magnolia warbler	*Setophaga magnolia*	14	4
Mallard	*Anas platyrhynchos*	4	-
Mourning dove	*Zenaida macroura*	-	2
Northern flicker	*Colaptes auratus*	-	3
Northern parula	*Setophaga americana*	2	2
Osprey	*Pandion haliaetus*	1	-
Ovenbird	*Seiurus aurocapilla*	-	2
Red-breasted nuthatch	*Sitta canadensis*	6	7
Red-eyed vireo	*Vireo olivaceus*	-	2
Red-winged blackbird	*Agelaius phoeniceus*	15	10
Ring-billed gull	*Larus delawarensis*	4	-
Savannah sparrow	*Passerculus sandwichensis*	7	6
Song sparrow	*Melospiza melodia*	25	14
Swainson's thrush	*Catharus ustulatus*	10	2
Swamp sparrow	*Melospiza georgiana*	-	7
Unidentified duck	*Subfamily Anatinae*	3	-
Unidentified woodpecker	*Family Picadae*	1	-
White-breasted nuthatch	*Sitta carolinensis*	-	7
Winter wren	*Troglodytes hiemalis*	-	7
White-throated sparrow	*Zonotrichia albicollis*	7	14
Yellow warbler**	*Steophaga petechia*	-	14
Yellow-rumped warbler	*Setophaga coronata*	1	7

**Species of Special Concern in Maine
Source: Tetra Tech, Inc. 2014a; Tetra Tech, Inc. 2018a





Source: ESRI, USA Base Map Data; Navy 2016, 2017, 2018

0 4,000 8,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- VSR Beam (0.75 Nautical Miles)
- HSR Beam (2 Nautical Miles)
- Nearshore Survey Area 250m from Installation
- Avian Radar Unit
- Shorebird Survey Site
- Mist Nest Location
- Wildlife Acoustic Detector

Figure 2.17. Very Low Frequency Avian Acoustic Survey and Shorebird Survey Sites NSA Cutler, Cutler, Maine.

Date:
08/18

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Acoustic surveys indicated that the majority of the species on the installation are associated with grassland, wetlands and forested habitats. However, seven species of water birds were identified including herring gull (*Larus argentatus)*, common loon (*Gavia inmer*), Canada goose (*Branta canadensis*), American black duck (*Anas rubripes*), osprey, ring billed gull (*Larus delawarensis)* and mallard *(Anas platrychynchos).* (Tetra Tech, Inc. 2014a, 2018)

Incidental observations of bird species during the 2014–2015 shorebird surveys included American black duck, American woodcock (*Scolopax minor*), bald eagle (*Haliaeetus leucocephalus*), black guillemot (*Cepphus grylle*), black scoter (*Melannitta americana*), blue-winged teal (*Anas discors*), bufflehead (*Bucephala albeola*), Canada goose, common eider (*Somateria mollissima*), common goldeneye (*Bucephala clangula*), common loon, common merganser (*Mergus merganser*), gull (*Larus sp.*), horned grebe (*Podiceps. auritus*), surf scoter (*Melanitta perspicillata*), and northern harrier (Tetra Tech, Inc. 2016c). The bald eagle, a Maine Species of Conservation Concern that is discussed further in **Section 2.7.2**, was observed 15 times during surveys (Tetra Tech, Inc. 2016c), but it is unknown if the sightings were of multiple birds.

The MAPs methodology provides data to support estimates of adult annual survivorship, population size, proportion of resident individuals in the adult population, recruitment to the adult population, and population growth. (DeSante et al. 2015).

The MAPs survey area, approximately 20 acres in the northwest portion of the VLF area, includes four habitat types: (1) field, (2) shrub dominated by gray alder (*Alnus incana*), (3) conifer forest dominated by red and black spruce, and (4) deciduous forest dominated by paper birch. The 2015 mistnetting efforts yielded 17 species with 84 birds banded and 23 birds recaptured for a total of 107 birds. The 17 species include the yellow-bellied flycatcher (*Empidonax flaviventris*), black-throated green warbler, American redstart, magnolia warbler (*Setophaga magnolia*), golden-crowned kinglet (*Regulus satrapa*), Nashville warbler (*Oreothlypis ruficapilla*), common yellowthroat (*Geothlypis trichas)*, willow flycatcher, black-capped chickadee (*Poecile atricapillus*), black-and-white warbler (*Mniotilta varia*), blue-headed vireo (*Vireo solitaries*), ovenbird (*Seiurus aurocapilla*), white-throated sparrow (*Zonotrichia albicollis*), hermit thrush (*Catharus guttatus*), Swainson’s thrush (*Catharus ustulatus*), Hairy woodpecker (*Picoides villosus*), and the American robin. (BRI 2016)

Migrating Landbirds

The VLF tower field, woods of the Sprague Neck peninsula, and the sand and gravel bar of the Sprague Neck peninsula are utilized by migrating sparrows, finches, warblers, thrushes and a host of other species. The grassland-shrubland edges of the VLF tower field, the shrub habitat to the north and south of the VLF tower field and forests at Sprague Neck provide valuable foraging habitat for fall migrants (Famous 1994). In addition to fall migrating shorebirds, Sprague Neck Bar supports regionally high densities of migrating horned larks (*Eremophila alpestris*), and, in some years, snow buntings (*Plectrophenax nivalis*), Lapland longspurs (*Calcarius lapponicus*) and water pipits (*Anthus spinoletta*) between October and December (Famous 2009d).

Avian radar surveys were used to determine migration patterns of bats, landbirds, and shorebirds. During spring, passage rates were greater nearshore than at the Installation (**Table 2-15 and Table 2-16**). Species had a general northeast target direction during days and nights of the spring migration, and the data indicate that the targets were a combination of migrants and local individuals (Tetra Tech, Inc. 2014a, 2018).

Table 2.15 Spring 2013 Passage Rates of Avian Targets

	Installation		Nearshore	
Statistics	**Day**	**Night**	**Day**	**Night**
Average total passage rate	117	667	215	895
Range total passage rate	25–262	95–1918	59–374	91–2334

Source: Tetra Tech, Inc 2014a

Table 2.16 Spring 2016 Passage Rates of Avian Targets

	Installation		Nearshore	
Statistics	**Day**	**Night**	**Day**	**Night**
Average total passage rate	227	227	321	358
Range total passage rate	0–721	0–838	0–1,362	0–1,700

Source: Tetra Tech, Inc 2018

During fall, passage rates were greater nearshore than at the Installation. During the 2013 survey, species had a general southwest target direction during days of the fall migration (**Table 2.17**). During the 2016 survey, species had variable target directions including southwest, west, and northwest during days of the fall migration (**Table 2.18**). During nights of the fall migration, the species spanned a large segment of direction from southwest to northwest to northeast. The data indicate that the targets were a combination of migrants and local individuals (Tetra Tech, Inc. 2014a, 2018).

Table 2.17 Fall 2013 Passage Rates of Avian Targets

	Installation		Nearshore	
Statistics	**Day**	**Night**	**Day**	**Night**
Average total passage rate	85	547	213	828
Range total passage rate	21–252	48-2,690	99–388	139-3,555

Source: Tetra Tech, Inc. 2014a

Table 2.18 Fall 2016 Passage Rates of Avian Targets

	Installation		Nearshore	
Statistics	**Day**	**Night**	**Day**	**Night**
Average total passage rate	536	408	931	702
Range total passage rate	14–2,237	12-1,647	46–3,614	32-2,637

Source: Tetra Tech, Inc. 2018a

In 2013, target passage rates were greater during the spring than during fall; however, the opposite was true during 2016. The variation in survey results suggests that passage rates during the day and night periods, as well as seasonally, are highly variable. Greater migration occurred in the nearshore sector than the onshore sector for both survey periods. Based on the avian radar surveys, the VLF area is within a migratory flight corridor. The surveys also provide evidence that nocturnal migrants fly within the Installation tower arrays, which could result in avian fatalities if birds collide with infrastructure. During peak migration season, the risk of collision likely is higher due to the increased number of birds flying over the VLF area. Survey data suggest that there is some level of avoidance over the VLF area with lower passage rates and higher flight heights compared to passage over the nearshore area. (Tetra Tech, Inc. 2014a, 2018a).

Raptor migration surveys were conducted for the VLF area to acquire baseline raptor migration data and to record raptor behavior around the radio tower antenna arrays. The raptor migration survey efforts identified 12 raptor species with 260 individual raptors recorded, including American kestrel (*Falco sparverius*), bald eagle, broad-winged hawk (*Buteo platypterus*), Cooper's hawk (*Accipiter cooperii*), merlin, northern goshawk (*Accipiter gentilis*), northern harrier, osprey, peregrine falcon, red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), and turkey vulture. Eight of the raptor species (making up 36 percent of the total observations) were observed in the hazard areas within the radio tower fields; the observed species included the American kestrel, bald eagle, merlin, northern harrier, osprey, peregrine falcon, red-tailed hawk, and sharp-shinned hawk. (Tetra Tech, Inc. 2017b)

The raptor migration surveys recorded incidental observations including bald eagles perched on and in nest boxes (not occupied for nesting) along the northeast and west shore of the VLF areas. Frequent observations of the northern harrier suggest the VLF area has a resident and breeding population of northern harriers. Rough-legged hawks did not exhibit avoidance behavior in the hazard areas; instead, they were using the towers and guy wires as perch locations for hunting. (Tetra Tech, Inc. 2017b)

Fatality surveys were initiated at the VLF area in 2015 and continued through 2017 to determine if bird and bat fatalities resulted from collisions with structures at the Installation, such as communication towers and guy wires, and whether any of the fatalities were federal or state-listed species. The hazardous area of the VLF area was defined as the 800-acre area beneath all towers and guy wires. The helix houses or zero towers, which can produce dangerous levels of radioactivity when transmitting, also were a concern for fatalities. The surveys consisted of carcass persistence trials, searcher efficiency trials, and standardized carcass searches in plots established for these surveys. The mean per plot modeled estimated fatality rate over the three years was 7.77 fatalities per plot per year. Twenty-seven species of birds were identified as confirmed fatalities during the surveys with approximately 50 percent categorized as unknown small bird. Identified birds included waterbirds, shorebirds, songbirds, and raptors. No bat carcasses were found. (Tetra Tech, Inc. 2018b)

Wintering Landbirds

Because they are seasonal residents, wintering landbird populations levels are highest from late fall through early spring. The forests, woodlands, and older shrub-dominated habitats contain mountain ash, witherod, lowbush blueberry, black crowberry, and other fleshy-fruit bearing plants, which support fruit-eating migratory birds during the fall migration and in winter. Species that utilize this food source include whimbrel (*Numenius phaeopus*), a Maine species of special concern, American robin, hermit thrush, purple finch (*Carpodacus purpureus*), and waxwings (*Bombycilla* spp.). The expansive alder-dominated shrublands surrounding the VLF tower fields support wintering populations of seed-eating finches such as common redpoll [*Carduelis flammea*] and pine siskin [*Spinus pinus*]).

Migratory Shorebirds

Shorebird species richness in the VLF area is among the highest in Maine with 35 species identified since 1975. Although shorebirds occur in winter and spring, the VLF area is primarily a fall migration stopover area. The number of shorebirds using intertidal habitats surrounding the VLF has declined substantially since the late 1970s, both locally and regionally. Shorebird counts for Sprague Neck and several other locations have declined from a high of about 10,000 birds in the late 1970s to less than 1,500 birds in the early 1990s. Nearby Machias and Little Machias bays supported more than 20,000 birds in the late 1970s and early 1980s (Famous et al. 1980) compared to about 1,500 in the early 1990s (Famous 1994). Although similar systematic surveys have not been conducted since the early 1990s, shorebird populations remain below historical maximums, and are estimated to range between 6,000 and 8,500 birds for Machias and Little Machias bays (Famous 2009d).

As evidenced by the 1990 designation of the ERA, the Navy recognizes that Sprague Neck and the surrounding area provide an important staging area for migratory shorebirds, particularly during the southward migration season (July–October). Thirty-four species of shorebirds were observed in the VLF area between 1978 and 2015 (**Appendix G**); however, many of these species are infrequent visitors. Of the shorebird species associated with the Installation, the piping plover (*Charadrius melodus*) is federally threatened and endangered in Maine, the upland sandpiper is threatened in Maine, and the red knot (*Calidris canutus rufa*) is a federally threatened species. Seven shorebird species associated with the Installation are considered Birds of Conservation Concern (BCC) by USFWS, and four are species of special concern in Maine (**Appendix H**).

Purple sandpiper at VLF area.

The Installation and surrounding area have recorded high numbers of several species of concern during fall migratory bird counts. Many fall migrants, such as whimbrels, stage between Little Machias Bay and Mason's Bay in Jonesport. In the eastern U.S., NSA is an important stopover area for fall migrating whimbrels, with the sixth highest individual count (approximately 125 birds) for this species recorded at the Installation in 1998 out of 1,800 International Shorebird survey locations (Famous 2010a). Whimbrels in eastern Maine typically fatten up on fleshy fruits prior to departing on their trans-Atlantic flight to northern South America. Shorebird feeding and roosting areas under Navy stewardship at NSA Cutler include the largest and most stable shorebird site in the Machias and Little Machias bays region, providing habitat for 11 of the most abundant shorebird species (**Table 2.19**). In addition, during winter, between 30 and 300 purple sandpipers (*Calidris maritima*) are residents along the rocky intertidal shorelines. Surveys along portions of the perimeter of the Installation in 2009 yielded maximum counts of 25 birds. No shorebirds were observed during a 2015 winter survey, but the record-breaking cold may have been a factor (Tetra Tech, Inc. 2016c). The number of birds overwintering along the rocky shorelines and intertidal ledges of the Installation is unknown.

Table 2.19 Shorebird Species that Feed and Roost at NSA Cutler

Common Name	Scientific Name	Conservation Concerns[1]
Black-bellied plover	*Pluvialis squatarola*	IBA
Dunlin	*Calidris alpina*	SHP1
Greater yellowlegs	*Tringa melanoleuca*	IBA
Least sandpiper	*Calidris minutilla*	–
Lesser yellowlegs	*Tringa flavipes*	SSC/BCC (non-breeding)
Purple sandpiper	*Calidris maritima*	BCC (non-breeding)/SHP1
Piping plover	*Charadrius melodus*	FT/SHP1
Red knot	*Calidris canutus rufa*	FT/BCC (non-breeding)/SHP1
Semipalmated plover	*Charadrius semipalmatus*	IBA
Semipalmated sandpiper	*Calidris pusilla*	SSC/BCC (non-breeding)/IBA
Short-billed dowitcher	*Limnodromus griseus*	SHP1/IBA
Whimbrel	*Numenius phaeopus*	SSC/BCC (non-breeding)/SHP1/IBA
White-rumped sandpiper	*Calidris fuscicollis*	IBA

[1] **Conservation Concerns**

BCC	USFWS Birds of Conservation Concern
FT	Federally Threatened
IBA	Maine Important Bird Areas Program-High populations of statewide significance
SHP1	Shorebird Conservation Plan-Populations Imperiled
SSC	Maine Species of Special Concern

Sprague Neck Bar had the second highest recorded count for white-rumped sandpipers (*Calidris fuscicollis*) in the lower 48 states and was among the highest in Maine for semipalmated sandpiper (*Calidris pusilla*), semipalmated plover (*Charadrius semipalmatus*), short-billed dowitcher (*Limnodromus griseus*), and black-bellied plover (*Pluvialis squatarola*) (Famous 2009a). The intertidal flats associated with Sprague Neck support substantial numbers of white-rumped sandpipers and remain high among whimbrel-bearing stopover areas. The numbers of most other species have declined substantially over the last 30 years (Famous 2009a).

Other nearby public and privately owned lands cohabited by shorebird species observed at the VLF area include Hog Island Wildlife Management Area, a state property, that is 0.5 mile north of Sprague Neck, and the Cross Island National Wildlife Refuge (CINWR) which is 0.25 mile south-southwest of the VLF peninsula. CINWR, is used for roosting by smaller numbers of shorebirds during the fall migration, such as semipalmated sandpiper, least sandpiper (*Calidris minutilla*), white-rumped sandpiper, and semipalmated plover, and for feeding by larger shorebirds such as whimbrel, black-bellied plover, and ruddy turnstone (*Arenaria interpres*).

The 2013 and 2016 avian radar surveys were used to determine migration patterns of shorebirds.

The survey results are discussed above in the Migrating Landbirds section.

A shorebird monitoring survey was conducted during the 2014 fall migration period and the 2015 spring migration period. Ten survey sites were selected to represent the landforms and substrate that occurs on the Installation. **Table 2.20** lists the survey locations and type of habitat they represent. **Figure 2.17** depicts the shorebird survey sites on the VLF, which was the only area assessed for shoreline species (Tetra Tech, Inc. 2016c).

Table 2.20 Shorebird Survey Sites and Habitat at NSA Cutler

Survey Site	Site Name	Shorebird Habitat
C1	Little Machias Bay (North)	Mud flats
C2	Alley's Flat	Mud flats
C3	Sprague Neck	Mixed sand/mudflats/rocky beach
C4	Davis Beach	Rocky beach
C5	Great Pond Cove	Muddy/ rocky beach
C5b	Deep Cove	Rocky beach
C6	Ferris Point	Muddy/ rocky beach
C7	Big Holly Cove	Rocky beach
C7b	Little Holly Cove	Rocky beach
C8	Little Machias Bay (South)	Mixed sand/mudflats/rocky beach

Source: Tetra Tech, Inc. 2016c

While many shorebirds were identified to species during the 2014-2015 shorebird surveys, large flocks of migratory shorebirds were not identified to species but were determined to belong to the genus Calidris and classified as “peeps.” The number of shorebirds observed fluctuated during the peak migration periods in August and September of 2014. **Table 2.21** identifies the shorebirds identified during the 2014-2015 surveys. (Tetra Tech, Inc. 2016c)

Table 2.21 Shorebird Species Identified from the 2014 and 2015 Surveys, NSA Cutler

Shorebird Species		Number of Birds Observed
Common Name	Scientific Name	
Black-bellied Plover	*Pluvialis squatarola*	17
Dunlin	*Calidris alpina*	3
Greater Yellowlegs	*Tringa melanoleuca*	6

Table 2.21 Shorebird Species Identified from the 2014 and 2015 Surveys, NSA Cutler

Shorebird Species		Number of Birds Observed
Common Name	**Scientific Name**	
Greater/Lesser Yellowlegs	*Tringa sp.*	3
Killdeer	*Charadrius vociferus*	30
Least Sandpiper	*Calidris minutilla*	147
Lesser Yellowlegs*	*Tringa flavipes*	13
Pectoral Sandpiper	*Calidris melanotos*	8
Peeps	*Calidris sp. (unknown)*	698
Sanderling	*Calidris alba*	16
Semipalmated Plover	*Charadrius semipalmatus*	339
Semipalmated Sandpiper*	*Calidris pusilla*	346
Short-billed Dowitcher	*Limnodromus griseus*	28
Spotted Sandpiper	*Actitis macularius*	3
Stilt Sandpiper	*Calidris himantopus*	2
Whimbrel*	*Numenius phaeopus*	60
	Site Total	**1,719**

*Maine Species of Conservation Concern (MDIFW 2011)
Source: Tetra Tech, Inc. 2016c)

The surveys documented 1,719 shorebirds. The most common species were the semipalmated sandpiper, the semipalmated plover, and the least sandpiper. No federal or state listed species were observed during the surveys. Three Maine species of conservation concern were observed: lesser yellowlegs (*Tringa flavipes)*, semipalmated sandpiper, and the whimbrel (*Numenius phaeopus)* (Tetra Tech, Inc. 2016c).

The greatest species richness was observed at Sprague Neck (Site C3). Davis Beach (Site C4) was the only location where no individuals were observed. While Deep Cove (Site C5b) had the third highest number of individuals, the diversity was low because it was dominated by a single species, the semipalmated sandpiper (Tetra Tech, Inc. 2016c). **Table 2.22** summarizes the distribution of individuals and species and indices of shorebird diversity across the VLF area.

Substantial population decline of the semipalmated sandpiper and the black-bellied plover were observed between the 1980s and 2010. However, at present both species appear to be stable or increasing in population size (Tetra Tech, Inc. 2016c).

It has been determined that areas of the Installation serve as sites for migratory resting and stopovers. The peak migratory stopover times are presumed to be between early August and late September. No birds were observed during March (Tetra Tech, Inc. 2016c).

Table 2.22 Distribution of Individuals and Species and Indices of Shorebird Diversity Across NSA Cutler During 2014 and 2015 Surveys

Survey Site	Total # of Individuals	Species Richness	Shannon Diversity (H)	Simpson Diversity (D)
C1	152	7	1.68	0.79
C2	93	7	1.68	0.78
C3	1197	9	1.29	0.65
C4	0	0	0.00	0.00
C5	16	5	1.49	0.73
C5b	121	4	0.52	0.24
C6	8	4	1.40	0.71
C7	34	2	0.88	0.51
C7b	34	5	1.48	0.73
C8	64	6	1.60	0.76
Overall	**1719**	**14**		

Source: Tetra Tech, Inc., 2016c

The raptor migration surveys provided some incidental observations on large flocks of migrating double-crested cormorants (*Phalacrocorax auritus*). On one occasion, a flock of migrating double-breasted cormorants appeared to avoid the hazards within the tower field with the flock breaking up, circling to gain elevation, re-forming after gaining altitude above the towers and continuing flying to the south. (Tetra Tech, Inc. 2017b)

High Frequency Area

One hundred and three (103) bird species have been documented at the HF site, of which 97 species were observed during 2009 field activities (**Appendix G**). The alder-dominated shrublands surrounding the HF tower fields support large wintering populations of seed eating northern finches and are valuable for fall migrants and wintering landbirds (Famous 1994).

The list provided in **Appendix G** includes birds observed in the woods adjacent to the site that were detected during breeding season point count surveys. The list of birds breeding within the site is somewhat less, and the overall list of species for the HF area is low because no historical surveys, other than several hawk counts during the late 1970s, have been conducted (Famous 2009d). The number of species associated with the HF area would be expected to be much lower than at the VLF area because it is a smaller parcel with more uniform habitat types.

The HF area was not assessed during many of the acoustic, radar, MAPs, or shorebird surveys (Tetra Tech, Inc 2014a; BRI 2016; Tetra Tech, Inc 2016c). However, one detector station was established for the 2016 avian and bat surveys (Tetra Tech, Inc. 2018a). The greatest index of diversity, i.e. species richness, was highest in the HF area. **Table 2.23** identifies the species detected in the HF area. **Figure 2.18** depicts the acoustic survey site on the HF. (Tetra Tech, Inc. 2018a)

Table 2.23 Number of Individuals Detected by Species Based on Review of Acoustic Recording Subsample in the HF Area

Common Name	Scientific Name	2016 Survey
Alder flycatcher	*Empidonax alnorum*	3
American crow	*Corvus brachyrhynchos*	1
American redstart**	*Setophaga ruticilla*	1
American robin	*Turdus migratorius*	5
Black-and-white warbler**	*Mniotilta varia*	4
Blue-headed vireo	*Vireo solitarius*	1
Blue jay	*Cyanocitta cristata*	2
Black-throated green warbler	*Setophaga virens*	3
Cedar waxwing	*Bombcyilla cedrorum*	1
Chipping sparrow	*Spizella passerina*	2
Common yellowthroat	*Geothlypis trichas*	4
Dark-eyed junco	*Junco hyemalis*	1
Hermit thrush	*Catharus guttatus*	3
Magnolia warbler	*Setophaga magnolia*	2
Northern flicker	*Colaptes auratus*	3
Ovenbird	*Seiurus aurocapilla*	3
Red-breasted nuthatch	*Sitta canadensis*	1
Red-eyed vireo	*Vireo olivaceus*	1
Ruby-crowned kinglet	*Regulus calendula*	2
Savannah sparrow	*Passerculus sandwichensis*	3
Song sparrow	*Melospiza melodia*	2

Table 2.23 Number of Individuals Detected by Species Based on Review of Acoustic Recording Subsample in the HF Area

Common Name	Scientific Name	2016 Survey
Swamp sparrow	*Melospiza georgiana*	2
Winter wren	*Troglodytes hiemalis*	2
White-throated sparrow**	*Zonotrichia albicollis*	5

**Species of Special Concern in Maine
Source: Tetra Tech, Inc. 2014a; Tetra Tech, Inc. 2018a

Howard Cove Area

This area has not been surveyed for birds, but the Howard Cove area likely supports many of the same species that were detected at the HF site (NCTAMSLANT DET Cutler 2014).

2.6.4 Fish

Fish sampling was conducted in several ponds within the VLF area and in Huntley Creek in the HF area to obtain representative data on fish communities that occur on NSA Cutler. A beach seine was used in the ponds in the VLF area and handheld net sweeps were conducted in Huntley Creek. Beach seine sampling was not possible in Huntley Creek due to the narrow width of the channel and the presence of boulders, snags, and other debris within the channel.

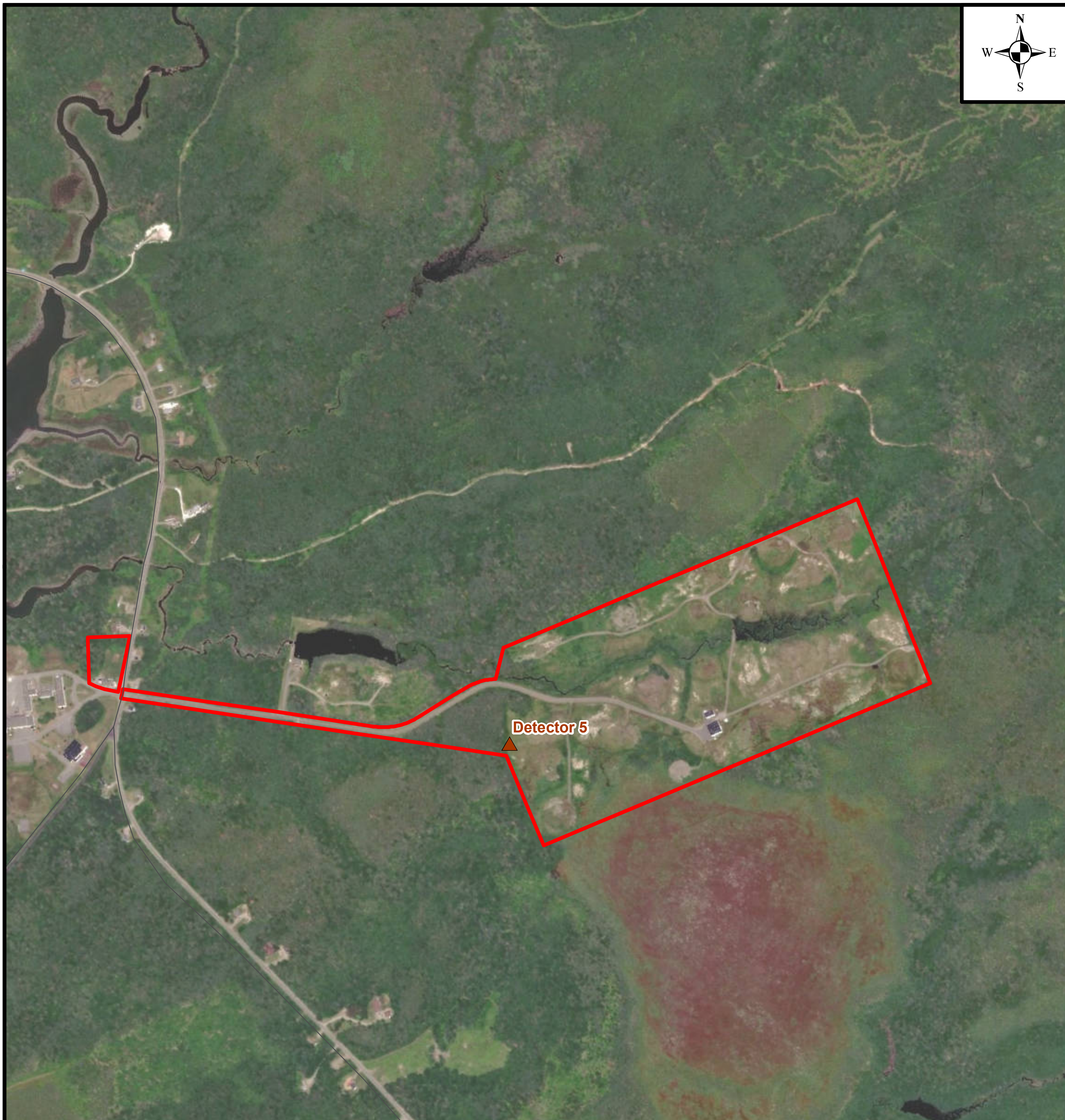
In 2013, an Essential Fish Habitat (EFH) assessment for the Commercial Power Connection Project was conducted in Machias Bay, Machias River and East Machias River. These waters are considered vital nursery, feeding and resting areas for marine estuarine finfish and shellfish species.

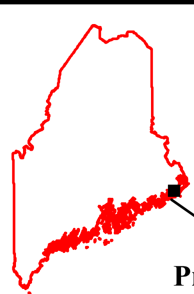
Very Low Frequency Area

Seven ponds were sampled in the VLF area on May 2009, including the large pond north of the abandoned pier on the western coast of the VLF peninsula. Sampling efforts detected five fish species from three of the ponds sampled. The species detected included American eel (*Anguilla rostrata*), fourspine stickleback (*Apeltes quadracus*), ninespine stickleback (*Pungitius pungitius*), banded killifish (*Fundulus diaphanous*), and mummichog (*Fundulus heteroclitus*).

All of these species were collected from the pond outside the perimeter road along the eastern edge of the northern antenna array, which had the highest diversity and abundance of fish for all sites sampled. Ninespine stickleback was the only fish species collected at the pond located just south of the perimeter road and southern antenna array. Mummichog and ninespine stickleback were the only fish species collected from the large pond located along the western edge of the VLF peninsula. All of the fish collected were small in size (total length less than two inches), many of which probably represented young-of-the-year. No fish were collected in the remaining four ponds.

A majority of the ninespine sticklebacks collected from the large pond located along the western shore of the VLF area were covered with white parasitic-looking granules, which resembled small grains of rice. An online investigation was conducted, as well as consultation with scientists familiar with fish parasites; however, this parasite could not be conclusively identified.





Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018

0 1,000 2,000
Feet

LEGEND:

NSA Cutler Project Boundary

Wildlife Acoustic Detector

Figure 2.18. Very High Frequency Avian and Bat Acoustic Survey Sites NSA Cutler, Cutler, Maine.

Date:
08/18

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It is possible that since this pond is periodically inundated with saltwater during periods of spring high tide and storm surges, the organisms observed were a type of parasitic copepod that attaches itself to the skin but this has not been confirmed.

The 2013 EFH assessment identified several shellfish resources: Atlantic sea scallop, soft shell clams, blue mussels, eastern oysters, and American lobsters. Several fish species use these areas for spawning and seasonal migration, including blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus)*, rainbow smelt (*Osmerus mordax)*, American eel, and the American shad. The blueback herring, alewife, and rainbow smelt are considered species of concern under the ESA. The blueback herring and alewife are candidate species for listing under the ESA that are undergoing status review for listing (NOAA 2017). During the video surveillance survey, winter flounder were observed in 90 percent of the transects. The area outside of the nearshore areas serve as EFH for larva, eggs, juveniles and adult spawning for winter flounder (Ecology and Environment, Inc. 2013). Species with designated essential fish habitat in the vicinity of the Installation are listed in **Table 2.24**.

Table 2.24 Species with Designated Essential Fish Habitat in Machias Bay

Species						
Common Name	**Scientific Name**	**Eggs**	**Larva**	**Juveniles**	**Adult**	**Spawning Adults**
Atlantic salmon	*Salmo salar*			x	x	
Atlantic cod	*Gadus morhua*	x	x	x	x	x
Pollock	*Pollachius virens*			x		
Whiting	*Merluccius bilinearis*			x	x	
Red hake	*Urophycis chuss*			x	x	
White hake	*Urophycis tenuis*			x	x	
Winter flounder	*Pseudopleuronectes americanus*	x	x	x	x	x
Yellowtail flounder	*Limanda ferruginea*	x	x			
Windowpane flounder	*Scophthalmus aquosus*	x	x	x	x	x
American plaice	*Hippoglossoides platessoides*	x	x	x	x	x
Ocean pout	*Macrozoarces americanus*	x	x	x	x	x
Atlantic halibut	*Hippoglossus hippoglossus*	x	x	x	x	x
Atlantic sea scallop	*Placopecten magellanicus*	x	x	x	x	x
Atlantic sea herring	*Clupea harengus*	x	x	x	x	

Table 2.24 Species with Designated Essential Fish Habitat in Machias Bay

Species		Eggs	Larva	Juveniles	Adult	Spawning Adults
Common Name	**Scientific Name**					
Atlantic mackerel	*Scomber scombrus*				x	
Bluefin tuna	*Thunnus thynnus*				x	
Atlantic wolffish	*Anarhichas lupus*	x	x	x	x	x
White shark	*Carcharodon carcharias*			x	x	x

Source: Ecology and Environment, Inc. 2013

Key:
X = Designated EFH in the analyzed squares.

During the 2012 benthic sampling effort, 186 species of benthic infauna were identified in grab samples from 20 stations along the proposed cable route. The most common organisms found in the samples included polychaetes and small bivalves (*Nucula delphinodonta and Nucula annulata/proxima*) (Ecology and Environment, Inc. 2013).

During the 2015 seasonal survey, adult and juvenile fish communities were characterized using trawls and gillnets. The survey area was analyzed for ichthyoplankton to identify early lifestages of fishes found within the survey area. Five seasonal sampling events were completed for juvenile/adult fish species, and three ichthyoplankton tows were conducted. An acoustic study was done to determine whether any tagged fish were in the area. During this survey, 21 species of fish, eight larval fish species, five egg species, 12 invertebrate species, and one marine time mammal were observed. Ten species were commercially harvested in 2014 and eight have EFH within the survey area. The Atlantic silverside (*Menidia menidia*) made up 87.5 percent of the total catch across all seasons and provided the greatest total biomass, representing 8.767 kilograms (kg) of the 16.845 kg from all 21 species (Tetra Tech, Inc. 2016d). **Table 2.25** provides the seasonal fish composition in nearshore waters.

The ichthyoplankton surveys were conducted with the juvenile and adult fish collections. Summer ichthyoplankton samples showed the greatest diversity and abundance, while only one species was identified in the fall survey. The winter survey indicated the American sand lance *(Ammodytes americanus)* in the yolk-sac larvae life stage had the greatest abundance. In the spring, unknown species in the egg life stage had the greatest abundance, occurring in 75 percent of the samples. A different unknown species had the greatest abundance (49.6 percent of samples) (Tetra Tech, Inc. 2016d). A list of macroinvertebrates observed during sampling is provided in **Table 2.26**.

In addition to the fish species identified during this survey, 16 invertebrates and four algal species were identified. No marine mammals were observed in the winter, spring, or summer surveys, but one gray seal (*Halichoerus grypus*) was observed during the fall survey (Tetra Tech, Inc. 2016d).

The nearshore habitat mainly comprises hardbottom, silt/clay sediment, and mud that create an ideal environment for eelgrass, a type of SAV. Eelgrass provides a habitat for a variety of different aquatic species.

Table 2.25 Seasonal Fish Composition in Cutler's Nearshore Waters[1]

Common Name	Scientific Name	Fall 2014	Winter 2015	Spring 2015	Summer 2015	Total
		No. of Individuals	No. of Individuals	No. of Individuals	No. of Individuals	No. of Individuals
Atlantic silverside	*Menidia menidia*	--	2,830	1,648	-	4,478
Rainbow smelt	*Osmerus mordax*	5	150	59	2	216
Atlantic herring	*Clupea harengus*	--	7	--	156	163
Winter flounder	*Pseudopleuronectes americanus*	--	24	39	61	124
White hake	*Urophycis tenuis*	--	--	--	52	52
Alewife	*Alosa pseudoharengus*	21	--	4	2	27
Atlantic cod	*Gadus morhua*	--	1	--	25	26
Shorthorn sculpin	*Myoxocephalus scorpius*	--	8	--	1	9
Haddock	*Melanogrammus aeglefinus*	--	--	--	7	7
Silver hake	*Merluccius bilinearis*	--	--	--	3	3
Skilletfish	*Gobiesox strumosus*	--	--	--	3	3
Snakeblenny	*Lumpenus lampretaeformis*	--	--	--	2	2
Windowpane flounder	*Scophthalmus aquosus*	--	--	--	2	2
Atlantic alligatorfish	*Aspidophoroides monopterygius*	--	1	--	--	1
Goosefish	*Lophius americanus*	--	--	--	1	1

Table 2.25 Seasonal Fish Composition in Cutler's Nearshore Waters[1]

Common Name	Scientific Name	Fall 2014	Winter 2015	Spring 2015	Summer 2015	Total
		No. of Individuals	No. of Individuals	No. of Individuals	No. of Individuals	No. of Individuals
Longhorn sculpin	*Myoxocephalus octodecemspinosus*	--	--	1	--	1
Lumpfish	*Cyclopterus lumpus*	1	--	--	--	1
Pollock	*Pollachius virens*	--	--	--	1	1
Red hake	*Urophycis chuss*	--	--	1	--	1
Rock gunnel	*Pholis gunnellus*	--	--	--	1	1
Sea raven	*Hemitripterusamericanus*	--	--	--	1	1
Grand Total		**27**	**3,021**	**1,752**	**320**	**5,120**

Source: Tetra Tech, Inc. 2016d

Table 2.26 Macroinvertebrates Observed during Seasonal Fish Collections at NSA Cutler

Common name	Fall 2014	Winter 2015	Spring 2015	Summer 2015
Shrimp	X	X	X	X
Hermit crab		X	X	X
Rock crab		X	X	X
Sea urchin		X	X	X
Spider crab		X	X	X
Jellyfish			X	X
Lobster			X	X
Blue mussel		X		
Jonah crab		X		
Sand dollar		X		
Smooth whelk			X	
Limpet				X

Source: Tetra Tech, Inc. 2016d

During summer, the area of soft sediment had the most abundant and diverse communities, with a polychaete (*Tharyx* sp.) as the dominant species. The benthic infauna compositions indicated that the dominant phylum was Annelida between the spring and summer surveys. The number of species and individuals were greatest in summer (Tetra Tech, Inc. 2016d).

In September of 2014, CR Environmental, Inc. (CR) conducted an underwater video survey to determine the presence of eelgrass near the shore of the proposed submarine power transmission cable route in the southern portion of Machias Bay. The survey noted the ocean floor substrate, epifauna, algae and whether eelgrass (*Zostera marina*) occurred within 500 ft either side of the proposed cable route. There were 16 video survey transects in Machias Bay. The ocean substrate was consistent with the findings of the Tetra Tech survey and indicated a muddy, sand pebble/cobble boulder surface. In 1997, the Maine Department of Marine Resources (MDMR) documented several beds of eelgrass in the northern corner of Howard Cove, but these were not observed in the 2014 survey. **Table 2.27** lists the species observed during the video surveillance survey (CR Environmental, Inc. 2014).

Table 2.27 List of Species of Observed During Video Surveillance

Species Observed
Invertebrate
Common periwinkle (*Littorina littorea*)
Marine Algae
Kelp (*Laminaria stenopylla*)
Sea lettuce (*Ulva lactuca*)

Table 2.27 List of Species of Observed During Video Surveillance

Rock weed (*Ascophylum nodosum*)
Bladder wrack (*Fucus vesiculosus*)
Several species of branching red algae
Fish
Winter flounder (*Pseudopleuronectes americanus*)
Several active lobsters

Source: (CR Environmental, Inc. 2014)

High Frequency Area

No fish were collected in any of the handheld net sweeps in Huntley Creek. The macroinvertebrate community that was observed during sampling would provide a suitable food source for fish, and due to the perennial flow associated with this creek there is a high potential for fish to occur.

Howard Cove Area

The Howard Cove area contains a perennial stream which may support fish, but no fish surveys have been conducted (NCTAMSLANT DET Cutler 2014).

2.6.5 Invertebrates

Dip net sampling for aquatic invertebrates was conducted in May of 2009, in the NSA Cutler ponds throughout the VLF area and in Huntley Creek in the HF area. Additionally, invertebrates also were identified from beach seine samples collected to identify fish species occurring within the ponds in the VLF area.

The crowberry blue butterfly (*Plebejus idas* ssp. *empetri*) is a state listed species of special concern that is expected to occur in both the VLF and HF areas at NSA Cutler. Both areas have the low-growing shrub, black crowberry, upon which this species is dependent. Two surveys were completed in 2015 to determine the presence/absence of the crowberry blue. Surveys focused on bog habitat containing black crowberry, but also included sampling in additional habitats. Sampling was done at 17 locations in the VLF area and two locations in the HLF area. The survey included perimeter and interior roadways within the VLF and HF area, including habitats along the shoreline, grasslands, and forested habitats (Tetra Tech, Inc. 2016a). More information on this species is provided in **Section 2.7.2**.

These crowberry blue surveys serve as a baseline assessment of butterfly, damselfly, and dragonfly species that occur on the Installation. Four special status species were also targeted during the survey: bog elfin (*Callophrys lanoraieensis)*, Rambur's forktail *(Ischnura ramburii)*, broad-tailed shadowdragon *(Neuocordulia michaeli)*, and comet darner *(Anax longipes)*. However, no protected species were observed (See Section 2.7.2). (Tetra Tech, Inc. 2016a)

Forty-five terrestrial invertebrates were collected representing fourteen species (10 butterfly species, 2 dragon fly species, and 2 damselfly species) and are discussed under the VLF area below. (Tetra Tech, Inc. 2016a)

Pest Invertebrates

As described in Section 2.5.4, several insects, identified in **Table 2.28** below, have been determined to be potentially harmful to forests on the Installation. These potentially damaging insects include: the spruce budworm (*Choristoneura fumiferana),* forest tent caterpillar (*Malacosoma disstria)*, eastern tent caterpillar (*Malacosoma americanum)*, balsam woolly adelgid (*Adelges piceae)*, spruce beetle (*Dendroctonus rufipennis),* and the larch sawfly (*Pristiphora erichsonii)* (Tetra Tech, Inc. 2015). The table also identifies the host species and the infestation or hatching periods.

Table 2.28 Potentially Damaging Insects on NSA Cutler

Potentially Damaging Insects	Primary Host Species	Other Host Species	Infestation or Hatching
Spruce Budworm	Northern spruce (*Picea* spp.) and fir (*Abies* spp.)	White spruce (*Picea glauca*), red spruce (*Picea rubens*), black spruce (*Picea mariana*), tamarack (*Larix laricina*), pine (*Pinus* spp.), hemlock (*Tsuga* spp.)	Occurs every 30 years.
Forest Tent Caterpillar	Sugar maple (*Acer saccharum*) and aspen (*Populus* spp.)	Birches (*Betula* spp.), cherries (*Prunus* spp.), basswoods (*Tilia* spp.), ashes (*Fraxinus* spp.)	Every 6- to 16-year intervals lasting 3 years.
Eastern Tent Caterpillar	Apple (*Malus* spp.), wild or ornamental cherry (*Prunus* spp.)	Pecan (*Carya illinoinensis*), hawthornes (*Crataegus* spp.), beech (*Fagus grandifolia*), willows (*Salix* spp.)	Larvae hatch in early spring.
Balsam Woolly Adelgid	True firs (*Abies* spp.)		Development occurs in late April-early May. Adults present in June.
Spruce Beetle	All species of spruce within its geographical range 1		Adults emerge between May and October. Most attacks occur in early summer.
Larch Sawfly	Larvae feed on needles of older twigs.		June through August

Source Tetra Tech, Inc. 2015
[1]Source Holsten et al. 2000

Very Low Frequency Area

All of the ponds sampled are freshwater ponds. However, the pond along the perimeter road along the western edge of the peninsula of the northern antenna array of the VLF area is subjected to saltwater influxes during the highest spring high tides and storm surges. The overall diversity of invertebrate species collected within the ponds of the VLF was low. **Appendix G** lists the invertebrate species observed during pond sampling of the VLF area.

In addition to the aquatic invertebrates observed, common terrestrial forms expected to occur within the VLF area include: spiders (class Arachnida); grasshoppers, katydids, crickets, mantids, walkingsticks, and cockroaches (order Orthoptera); earwigs (order Dermaptera); stink bugs (order Hemiptera); cicadas and aphids (order Homoptera); terrestrial beetles (order Coleoptera); butterflies and moths (order Lepidoptera); flies (order Diptera); and ants, wasps, and bees (order Hymenoptera).

During the 2015 survey, the following 12 species were captured within the VLF: long dash (*Polites mystic)*, Peck's skipper (*Polites peckius),* boreal spring azure (*Celastrina lucia),* Harris' checkerspot (*Chlosyne harrisii),* inornate ringlet (*Coenonympha tullia),* northern pearl crescent (*Physiodes cocyta),* American lady (*Vanessa virginiensis),* great spangled fritillary (*Speyeria Cybele),* cabbage white (*Pieris rapae),* pink-edged sulphur (*Coluas interior)*, belted whiteface (*Leucorrhinia frigida),* and the twelve-spotted skimmer (*Libellula incest)* (Tetra Tech, Inc. 2016a).

High Frequency Area

Huntley Creek has a high diversity of macroinvertebrates compared to the invertebrate sampling locations of the VLF area. Common macroinvertebrate types observed within Huntley Creek include three species of case-maker caddisfly larvae (order Trichoptera), stonefly larvae (Plecoptera), adult and larval mayflies (order Ephemeroptera), and fingernail clam (family Sphaeriidae). Other macroinvertebrate types collected within the stream channel include water penny beetle (family Psephenidae), whirligig beetle (family Gyrinidae), backswimmer beetles (*Notonecta* sp.), predacious diving beetle (family Dytiscidae), dragonfly larva (suborder Anisoptera), damselfly larva (suborder Zygoptera), mosquito larva (family Culicidae), black fly larva (family Simuliidae), amphipod (order Amphipoda), snail (order Gastropoda), leech (class Hirudinea), and oligochaete worms (class Oligochaeta). The diversity of macroinvertebrates observed suggests the stream water is of moderately–high quality. Aquatic macroinvertebrates serve as important food sources to other wildlife, such as fish and waterfowl, although no fish were observed within the creek. **Appendix G** lists invertebrate species observed within Huntley Creek within the HF area of NSA Cutler.

Similar to the VLF area, other common terrestrial invertebrates expected to occur within the HF area include: spiders (class Arachnida); grasshoppers, katydids, crickets, mantids, walkingsticks, and cockroaches (order Orthoptera); earwigs (order Dermaptera); stink bugs (order Hemiptera); cicadas and aphids (order Homoptera); terrestrial beetles (order Coleoptera); butterflies and moths (order Lepidoptera); flies (order Diptera); and ants, wasps, and bees (order Hymenoptera).

During the 2015 survey, five species were captured within the HF area. Three of the species, the boreal spring azure (*Celastrina lucia),* inornate ringlet (*Coenonympha tullia),* and the belted whiteface *(Leucorrhinia frigida),* also were found in the VLF area. The two species that were found solely in the HF area near Huntley Creek include the eastern forktail (*Ischnura verticalis)* and the marsh bluet (*Enallagma erbium)* (Tetra Tech, Inc. 2016a).

Howard Cove Area

The Howard Cove area has not been surveyed for invertebrates. Common terrestrial invertebrates would be expected to occur within the Howard Cove area and include: spiders (class Arachnida); grasshoppers, katydids, crickets, mantids, walkingsticks, and cockroaches (order Orthoptera); earwigs (order Dermaptera); stink bugs (order Hemiptera); cicadas and aphids (order Homoptera); terrestrial beetles (order Coleoptera); butterflies and moths (order Lepidoptera); flies (order Diptera); and ants, wasps, and bees (order Hymenoptera).

2.7 THREATENED AND ENDANGERED SPECIES AND SPECIES OF SPECIAL CONCERN

Data and research on threatened and endangered, and special concern flora and fauna species that are known or expected to occur at NSA Cutler were assembled from existing survey reports and incidental observations made during site survey work. Direct observations or historical reports of known or suspected occurrence of threatened and endangered or special concern species, are discussed below for flora and fauna. No special status amphibian and reptile species were observed, and none are expected to occur at the Installation. **Table 2.29** lists the federal and state threatened and endangered mammal, and bird species known or with the potential to occur at the Installation. This list also includes the Maine vegetation classifications and national vegetation classifications.

Rare natural plant communities are described in **Section 2.8** and **Appendix I**. A list of special status species associated with the Installation is provided in **Appendix H**, which includes many bird species listed as species of special concern in Maine, USFWS BCC, and birds protected by an IBA, the National Shorebird Plan, and DoD PIF.

2.7.1 Vegetation

Surveys for threatened and endangered plant species were conducted at NSA Cutler during the spring, summer, and fall months of 2009. **Appendix H** lists the targeted threatened and endangered plant species and includes annotated comments regarding their rarity in the immediate region, in Maine, and within the U.S. and Canada. Plants of conservation concern provided in **Appendix H** include rare plant species that were not detected, but that have the potential to occur at the Installation due to the presence of suitable habitat. No threatened and endangered plant species were detected during the 2009 field surveys. During the field surveys a potential population of the rare plant Ray's knotweed (*Polygonum oxyspermum* ssp. *raii*) was observed at Davis Beach. A collected specimen was submitted to a Harvard University botanist experienced in identification of *Polygonum* for confirmation. The taxonomic review determined that the collected specimen was not Ray's knotweed but the more common subspecies *Polygonum oxyspermum* ssp. *oxyspermum*.

Very Low Frequency Area

Several recovered species that were formally listed as rare in Maine were detected during the 2009 rare plant surveys, including Hooker's iris (*Iris setosa* var. *canadensis*), blue-eyed grass (*Sisyrinchium montamum*), and dragon's mouth (*Arethusa bulbosa*). There is a historical account of blue birch (*Betula caerulea*), a hybrid of paper birch and gray birch, occurring on Sprague Neck (Famous 2009c). However, this rare hybrid has not been reconfirmed since the Installation was constructed.

High Frequency Area

The longleaf summer bluet (*Houstonia longifolia*), a Maine Species of Special Concern, was detected in upland habitat of the HF area (**Figure 2.10**).

Table 2.29 Federal and State Threatened, Endangered, Special Concern, and Candidate Species of NSA Cutler

Common Name	Scientific Name	Status	Maine Natural Community Types	Maine Ecosystem Types	National Vegetation Classification Ecological System
Mammals					
Canada lynx	*Lynx canadensis*	FT	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Not applicable, no NCT assigned to this habitat type	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; Not applicable	Laurentian-Acadian Pine-Hemlock-Hardwood Forest Non-Specific Disturbed
Eastern small-footed bat	*Myotis leibii*	ST	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest Beech-Birch-Maple Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Pine-Hemlock-Hardwood Forest Laurentian-Acadian Northern Hardwood Forest
Little brown bat	*Myotis lucifugus*	SE	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest Beech-Birch-Maple Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Pine-Hemlock-Hardwood Forest Laurentian-Acadian Northern Hardwood Forest

Table 2.29 Federal and State Threatened, Endangered, Special Concern, and Candidate Species of NSA Cutler

Common Name	Scientific Name	Status	Maine Natural Community Types	Maine Ecosystem Types	National Vegetation Classification Ecological System
Northern long-eared bat	*Myotis septentrionalis*	FT, SE	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest Beech-Birch-Maple Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Pine-Hemlock-Hardwood Forest Laurentian-Acadian Northern Hardwood Forest
Tri-colored bat	*Perimyotis subflavus*	SSC	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest Beech-Birch-Maple Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Pine-Hemlock-Hardwood Forest Laurentian-Acadian Northern Hardwood Forest
Birds					
Arctic tern	*Sterna paradisaea*	ST, BCC	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach
Bald eagle	*Haliaeetus leucocephalus*	ST, BCC (breeding)	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow Not applicable, no NCT assigned to this habitat type	Appalachian-Acadian Basin Swamp; Appalachian-Acadian Rivershore; Streamshore Not applicable	Laurentian-Acadian Wet Meadow-Shrub Swamp Open water (estaurine)
Grasshopper sparrow	*Ammodramus savannarum*	SE	Alder Floodplain; Alder Shrub Thicket; Bluejoint	Appalachian-Acadian Basin Swamp;	Laurentian-Acadian Wet Meadow-Shrub Swamp

Table 2.29 Federal and State Threatened, Endangered, Special Concern, and Candidate Species of NSA Cutler

Common Name	Scientific Name	Status	Maine Natural Community Types	Maine Ecosystem Types	National Vegetation Classification Ecological System
			Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalachian-Acadian Rivershore; Streamshore	
Great cormorant	*Phalacrocorax carbo*	ST (nesting), BCC (non-breeding)	Not applicable, no NCT assigned to this habitat type	Not applicable	Open Water (marine or estuarine)
Harlequin duck	*Histrionicus histrionicus*	ST	Not applicable, no NCT assigned to this habitat type	Not applicable	Open Water (marine or estuarine)
Least tern	*Sternula antillarum*	SE	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach
Peregrine falcon	*Falco peregrinus*	SE (breeding), BCC (breeding)	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalachian-Acadian Basin Swamp; Appalachian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp
Piping plover	*Charadrius melodus*	FT, SE	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach
Razorbill	*Alca torda*	ST	Beach Strand Not applicable, no NCT assigned to this habitat type	Coastal Dune – Marsh Not applicable	Northern Atlantic Coastal Plain Sandy Beach Open Water (marine or estuarine)

Table 2.29 Federal and State Threatened, Endangered, Special Concern, and Candidate Species of NSA Cutler

Common Name	Scientific Name	Status	Maine Natural Community Types	Maine Ecosystem Types	National Vegetation Classification Ecological System
Red knot	*Calidris canutus rufa*	FT	Beach Strand; Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Northern Atlantic Coastal Plain Sandy Beach, Acadian Coastal Salt Marsh
Roseate tern	*Sterna dougallii*	FE, SE	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach
Short-eared owl	*Asio flammeus*	ST (breeding)	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Appalachian-Acadian Basin Swamp; Appalachian-Acadian Rivershore; Streamshore Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Laurentian-Acadian Wet Meadow-Shrub Swamp Boreal-Laurentian Bog
Upland sandpiper	*Bartramia longicauda*	ST	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalachian-Acadian Basin Swamp; Appalachian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp
Invertebrates					
Crowberry blue butterfly	*Plebejus idas ssp. empetri*	SSC	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several	Boreal-Laurentian Bog

Table 2.29 Federal and State Threatened, Endangered, Special Concern, and Candidate Species of NSA Cutler

Common Name	Scientific Name	Status	Maine Natural Community Types	Maine Ecosystem Types	National Vegetation Classification Ecological System
			Dwarf Shrub Bog; Spruce - Larch Wooded Bog	other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	

Source: MDIFW 2015.

FE	Federally Endangered
FT	Federally Threatened
SE	Maine Endangered
SCC	Maine Species of Special Concern
ST	Maine Threatened

Howard Cove Area

No threatened and endangered species surveys have been conducted at the Howard Cove area.

2.7.2 Fish and Wildlife

Federally and state protected wildlife species known to occur at the Installation include four mammals (the Canada lynx, the northern long-eared bat, little brown bat, and eastern small-footed bat) and 13 bird species (8 species of seabird or shorebird, 2 raptors, 2 grassland species and 1 owl) (**Table 2.28**). The crowberry blue butterfly, a Maine species of special concern has also been documented at the Installation. In addition to these protected species, this section describes species that occur in the vicinity of the Installation or that potentially occur on the Installation. These include one bat species that is under review for listing as special status species; marine mammals; and the Atlantic salmon, (*Salmo salar*) a federally protected fish species.

Very Low Frequency Area

<u>*Mammals*</u>

> In February 2009 a **Canada lynx**, a federally threatened mammal species, was observed along the road that leads from the VLF tower field to Sprague Neck (Famous 2009a).

A Canada lynx (federally threatened) was observed along the road that leads from the VLF tower field to Sprague Neck during winter mammal track count surveys (Famous 2009a and **Figure 2.15**). Canada lynx occurs in boreal forests in the northern U.S. and Canada. Generally, good lynx habitat consists of large areas of young, dense stands of balsam fir and northern hardwoods under 30 years old following a major forest disturbance (e.g., cutting, fire). These habitats contain abundant snowshoe hare and denning sites (MDIFW 2003).

In 2009, the USFWS issued revised critical habitat for the Canada lynx to include a section of northern Maine (Unit 1) that includes portions of Aroostook, Franklin, Penobscot, Piscataquis, and Somerset Counties (USFWS 2009a). NSA Cutler is not within the federally designated critical habitat for this species. However, lynx habitat and its main food item, snowshoe hare, occur on the Installation. A fact sheet for this species is provided in **Appendix E**.

The northern long-eared bat, little brown bat, eastern small-footed bat, and tri-colored bat were identified as occurring at the Installation through bat acoustic monitoring (Tetra Tech, Inc. 2014a, 2018). The northern long-eared bat is a federally threatened species and a state endangered species (MDIFW 2015). The little brown bat is state endangered and the eastern small-footed bat is state threatened (MDIFW 2015). USFWS has issued a 90-day finding and is evaluating the tri-colored bat to determine if listing is warranted under the ESA (USFWS 2017). If the tri-colored bat is listed, the INRMP would be revised to address it. Mist net surveys to determine presence/absence of bats have been conducted. No bat species were collected at NSA Cutler during the 2015 mist net surveys (BRI 2015). Two eastern red bats were collected during 2016 mist net surveys (Tetra Tech, Inc. 2018a).

The data from 2013 and 2016 avian radar surveys were used to determine migration patterns of bats, landbirds, and shorebirds. The survey results are discussed in Section 2.6.3 Migrating Landbirds.

NSA Cutler is within white-nose syndrome zone. White-nose syndrome is a fungal disease that is adversely affecting cave-hibernating bats and may completely or significantly reduce bat populations during their hibernation period. White-nose syndrome was confirmed in Washington

County in 2011 and 2012 (White-nose Syndrome 2017). The USFWS determined that designating Critical Habitat for the northern long-eared bat was not prudent (USFWS 2016b). Therefore, there is no Critical Habitat for bat species within NSA Cutler.

An acoustic bat monitoring survey was conducted spring to fall 2013 in the VLF area and spring to fall 2016 in the VLF and HF areas to determine the presence of bat species on the Installation.

In 2013 the most frequently detected bat species was the little brown bat, which occurred at all survey sites. The tri-colored bat and the eastern small-footed bat were detected infrequently during the 2013 surveys. The northern long-eared bat was not detected in 2013. In 2016 the activity rates of hibernating bat species, such as little brown bat and the other protected species, plummeted and the detection rates of migratory bats increased. The tri-colored bat was detected infrequently during the 2016 survey. The little brown bat was detected only a handful of times during the 2016 survey. The northern long-eared bat was detected only once in 2016. The eastern small-footed bat was not detected in 2016.

The Installation provides habitat for Myotis species and other migratory or tree-roosting species. Resident Myotis species may be present in low numbers year-round along forested edge habitat or the cabin located on the installation. Migratory bat species occur during the summer months (Tetra Tech, Inc. 2014a). It is likely that the little brown bat, eastern small-footed bat, and the northern long-eared bat would primarily use areas inside the Installation for foraging and roosting.

The forested habitats of the Installation provide the local bat community with foraging and roosting habitat from the late spring to late fall (Tetra Tech, Inc. 2018a). Summer roosts of the eastern small-footed bat typically are within talus (a slope of accumulated rock debris) areas associated with rocky ridge-tops, but they also will roost on buildings and bridges, and behind loose bark on trees. Overwintering hibernacula of eastern small-footed bats, include caves and abandoned mines. Eastern small-footed bats are nocturnal foragers, foraging primarily over streams, ponds, or other waterbodies that have high concentrations of nocturnal insects. The species is a generalist feeder, feeding primarily on soft-bodied prey that they capture during flight or glean from surfaces.

Preferred summer roosts of the northern long-eared bat are generally associated with old-growth forests composed of trees 100 years old or older, and this species is dependent on intact interior forest habitats that have a low edge-to-interior ratio (USFWS 2011). Relevant late-successional forest features include a high percentage of old trees, uneven forest structure, single and multiple tree-fall gaps, standing snags, and woody debris. This species appears to favor small cracks or crevices in cave ceilings for hibernation. Northern long-eared bats are opportunistic insectivores, obtaining prey both in flight and by gleaning from surfaces. Prey includes small insects, such as moths, flies, leafhoppers, and beetles. Forested hillsides and ridges are their preferred foraging habitat, with the presence of mature forest stands thought to play an important role in their foraging behavior. Foraging occurs at dusk over small ponds and forest clearings under the forest canopy, or along streams.

Little brown bat reproductive females form maternity colonies in barns, attics, tree cavities, and other places that remain dark throughout the day (Kunz and Reichard 2011). Females tend to have high roost fidelity and return to their natal roosts each year. Little brown bats are opportunistic in selection of roost sites and are known to quickly exploit new roost sites once identified. Winter hibernacula are typically within caves or mines located between 180 and 620 miles from summer roosts. Little brown bats forage in flight on insects, often feeding over open water or along the margin of waterbodies and forest habitat. Juveniles tend to forage in clearings or open areas.

Although offshore areas of NSA Cutler are not covered by this INRMP, the following marine wildlife observations are provided as a reference to the importance of the marine habitat that surrounds the peninsula of the VLF area. In October 2009, a finback whale (*Balaenoptera physalus*), a federally threatened species, was observed about a mile offshore from Big Holly Cove feeding with a group of about 150 diving northern gannets and other seabirds. With the exception of years when schools of spawning herring (*Clupea* spp.) are present, fin whales and other cetaceans are uncommon near the Installation. Minke whales (*Balaenoptera* sp.) were observed in Cross Island Narrows within 500 ft of Little Holly Cove in 1993 (Famous and Spencer-Famous 1994). Gray seal pups were observed on ledges in Cross Island Narrows south of the Coast Guard Landing in 1993 and 1994 (Famous and Spencer-Famous 1994).

The endangered North Atlantic right whale (*Eubalaena glacialis*), threatened humpback whale (*Megaptera novaeangliae*), and Atlantic white-sided dolphin (*Lagenorhynchus acutus*) were observed in the outer section of Little Machias Bay during the 1980s (Turnbull 2009). Over 25 percent of the world population of the North Atlantic right whale summer in the lower Bay of Fundy, and individual whales have historically been observed in the Grand Manan Channel between NSA Cutler and Grand Manan Island. Other federally protected whale species documented in the Bay of Fundy region over the past three decades include sperm whale (*Physeter catodon*), blue whale (*Balaenoptera musculus*), and sei whale (*Balaenoptera borealis*; one occurrence).

<u>*Birds*</u>

Several state and federally protected bird species have been observed in the VLF area (**Table 2.28** and **Appendix C**). The only federally endangered bird species observed in the VLF area is the roseate tern (*Sterna dougallii*). At the Installation, roseate terns forage and take advantage of shoreline habitat around Sprague Neck and Great Pond Cove for resting and roosting at high tide (Famous 2010a). The roseate tern does not breed at the Installation but uses the site and nearby beach areas of Little Machias Bay, and may bring young there to rest. The highest numbers of terns using Sprague Neck occur during high tide. Feeding terns are present in the Cross Island Narrows, in proximity to Machias Seal Island, and likely nest on the Brothers Islands.

Short-eared owl perching in VLF area.

The federally threatened piping plover has been observed at Sprague Neck Bar. Piping plovers use the habitat at the Installation for stopovers during migration flights. Breeding habitat for this species occurs in the VLF area.

The federally threatened red knot (*Calidris canutus rufa*) has been documented to occur at Sprague Neck and in Little Machias Bay (Famous 2009c). These large shorebirds forage along the shores of the VLF area during stopovers along their migration flights, primarily the fall migration between late July and early October.

Five species observed that are listed as endangered in Maine include the breeding population of peregrine falcon (*Falco peregrinus*), piping plover, least tern (*Sternula antillarum*), roseate tern, and grasshopper sparrow (*Ammodramus savannarum*). Seven species listed as threatened in Maine that utilize the VLF area are listed in **Table 2.28**.

The raptor migration survey identified the peregrine falcon, a state-listed endangered species, as occurring on the Installation. There were 11 individuals observed during the general survey, and one individual was observed in the hazard area. No federally-listed raptor species were observed during these surveys. (Tetra Tech, Inc. 2017b)

An additional 41 bird species observed at the Installation are listed as a species of special concern in Maine, and suitable habitat for eight other bird species known to occur at the VLF area have been designated as Important Bird Habitat by the state of Maine (**Appendix H**).

The bald eagle was removed from the federal list of threatened and endangered wildlife in 2007. The USFWS established National Bald Eagle Management Guidelines (USFWS 2007) in 2007 that include protective measures outlined in the Bald and Golden Eagle Protection Act (16 U.S.C. 668–668c) and the MBTA (16 U.S.C. 703–712). At NSA Cutler, bald eagles are found primarily near the immediate coastline or on nearshore ledges; they are distributed throughout most of Installation, but especially at the VLF site. MDIFW has designated areas in the vicinity of NSA Cutler as important bald eagle nesting habitat (MDEP 2009).

Bald eagles were the most commonly observed raptor species at the Installation during surveys. It was speculated that some of the bald eagles observed were residents. Some of the bald eagles were observed within the hazard area, where the birds are at risk of collisions with towers and guy wire arrays. (Tetra Tech, Inc. 2017b)

There are four known bald eagle nesting locations on or near the Installation, which translates into eight resident, territorial bald eagles. One eagle nest is on the Sprague Neck peninsula and the next closest eagle nest is on Cape Wash Island, approximately 0.25 mile southeast of the VLF area peninsula. Four bald eagles were outfitted with transmitters to assess the potential collision risks in the VLF area. All four eagles tended to generally center on their nest sites. The two closest eagles spent limited time within the radio tower hazard area; the Cape Wash eagle spent more time within the hazard zone. The limited data suggest higher probability of entering into the buffered hazard area and hazard area during the fall/early winter versus summer. Additional data is needed to determine if the time of year affects bald eagle entry into the hazard area. (DeSorbo et al. 2018)

Fatality monitoring surveys over a three-year period (2015-2017) did not find any eagle carcasses, and the collision fatality rate estimate for eagles is zero (Tetra Tech, Inc. 2018b). However, a bald eagle fatality or serious injury has been recorded five times at NSA Cutler since 1980 (early 1980s, 1985, 1996, 2005, and 2013). Because of the risk to bald eagles, as well as other birds and bats, the Installation has prepared an Eagle Protection Plan and a Bird and Bat Conservation Strategy Report that is included as **Appendix J** and **Appendix K**.

Due to the occurrence of bald eagles at NSA Cutler, the National Bald Eagle Management Guidelines have been included as a management measure in this INRMP for the protection of this species.

With the exception of the European starling (*Sturnus vulgaris*) and rock pigeon (*Columba livia*), the birds known to occur at NSA Cutler are protected either by the MBTA or state game laws. NSA Cutler supports a high concentration of bird species that are USFWS BCC, including the 104 species that were detected at the Installation during field activities (**Appendix H**). Most of these species are associated with the VLF area and have been documented to have severe population declines either regionally, nationally, or internationally, and have been identified as species of concern by federal or state agencies, DoD PIF, or the National Shorebird Plan.

Osprey are migratory birds that are present on NSA Cutler during the spring and summer. Osprey begin to arrive at nesting grounds in North America in mid-March through early April, continuing through early May (Zarn 1974 *in* Navy 2007). During this time, they are especially selective of prey sites that are shallow and contain numerous populations of schooling fish (Bonney et al. 1981 *in* Navy 2007). At NSA Cutler, ospreys frequently construct nests on the antennas at the VLF. Ospreys that nest in the northeastern U.S. often show a high degree of fidelity to their natal nesting sites, returning to these locations to breed in successive years (Poole 1983 *in* Navy 2007). Osprey begin to migrate to southern locations from mid- to late September through October.

As part of the 1988 amendment to the Fish and Wildlife Conservation Act (Public Law 100-653), the USFWS is required to identify species, subspecies, and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA. According to the USFWS Birds of Conservation Concern 2008 (USFWS 2008), NSA Cutler is located within the U.S. portion of the Atlantic Northern Forests region, also known as Bird Conservation Region (BCR) 14. The goal envisioned by the USFWS in identifying BCC species is to stimulate the implementation of coordinated, proactive management and conservation actions among federal, state, tribal, and private partners to prevent these species from being listed under ESA. Additionally, the BCR lists are intended to assist federal land-managing agencies and their partners in their efforts to abide by the bird conservation principles embodied in the MBTA and EO 13186, *Responsibilities of federal agencies to protect migratory birds* (USFWS 2008). There are 29 bird species listed by USFWS for BCR 14 and 25 of these species have been documented at the Installation (**Appendix G** and **Appendix H**).

Sprague Neck Bar.

The high concentration of at-risk species documented to occur at the VLF area is due to the diversity of terrestrial habitat types, plus the presence of highly productive estuarine and marine habitats that support large numbers of shorebirds, seabird, waterfowl and other waterbirds. Extensive intertidal flats, productive submerged ledges and invertebrate reefs, and nearby tidal upwelling areas rich in plankton and fish stocks surround the Installation.

Fish: Atlantic Salmon (Federal Endangered Species)

Historically, the northeast section of Maine coastline, and its associated rivers were major migratory routes and spawning grounds for Atlantic salmon. Due to biological, environmental, and anthropogenic impacts, such as pollution, habitat degradation, overfishing and bycatch, which have increased over the past several decades, the population of Atlantic salmon documented to use this area of the Maine coastline and area rivers for migration and spawning has declined significantly, resulting in the recent federal listing of this species as endangered by the USFWS and NOAA. Other factors that are thought to contribute to the decline in Atlantic salmon populations in the area include the presence of salmon aquaculture projects in the area, which can cause negative changes in the gene pool, contribute to the frequency of disease, and cause negative impacts from competition (Fay et al. 2006).

The USFWS and NMFS listed the Gulf of Maine Distinct Population Segment of Atlantic salmon as endangered on December 17, 2000 (NMFS and USFWS 2005). The Gulf of Maine Distinct Population Segment includes all naturally reproducing populations of Atlantic salmon associated with the Kennebec River downstream of the former Edwards Dam site, extending northward to the mouth of the St. Croix River, as well as salmon taken for hatchery rearing for broodstock purposes, and any captive progeny from these salmon. The closest rivers to the Installation that support populations of the Gulf of Maine Distinct Population Segment are the Machias and East Machias rivers, which discharge into Machias Bay.

The freshwater habitat of this species includes clear, cold streams and rivers that have relatively unobstructed connection to the sea. Spawning habitat is characterized by coarse gravel or rubble bottom. NOAA has designated critical habitat for Atlantic salmon for the NSA Cutler area and Atlantic salmon utilize areas off the coast of the Installation and the nearby rivers. The Installation does not contain suitable habitat to support Atlantic salmon. The VLF area lacks drainages that have sustained flow and, as described in Section 2.4.2, only ephemeral drainages and constructed ditches occur within the VLF. Although there is no suitable Atlantic salmon habitat at NSA Cutler, the HUC 10 watershed in which the Installation is located is supports the Gulf of Maine Distinct Population Segment of Atlantic salmon.

<u>Invertebrates: Crowberry Blue Butterfly (Maine Species of Special Concern)</u>

> **Black crowberry** shrubs are an essential component of the **crowberry blue butterfly** life cycle, as it is the preferred substrate on which eggs are deposited by the adult female of this Maine species of special concern.

The crowberry blue butterfly is a Maine species of special concern, has an MNAP Rank of S4 (apparently secure in Maine), and a Global Rank of G5 (demonstrably secure globally). Black crowberry is an essential component of the crowberry blue butterfly life cycle, as it is the preferred substrate on which eggs are deposited. Upon hatching, larvae feed on black crowberry leaves until forming a pupa, from which the adult butterfly emerges. Within the VLF area, field biologists tentatively identified crowberry blue butterflies in a sloping bog behind Davis Beach and in a small coastal peatland west of the artillery range (**Figure 2.15**). However, no crowberry blue butterflies were collected during surveys (Tetra Tech, Inc. 2016a).

High Frequency Area

<u>Mammals</u>

No threatened or endangered mammal species were observed or are known to occur in the HF area.

<u>Birds</u>

Although a few sensitive bird species have been documented at the HF area, a majority of the sensitive species that occur at NSA Cutler are associated with the VLF area, due to the coastal location and diversity of habitat types found at the VLF area. One exception is the short-eared owl, which is expected to utilize the habitats of the HF area and adjacent bog habitat for hunting. Although bald eagle observations are primarily associated with the VLF area, the species also has been observed at the HF site. Observations are rare because, with the exception of occasional dead carcasses, feeding habitat is limited. Although rare, grasshopper sparrows and upland sandpipers have a low possibility of occurring at the HF area.

Fish: Atlantic Salmon (Federal Endangered Species)

Huntley Creek, a small perennial stream, flows through the HF area. Although this small stream maintains flow throughout the year, it flows into a dammed reservoir (Huntley Creek Pond) that prevents passage to and/or from the sea. Therefore, Atlantic salmon would not occur on the HF area. Prior to the impoundment of Huntley Creek, it is unlikely that Atlantic salmon used Huntley Creek for spawning. The stream lacks key features that are necessary for Atlantic salmon spawning habitat. The flow is generally too low to sustain salmon migration. Gravel substrate for spawning beds are uncommon and substrates of finer grain material including clay are more abundant. Although the Installation does not contain suitable Atlantic salmon habitat, the HUC 10 watershed in which the Installation is located is known to support the Gulf of Maine Distinct Population Segment of Atlantic salmon.

Invertebrates: Crowberry Blue Butterfly (Maine Species of Special Concern)

Black crowberry is one of the dominant plants associated with Kelley Heath Coastal Plateau Bog that straddles the southern border of the HF area (See Figure 2-11). Habitat suitable for the crowberry blue has colonized disturbed areas in many sections of the HF site. It is particularly common on damp surfaces under and surrounding antenna structures on the south side and northeast corner of the site. Large patches of black crowberry occur near the antenna near the stream crossing and the antenna at the north edge of the Installation above the stream crossing. Surveys for crowberry blue butterfly have not detected this species (Tetra Tech, Inc. 2016a).

Howard Cove Area

No threatened and endangered species surveys have been conducted at the Howard Cove area.

2.8 RARE COMMUNITIES AND SIGNIFICANT WILDLIFE HABITAT

For this INRMP, special concern communities and habitat includes rare community types identified by the MNAP (e.g., state rank S1, S2, S3), and Significant Wildlife Habitat defined by MDIFW. MDIFW has defined and/or mapped the following significant habitat areas: high and moderate value waterfowl and wading bird habitat, including nesting and feeding areas; shorebird nesting, feeding, and staging areas; significant vernal pools; and deer wintering habitat. Vernal pool-dependent species have been observed on the Installation. However, the data collected are insufficient to determine if the vernal pools surveyed meet significance criteria as defined by MDIFW

MNAP State Rarity Ranks

S1–Critically imperiled: extreme rarity (≤5 occurrences) or especially vulnerable to extirpation from ME;

S2–Imperiled in Maine because of rarity (6-20 occurrences) or vulnerable to further decline;

S3–Rare in Maine (20-100 occurrences);

S4–Apparently secure in Maine;

S5–Demonstrably secure in Maine;

SH–Known historically from the state, not verified in the past 20 years;

SX–Apparently extirpated from the state;

SU–Under consideration for assigning rarity status; and

S#?–Current occurrence data suggests assigned rank, uncertainty exists (e.g., S3?).

For this INRMP, special concern communities and habitat includes rare community types identified by the MNAP (e.g., state rank S1, S2, S3), and Significant Wildlife Habitat defined by MDIFW. MDIFW has defined and/or mapped the following significant habitat areas: high and moderate value waterfowl and wading bird habitat, including nesting and feeding areas; shorebird nesting, feeding, and staging areas; significant vernal pools; and deer wintering habitat. Vernal pool-dependent species have been observed on the Installation. However, the data collected are insufficient to determine if the vernal pools surveyed meet significance criteria as defined by MDIFW.

Very Low Frequency Area

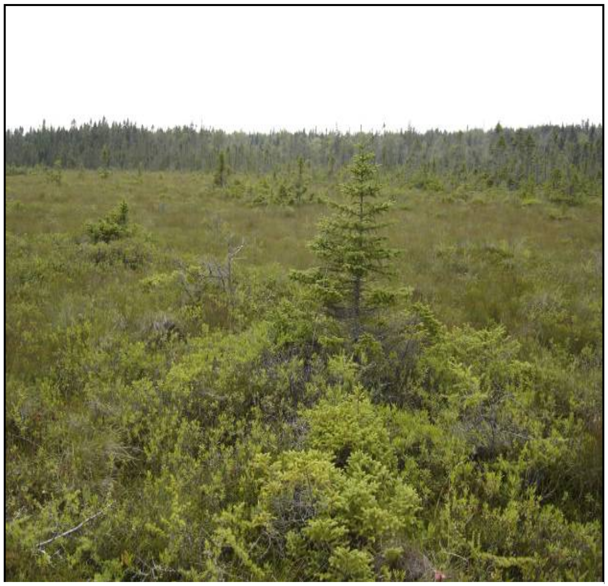
Looking northeast from southeast area of VLF peninsula.

The VLF area contains the MNAP Coastal Plateau Bog ecosystem, which is state-ranked S3, rare in Maine. Four coastal peatland communities occur entirely within the VLF along the northern boundary of the site. These peatlands include one area of Heath–Crowberry Maritime Slope Bog (S2) and three areas of Deer-hair Sedge Bog Lawn (S3). A fifth peatland occurs along the northeast boundary of the VLF area and extends offsite. The VLF tower field is over two buried historical peatlands in the southeast portion of the southern antenna array. Minimal subsurface water movement occurs in coastal peatlands because they are perched on an impermeable layer (e.g., marine clay of the Presumpscot formation) that isolates it from the regional water table (Famous 2009c).

Coastal peatlands containing black crowberry support the rare crowberry blue butterfly, a species found only at 17 locations in the U.S. black crowberry is the host plant for the caterpillar stage of this species. See **Section 2.7.2** for a more thorough discussion of the crowberry blue butterfly. Habitat is also present that has the potential to support other state listed plants, including northern comandra (*Geocaulon lividum*), the diminutive boreal blueberry (*Vaccinium borealis*), screw-stem (*Bartonia paniculata*), Wiegand's sedge (*Carex wiegandii*), and former state listed and regionally rare/uncommon species such as dragon’s mouth, and baked-apple berry (*Rubus chamaemorus*).

The long gravel bar at the end of Sprague Neck provides foraging and roosting habitat for thousands of shorebirds of at least 30 species. Due to the abundance and high species richness of birds, the foraging and roosting habitat at Sprague Neck was historically considered one of the most heavily used bird locations in the State of Maine (Famous et al. 1980). In recognition of its significance, the Navy designated the Sprague Neck Bar as an ERA and Watchable Wildlife Area in 1990 (DoD 1990). This was the first ERA designated by the Navy in the northeast and the first Watchable Wildlife Area established within the DoD. In addition to the habitat preserved as part of the ERA and Watchable Wildlife Area, much of the areas along the coast of the VLF peninsula and Sprague’s Neck peninsula have been designated as important habitat for tidal wading waterfowl (**Figure 2.15**). Through the DoD’s Legacy Resource Management Program (Legacy Program, or Legacy), the Navy cooperatively monitored shorebird populations for five years during the late 1990s to assess shorebird use, potential risks and to use for developing local management practices (Famous 1994).

High Frequency Area



Kelley Heath adjacent to the HF area.

The MNAP classifies Kelley Heath as a Coastal Plateau Bog within the significant Coastal Plateau Bog ecosystem type. Kelley Heath is approximately 225 acres in size and extends south beyond the southern boundary of the HF site (Figure 2.16). Only approximately 8 acres of the northernmost section of Kelley Heath is within the HF boundaries. The perimeter of the filled area at the HF site has been naturally recolonizing over the last 50 years by bog species characteristic of Coastal Plateau Peatlands, including six species of sphagnum moss. The Kelley Heath Coastal Plateau Bog is surrounded by black spruce flats (MNAP 2003). Dominant plant species within Kelley Heath include deer-hair sedge (*Trichophorum cespitosum*) and black crowberry. Tussock cotton-grass (*Eriophorum vaginatum*), sheep laurel (*Kalmia angustifolia*), bog laurel (*Kalmia polifolia*), small cranberry (*Vaccinium oxycoccos*), Labrador tea (*Rhododendron groenlandicum*), black chokeberry (*Photinia melanocarpa*), and baked-apple berry are other plant species common to Kelley Heath.

Coastal peatlands containing black crowberry may support the rare crowberry blue butterfly, as well as other state listed plants. See the coastal peatland description for the VLF area above for other species that may occur within the coastal peatland communities.

The MNAP created two focus areas in the vicinity of NSA Cutler: the Cutler West Focus Area and the Larrabee Focus Area. The Cutler West Focus Area, which included Kelley Heath, is west of Route 191 and south of the HF area. The Larrabee Focus Area is south of Sprague Neck Peninsula. MNAP is in the process of combining these two separate focus areas into a single Machias Bay Focus Area.

Howard Cove Area

It is unknown if the Howard Cove area contains special concern communities and habitat.

2.9 Land Management

2.9.1 Installation Restoration Sites

The Navy developed the IRP in 1997. The goal of this initiative is to identify, investigate, and clean up former waste disposal sites in accordance with the Resource Conservation and Recovery Act (RCRA), and/or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Very Low Frequency Area

Four waste disposal sites were identified at NSA Cutler for restoration as part of the Navy's IRP (Tetra Tech, Inc. 2009); the Fire Training Area, Salvage Yard Area, Construction Debris Area, and the Very Low Frequency Area (**Figure 2.19**). Within the VLF area, soils were found to be contaminated with lead from lead-based paint chips that had fallen off the towers. Restoration activities were completed for the Fire Training Area in 2009, and waste removal and remediation activities that are planned for the other three sites have been identified. Waste removal and remediation likely will involve habitat restoration of the areas where contaminated soil is removed. However, these projects are still in the planning or early implementation stages, and do not contain specific habitat restoration requirements at this time.

In addition to the four IRP sites, several areas of concern (AOCs) also were identified during the Installation-wide IRP investigation. In 2007, the Navy completed a Preliminary Assessment (PA) with the objective of identifying AOCs where the current or historical use, storage, or disposal of oil or hazardous materials may have resulted in a release of contamination to environmental media. The PA identified 13 AOCs that warranted additional investigation under the Navy's IRP. In 2007 and 2008, Tetra Tech on behalf of the Navy, designed and implemented site inspections at nine of these 13 AOCs. The objective of the site inspections was to determine the presence and nature, and preliminary extent, of contamination in environmental media at each AOC and to determine whether a more comprehensive investigation was warranted based on a preliminary evaluation of the potential for unacceptable human health or ecological risk.

In October/November 2009, Tetra Tech conducted a second phase of investigation at six AOCs and initiated investigations at the other four AOCs. The results of this second phase investigation were not available for inclusion in the INRMP. If the potential for significant risks to human health or the environmental are identified during the AOC investigations, the AOC will be re-classified as a "site" and more comprehensive investigations will be designed and implemented.

High Frequency Area

There are no IRP sites associated with the HF area.

Howard Cove Area

There are no IRP sites associated with the Howard Cove area.

2.9.2 Hazardous Waste

Very Low Frequency Area

NSA Cutler is considered a large quantity hazardous waste generator based on the waste generated by the VLF power plant. Although lead-based paint removal is being performed on the VLF area antenna towers, this is considered a temporary IRP project and will not contribute to long-term hazardous waste generation.

High Frequency Area

The HF area generates very little hazardous waste, with waste oil from generators constituting the primary hazardous waste collected from this site.

Howard Cove Area

The Howard Cove area generates no hazardous waste

Cultural Resources

A cultural resources survey was conducted at NSA Cutler in 2001 (NCTAMSLANT DET Cutler 2003). The 2001 survey was conducted in compliance with existing historic preservation obligations related to the transfer of the Administrative, HF, and VLF areas. The survey determined the overall archaeological sensitivity of the VLF, HF, and Administration areas and determined whether the Sprague Neck (VLF), HF, and Administration areas contained buildings or structures that would qualify for inclusion in the National Register of Historic Places (NRHP) based on their connection to the Cold War era. The survey consisted of an archaeological reconnaissance survey, and a Cold War architectural resources survey. The archaeological reconnaissance survey included an evaluation of past ground disturbances, documentary analysis, review of aerial photographs, and a minimal amount of subsurface testing. The Cold War architectural resources survey was designed to expand on a similar Cold War architectural survey that was conducted in 1999–2000 in the VLF area. The following sections summarize the findings of the archaeological reconnaissance survey and the two Cold War Architectural Resources surveys.

2.9.3 Archaeological Reconnaissance Survey Findings

Very Low Frequency Area

A significant amount of past ground disturbance across much of the Installation was documented in the archaeological reconnaissance survey. However, despite this level of disturbance, the presence of a prehistoric archaeological site on Sprague Neck (site number 62.2) on the VLF was documented (NCTAMSLANT DET Cutler 2003). Subsequent subsurface testing (i.e., shovel test pits) recovered small quantities of prehistoric remains at the location, which provided confirmation for the location as a prehistoric archaeological site. In addition to the Sprague Neck site, a new prehistoric site (site number 62.49) was identified along the coastline of the VLF peninsula adjacent to Little Holly Cove. Artifacts unearthed at this Native American site were predominantly chips of stone from stone tool making. Both of the prehistoric sites documented within the Installation boundaries require intensive testing to determine NRHP eligibility, which has not been undertaken.

High Frequency Area

No cultural materials were recovered from the HF area.

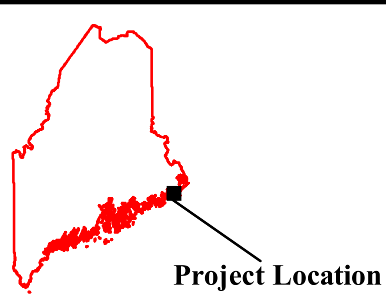
Howard Cove Area

It is unknown if the Howard Cove area contains archaeological material.

2.9.4 Cold War Architectural Resources Survey Findings

Very Low Frequency and High Frequency Areas

The first Cold War architectural resources evaluation of the VLF area determined that the VLF area contains one NRHP-eligible historic district, the NSA Cutler VLF Historic District. A similar survey of the Administrative and HF areas was conducted in 2001 and linked 96.7 acres within the HF area to the existing historic district. The combined, noncontiguous area is referred to as the Cutler VLF and HF Communications Historic District and includes 134 contributing architectural resources with 112 in the VLF area and 22 in the HF area (NCTAMSLANT DET Cutler 2003) (**Figure 2.20**).

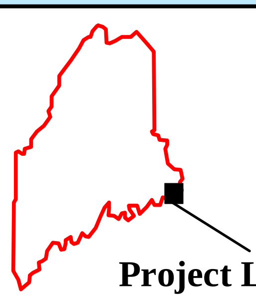


Source: ESRI, USA Base Map Data;
Navy 2016, 2017

0 3,000 6,000
Feet

Figure 2.19. Very Low Frequency Area, Installation Restoration Sites NSA Cutler, Cutler, Maine.

Date:
02/18



Source: USGS 7.5' Series Topographic Quadrangles, Cross Island and Cutler Maine, 1960, Photorevised 1975, Machias Bay, 1975, Revised 1978.

2,500 1,250 0 2,500 5,000

Feet

LEGEND

- NSA Cutler Project Boundary
- National Register Boundary
- Major Road
- Local Road
- Minor Road
- Town Boundaries
- County Boundaries

Figure 2.20. Cutler VLF and HF Communications Historic District NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH, INC.

Date: 04/10

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Howard Cove Area

Howard Cove area does not contain any structures and therefore does not have any Cold War Architectural Resources.

2.9.5 Integrated Cultural Resources Management Plan

An ICRMP is required for all DoD facilities per Federal and DoD regulations. An ICRMP is a 5-year planning document, which serves to manage and protect cultural and historic resources under the control of a military installation so that such resources are properly considered and integrated into the facilities decision-making process. The purpose of an ICRMP is to integrate the entirety of the Installation's cultural resources program with the ongoing military mission. As such, an ICRMP allows for identification of potential conflicts between the installation's mission and cultural resources and identifies actions necessary to meet statutory and regulatory requirements. NSA Cutler has an ICRMP.

2.10 Regional Conservation Lands

There are no conservation lands designated within the boundaries of NSA Cutler. However, several conservation areas are located within a 10-mile radius of the Installation (MDEP 2009). The CINWR is located approximately 0.25 mile to the south of the VLF peninsula. This 1,700-acre refuge comprises six islands, including Cross, Scotch, Outer Double Head Shot, Inner Double Head Shot, Mink, and Old Man islands (USFWS 2009b). Spruce-fir forest is the predominant community type on Cross, Mink, and Scotch islands, and these islands support populations of small mammals, white-tailed deer, bald eagles, osprey, and a variety of songbirds. These islands are important stopover areas for migrating waterfowl, songbirds, shorebirds, and raptors during the fall, as they move toward their wintering grounds to the south. Grasses and shrubs are the primary community types on the Double Head Shot islands and Old Man island, and these islands are primarily used by nesting seabirds. Old Man Island is one of four known nesting sites for razorbills in the Gulf of Maine (USFWS 2009b). In addition to the Kelley Heath that borders and extends into the HF area, two other peatlands that are outside the Installation boundaries are included in the MNAP Cutler West Focus Area: North Cutler Heath and West Cutler Heath. North Cutler Heath comprises three peatlands ranging from 10 to 29 acres and is just beyond the northeastern boundary of the VLF area, north of Ridge Road and west of Route 191 (MNAP 2003). West Cutler Heath is located east of Sprague Neck. Both of these heath areas contain black crowberry habitat that is essential for the larval development of the crowberry blue butterfly (MNAP 2003). Additional detail regarding the crowberry blue butterfly and black crowberry peatland habitat is included in **Sections 2.7.2 and 2.8**.

The MDIFW has identified and mapped important waterfowl and wading bird habitat, and shorebird resting and feeding habitat throughout Maine. Maine contains numerous coastal and inland areas that are important for birds migrating southward. These areas are sought out by birds due to the availability of suitable roosting habitat in proximity to food resources, which are critical for meeting their energy demands. As a result, shorebirds are often observed concentrating in large groups to utilize the limited number of these prime habitats. Shorebirds exhibit fidelity to these sites, which make them particularly vulnerable to habitat degradation, disturbance by humans and their pets, and habitat loss. Coastal areas of eastern Maine, including the Bay of Fundy and eastern Maine are considered the most important southward staging area eastern North American shorebirds (MDIFW 2009b).

MDIFW has designated approximately 40 percent of the Little Machias Bay as significant high-use shorebird habitat (Famous 2010b). Although not within the site boundaries, three areas along the northern and western edge of Cross Island, which is immediately south of the VLF peninsula, have been designated as important tidal wading bird and waterfowl habitat. In addition, MDIFW has identified important shorebird feeding habitat in the northeastern end of Holmes Bay, along the western edge of the VLF peninsula (from the southern end of Davis Beach, along Deep Cove, and in the vicinity of Great Pond and Great Pond Cove), and in the northern region of Little Machias Bay (**Figure 2.15 and Figure 2.16**). MDIFW has identified important shorebird roosting habitat along the northeastern edge of the VLF peninsula within Little Machias Bay and along the northern edge of Little Machias Bay. All of Hog Island, which is just north of Sprague Neck, and its vicinity has been designated as important shorebird roosting habitat. Shorebirds feeding in Holmes Bay utilize both the end of Sprague Neck Bar and Hog Island as high tide roosting areas. Seabirds do not nest at NSA Cutler, largely due to the presence of small mammals and other predators. However, nesting colonies occur on several nearby islands. There are major nesting colonies located on Old Man Island and one of the Double Head Shot Islands, south of the VLF peninsula, as well both of the Libby Islands and the Eastern Brothers located to the southeast. Smaller seabird nesting colonies are present on other islands located between Cross Island and Eastern Brothers.

3.0 NATURAL RESOURCES MANAGEMENT PROGRAMMATIC OBJECTIVES AND RECOMMENDATIONS

This section provides detailed information on the primary natural resources management programmatic objectives identified for the Installation. Specific projects and recommendations have been developed that will assist the Installation in meeting the established programmatic objectives. Recommendations are bulleted differently in the following sections depending on whether the project is funding dependent, or if it is a recommendation that will not require a specific funding mechanism in order to complete. All projects requiring funding are summarized in **Section 6.0** and **Appendix C**, and are coded according to the programmatic objective that they are associated with as follows:

- LA – land management
- FW – fish and wildlife management
- FO – forestry management
- OR – outdoor recreation management

☞ Specific project that requires a funding mechanism to complete. Funding dependent projects may be associated with more than one programmatic objective.

❖ Management recommendation that can be carried out passively, without the need to seek specific funding to complete.

The NRM will utilize a Project Planning Environmental Checklist (provided in **Appendix D**) to determine the environmental requirements associated with a proposed project prior to a project being implemented.

Implementation of this INRMP will benefit the operational mission of NSA Cutler, whereas lack of active management of natural resources may result in a negative impact to the operational mission. No impacts to the military mission are expected to occur from implementation of the programmatic objectives and recommendations described in this section; however, if special considerations are necessary, these are described where applicable.

3.1 LAND MANAGEMENT

OPNAVINST 5090.1D (Navy 2014) defines land management as programs and techniques for management of lands, wetlands, and water quality, including soil conservation, erosion control and nonpoint source pollution, surface and subsurface waters, habitat restoration, control of noxious weed and poisonous plants, agricultural out leasing, range management, identification and protection of wetlands, watersheds, floodplains management, landscaping, and grounds maintenance.

Land management at the Installation includes:

- Water resources management, including floodplains, wetlands, surface waters, and riparian areas

- Water quality management (CWA compliance, point and non-point source water pollution, sedimentation and erosion control)
- Coastal zone management
- Vegetation management
- Invasive plant species management
- Wildland fire management
- Rare communities and Significant Wildlife Habitat
- IRP and hazardous waste management
- Regional conservation lands
- Leases
- Cultural resources
- Environmental and natural resources training
- GIS management.

Land Management Programmatic Objectives

The following programmatic objectives have been established for land management at NSA Cutler.

1. Continue to manage, maintain, and enhance land areas with natural resource value.
2. Improve and enhance water quality by reducing non-point sources of pollution.
3. Continue ongoing Navy efforts to identify and clean up existing contaminated areas.
4. Preserve, protect, and enhance water resources (e.g., wetlands, vernal pools, surface water, groundwater).
5. Maintain and enhance native vegetation, and control and monitor invasive species.
6. Provide adequate special management or protection of threatened and endangered species, significant rare communities and species at risk.

3.1.1 Water Resources Management

Water resources are an important part of natural ecosystems due to the diverse biological and ecological functions they support and hydrologic functions they perform, such as groundwater recharge, pollution treatment, nutrient cycling, provision of wildlife habitat and niches for unique flora and fauna, stormwater storage, erosion protection, and improving water quality (Benton et al. 2008). To protect these important resources, many federal, state, and local laws have been enacted to regulate actions that impact them. The following sections describe these regulations and provide management recommendations that address the specific set of issues that occur at NSA Cutler.

- ❖ Military mission activities will be conducted in a manner that protects water quality, water temperature, bank and channel stability, floodplain functioning, vegetation, sediment trapping abilities of riparian ecosystems, and salmonid habitat.

Nuisance wildlife are not a significant problem at NSA Cutler; however, the Installation has an active beaver population that has constructed a beaver lodge within one of the ponds in the southern area of the VLF peninsula. Beaver lodges have the potential to affect water drainage, impede water flow, and impact water quality. Routine monitoring of nuisance wildlife identified at the Installation should be conducted to determine if nuisance wildlife removal or relocation actions are necessary to protect natural resources. NSA Cutler personnel conduct beaver monitoring annually.

- ☞ LA01 and FW01: Conduct annual monitoring of invasive and nuisance wildlife, such as beavers and bats, to determine if habitat modification to discourage beavers or wildlife removal of nuisance bats (excluding federally or state protected bat species) or other remedial actions are necessary to protect natural resources and/or human health and safety. Create a habitat modification plan to address beaver activity.

3.1.1.1 Floodplain Management

Floodplains receive protection through EO 11988, *Floodplain Management*, which directs federal agencies to reduce the risk of flood loss by not building in floodplains and to restore and preserve the natural and beneficial values served by floodplains. At the state level, the MDACF, Floodplain Management Program, works with communities and building professionals to reduce the risk of flooding. The program works with other state agencies, such as Maine Department of Environmental Protection (MDEP), Maine Department of Conservation, in reviewing development projects for consistency with Maine's National Resources Protections Act and site location law to ensure that development under state review is designed and developed to reduce future flood damages (MDACF 2013).

Maine also has Mandatory Shoreland Zoning requirements (Maine Revised Statutes Annotated Title 38, Chapter 3, Subchapter 1, Article 2-B) for any development activities proposed within the shoreland zone. The shoreland zone is defined as areas within 250 ft of the normal high-water line of any great pond, river or saltwater body, within 250 ft of the upland edge of a coastal wetland, within 250 ft of the upland edge of a freshwater wetland (except as otherwise provided in Section 438-A, Subsection 2 of the regulation), or within 75 ft of the high-water line of a stream. The purpose of the Mandatory Shoreland Zoning requirements are the following: to maintain safe and healthful conditions; to prevent and control water pollution; to protect fish spawning grounds, aquatic life, bird and other wildlife habitat; to protect buildings and lands from flooding and accelerated erosion; to protect archaeological and historic resources; to protect commercial fishing and maritime industries; to protect freshwater and coastal wetlands; to control building sites, placement of structures and land uses; to conserve shore cover, and visual as well as actual points of access to inland and coastal waters; to conserve natural beauty and open space; and to anticipate and respond to the impacts of development in shoreland areas (Maine Revised Statutes Annotated Title 38, Chapter 3, Subchapter 1, Article 2-B, Section 435).

The Navy is not required to comply with Maine's Mandatory Shoreland Zoning requirements; however, the Navy will evaluate relevant actions to remain consistent with the intent of the regulations to the maximum extent practicable.

- ❖ Any dredge or fill activities planned for areas located within a floodplain zone will require coordination with USACE and MDEP to obtain the appropriate permits. These activities may be subject to NEPA review and documentation before any ground-disturbing activities are undertaken in floodplains.

3.1.1.2 Surface Waters, Wetlands, and Riparian Areas Management

As directed by the CWA, the military is responsible for identifying and locating jurisdictional waters of the United States, including wetlands that have the potential to be impacted by activities associated with the military mission. Development of roads, installation of new culverts, and grading or fill activities are examples of impacts that have the potential to impact wetlands and waters of the United States according to Section 404 of the CWA. However, certain actions that have minimal adverse impact on wetlands and other water resources may qualify for a State of Maine General Permit (GP). The GP Program was designed to streamline the Section 404 permitting process and includes activities conducted under 'maintenance activities' such as repairing, rehabilitating, or replacing existing structures as well as removing accumulated fill or debris from within or around existing structures. Activities associated with aquatic habitat restoration, establishment, or enhancement may also qualify under a GP.

> **Impacts to wetlands** and other surface waters by planned future projects are to be **avoided** to the extent practicable.

A wetland delineation of the VLF and HF areas was completed in 2014 and a preliminary jurisdictional determination provided by the USACE in February 2015, which remains through 2020 (USACE 2015). See S**ection 2.4.3** and **Appendix F** for survey results. A delineation of wetlands and other waters of the United States has not been done on the Howard Cove area. If ground-disturbing activities are proposed that may impact waters of the United States (including wetlands) on the Howard Cove area, a protocol wetland delineation would be required to define the potential impact area, subject to verification and CWA Section 404 permit approval by USACE. CWA Section 404 permit approval by USACE may be required for any activity that would impact jurisdictional waters, including wetlands on the VLF and HF areas.

Palustrine (non-tidal) and estuarine (tidal) wetlands have been identified throughout the site and adjacent lands. Many of these wetland habitats are considered significant habitats by MDEP due to their importance as bird or amphibian foraging and/or breeding habitats. These areas include high and moderate value waterfowl and wading bird habitat, and significant vernal pools. Protection and management of these wetlands must be addressed according to state and federal regulations.

Impacts to wetlands, other surface waters, and riparian areas by planned future projects are to be avoided to the extent practicable. If wetland impacts are unavoidable and a permit is required to authorize the activity, appropriate impact minimization and mitigation will be required and will be determined through consultation with the appropriate federal and state agencies (USACE, USFWS, and MDEP). Additionally, Section 404 requires restoration of wetlands damaged by any project activities, with in-kind replacement of wetlands as the preferred mitigation strategy.

- ❖ Wetland and riparian areas will be avoided in future construction of structures and other facilities, including roads. New roads will be located outside riparian areas, whenever possible. Any stream crossings will be designed to minimize the area disturbed, and unimproved streams crossings are prohibited.

The unconsolidated bottom wetlands of the Installation are restricted to ponds, and are considered important ecologically for wildlife and vascular plant diversity.

Sedimentation into wetlands and streams is a concern at the Installation. Projects that address erosion and sedimentation into these water resources are provided in **Section 3.1.1.3**.

3.1.1.3 Water Quality Management

To protect water quality at NSA Cutler and within surrounding areas, environmental staff must identify existing and potential erosion problem areas and deploy appropriate measures, including sedimentation control and shoreline stabilization projects. The staff must also review erosion and sedimentation control plans for construction sites and provide oversight to ensure best management practices (BMPs) are being applied properly and consistently for all ground-disturbing activities. NSA Cutler has developed a Stormwater Pollution Prevention Plan (SWPPP) that identifies potential sources of pollution and pollution prevention measures, spill prevention and response procedures, BMPs, monitoring and inspection requirements, spill history documentation, and training requirements. Objectives of the SWPPP are to reduce pollution of receiving water and eliminate elicit discharges to the storm sewer system. The Installation SWPPP was updated in 2010.

- ❖ All ground-disturbing activities at the Installation should incorporate appropriate stormwater, erosion, and sediment controls to reduce nonpoint source pollution that could result from those activities. An erosion and sediment control plan should be developed for all land-disturbing activities to ensure that such controls are applied consistently. Guidance for developing project erosion and sediment control plans can be found in Maine’s Erosion and Sediment Control BMP Handbook (MDEP, Land Resources 2016). The NRM will review all proposed plans to ensure they comply with Maine’s Erosion and Sedimentation Law. Site specific erosion and sediment control measures and stormwater management recommendations are provided in the NSA Cutler SWPPP (NCTAMSLANT DET Cutler 2005).

☞ LA02: Conduct annual erosion surveys to identify soil erosion problem areas. These surveys should focus on the identification of erosion areas associated with roadways, and other areas of ground disturbance adjacent to wetlands, surface waters, and the coastline.

The NSA Cutler Streambank Assessment, performed in May 2013, identified three streams and five coastline segments as problem areas or potential problem areas (**Figure 2.10**; Tetra Tech, Inc. 2013). Issues for the problem areas include scouring of gravel road surfaces, potential for erosion of exposed soil areas, formation of plunge pools, active beach erosion, and slumping or roadside fill. NSA Cutler will acquire all necessary state and federal permits prior to implementing the suggested maintenance in jurisdictional waters of the United States. Key streambank and coastline management practices for the identified problem areas will include:

- ❖ Installation of additional rip-rap in areas with newly installed culverts
- ❖ Application of coarse crushed stone to road surfaces to allow for proper infiltration of water without causing outwash
- ❖ Removal of finer crushed stone material on the roadway
- ❖ Seed and mulch application to stabilize vulnerable areas
- ❖ Installation of geotextile fabric and rip-rap to road banks to provide stabilization and prevent erosion. (Tetra Tech, Inc. 2013)

☞ LA03: Implement erosion remedial and preventive measures to protect water quality and ensure shoreline stabilization, based on erosion survey results.

3.1.2 Coastal Zone Management

NSA Cutler is located in the Maine Coastal Zone. The Maine Coastal Zone is a federally approved coastal zone that extends from the inland boundary of all 147 coastal towns of Maine that contain tidal waters, to Maine’s coastal jurisdiction, which extends offshore to three nautical miles (MDMR 2017a). The Maine Coastal Program, established in 1978 and administered by MDMR, is a partnership among local, regional, and state agencies for managing Maine's coastal resources for the public benefit (MDMR 2017b). It was developed pursuant to Coastal Zone Management Act (CZMA), passed by Congress in 1972 in response to concerns about the rapid deterioration of coastal areas throughout the nation. Administered by the Department of Commerce – NOAA, the CZMA law authorized funding for state coastal programs around the country to improve the environmental and economic health of America’s coastal areas by establishing federal-state partnerships. The CZMA also provided the legal framework related to management of the nation's coastal resources.

The CZMA encourages states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife supported by those habitats. The CZMA grants Maine and other coastal states that have a federally approved coastal management program the authority to review federal activities, federal license or permit activities, and federally funded activities to ensure that federal actions that may affect its coastal area are consistent with the “enforceable policies” of the state's coastal program to the extent practicable. The process by which a state decides whether a federal action meets its enforceable policies is called federal consistency review (MDMR 2017a). Federal consistency applies to any activity that is in, or affects land use, water use, or any natural resource in the coastal zone, if the activity is conducted by or on behalf of a federal government agency, requires a federal license or permit, receives federal funding, or is a plan for exploration, development, or production from any area leased under the Outer Continental Shelf Lands Act.

The MDMR serves as a coordinator and point of contact for federal consistency review in Maine and has prepared a guide to the federal consistency review process (MDMR 2017a). In Maine, standards and criteria of state environmental permitting and licensing laws and regulations serve as the enforceable policies of the Maine Coastal Program. Rules issued by NOAA’s Office for Coastal Management establish specific procedures to facilitate federal-state coordination (MDMR 2017a). The NRM should consider and be aware of any Installation activities that could impact the Coastal Zone, including but not limited to sedimentation problems, and if necessary coordinate with the MDMR Maine Coastal Program. Specific wetland and water quality management recommendations are provided in **Section 3.1**.

- ❖ Any activity that may affect the natural resources in the Coastal Zone is subject to a federal consistency review. Coordination with the MDMR Maine Coastal Program should be conducted to ensure consistency with CZMA.

3.1.3 Vegetation Management

Vegetation management is an important component of natural resources management at the Installation because of the presence of rare natural communities as well as sensitive wildlife species that are dependent on habitats that occur at NSA Cutler. Vegetation management principles should be considered when conducting general grounds maintenance activities, such as grass mowing and weed control.

Oversight of the grounds maintenance program provides opportunities to enhance the visual appeal of the environment, enforce beneficial landscaping concepts, improve wildlife habitat, and reduce the costs of grounds maintenance at the Installation. This may include adopting an integrated vegetation management approach by encouraging establishment of certain vegetation communities.

> Due to the presence of **rare natural communities** as well as **sensitive wildlife species** that are dependent on habitats that occur at NCTAMSLANT DET Cutler, **vegetation management** is an important component of natural resources management at the Installation.

Beneficial landscape and turf management practices, such as planting native species to reduce water and nutrient demands, and increased use of shade trees and protective vegetation, are encouraged. The broad planning level community type mapping that has been developed will provide the NRM with baseline data that will aid in implementing responsible management practices; however, GIS data should be collected to ground-truth the natural community types of the Installation.

☞ LA04 and FW03: Conduct a natural community type survey of the Installation to collect ground-truthed GIS data of the vegetative community types present.

Management priorities should be directed toward protecting the ecological communities that are outside of the operations and administrative areas, which are largely unaffected by current activities to support the military mission. General habitat management includes avoiding negative impacts to and encouraging the proliferation of rare natural communities such as coastal peatlands, allowing shrub development to progress in non-essential sections of the Installation while targeting others for mowing, enhancing habitat for migrating birds through the creation of impoundments, and enhancing other community types that provide important habitat. In addition, impacts to individual mountain ash trees and other species that provide important forage for birds and other wildlife should be avoided. A fact sheet that includes identification tips for mountain ash is provided in **Appendix I**.

Vegetation management for breeding and migrating landbird habitat

Management of habitats located outside the operations and administrative areas is relatively passive and low in cost, and it provides widespread benefits to breeding and migrating landbirds, as well as other wildlife species. Key vegetation management practices for breeding and migrating landbird habitat should include the following:

- Leave mountain ash trees and shrubs undisturbed when feasible.
- Leave witherod, mountain holly, black holly, and most roses undisturbed and other fleshy fruit-bearing plant species undisturbed.
- Allow shrub growth along ditches transecting the tower field, along the ditch slopes and up to three ft beyond the top of the ditch slope. Many fleshy fruit bearing plants will colonize these areas. In addition, many dry-seeded plant species favored by fall and winter migrating finches and sparrows would

Mountain ash tree and fruit.

Up-close view of mountain ash

benefit. Finally, these natural 'hedge-rows' are import singing posts and provide nesting habitat for many grass and shrubland nest species, and also provide safe breeding areas within the heavily managed tower field. Generally, mowing during the nesting season has limited the natural production or the biological carrying capacity of this valuable habitat. Timing of mowing activities outside of the nesting season, as well as limiting the mowed footprint to the minimum size necessary, will minimize impacts to nesting grassland bird species.

- ❖ Allow shrub development in patches throughout the antenna field. At a minimum, patches should be 0.125- to 0.25-acre in size to provide nesting cover and perches for songbirds. If coordinated with the riggers, patches could be placed in locations without a risk to military mission of the Installation.
- ❖ On well-drained soils, encourage the development of lowbush blueberries and crowberries through continued mowing and, where possible, burning. This is occurring naturally along well-drained ridges within the north end of the antenna field where significantly higher levels of lowbush blueberries and black crowberry clones have become established. Upland sandpipers use interior sections of the antenna field for breeding and whimbrels are using the interior sections of the antenna fields for feeding. This change occurred gradually (Famous 2009). Although no quantitative data are available, small and large mammal populations should be benefiting from the increased biomass in both total vegetation and harvestable fruits.

Vegetation management for shorebird habitat

Additional management activities include population monitoring, habitat creation and enhancement, and protection from chronic disturbance.

- ❖ Key habitat management practices for whimbrels, a Maine species of special concern, should include maintaining and enhancing feeding habitat in low-bush blueberry fields, and creating feeding habitat using mowing to establish lowbush blueberry and black crowberry cover.

Vegetation management for crowberry blue butterfly habitat

As previously mentioned, black crowberry is a critical species in the life cycle of the crowberry blue butterfly. Additionally, black crowberry provides the most vegetative cover among the three co-dominant plant species characterizing Coastal Plateau Bogs, which include baked-apple berry and mare's tail sedge. The following management recommendations are provided for protection of black crowberry habitat:

- ☞ LA05 and FW04: Map the general distribution of larger populations of sensitive wildlife habitats (e.g., black crowberry plants and clusters of bog inhabiting plants, such as pitcher plants, ericaceous shrubs, mare's tail sedge), and avoid and minimize inadvertent crushing, burying and other forms of mechanical disturbance in these areas.

- Avoid crushing or burying black crowberry plants that have colonized antenna pads and surrounding surfaces, both during general maintenance and during the decommissioning process.

- Avoid and minimize disturbance, such as regrading or reshaping the topography, to established, self-sustaining black crowberry populations during antennae removal to facilitate rapid restoration of the site during the decommissioning process. In effect, avoiding and minimizing disturbance will protect large areas of the site that have already been undergoing natural restoration for nearly 50 years, and will significantly reduce restoration costs for the most ecologically sound restoration alternative.

Ruts created near bog habitat while mowing at HF area.

- During general site maintenance, avoid mowing extant black crowberry populations while the soils are saturated to avoid inadvertently crushing the plants. Ruts and soil compression resulting from mowing can alter bog hydrology and result in a change in hydrology-sensitive bog plants, such as dragon's mouth and grass pink orchid (*Calopogon tuberosus*). In addition, rut creation in bog soils releases nutrients, which in turn, alters the species composition of nutrient-sensitive assemblages of bog and fen plants.

- Avoid reseeding restored or disturbed habitat with conservation mixes. Reseeding may introduce aggressive weedy species that displace black crowberry and other bog or heath inhabiting taxa such as Sphagnum mosses, pitcher plants, cotton grasses, and ericaceous shrubs, which are typical of bog vegetation.

- Avoid application of fertilizers because increased nutrients may result in the colonization by more aggressive, nutrient demanding species. When nutrients are added to the system either by exposing new soil or through fertilization, optimum growing conditions for the specialized target flora are seriously compromised. Non-target species, in turn, may displace less aggressive low nutrient tolerant species such as black crowberry, sedges, and ericaceous shrubs. The establishment and survival of bog inhabiting species are dependent on low nutrient conditions either on mineral and organic substrates (e.g., peat, partially decomposed plant material). Reversing their effects may take decades, and it will minimize the likelihood of establishing large populations of black crowberry and other plants adapted to bog environments.

- Retain black crowberry clones, when feasible, to use in restoration efforts during the decommissioning process. Locally established plants are optimally adapted to the conditions of the site, including the local microclimate. Moreover, using in situ plant populations that are not typically available from specialized plant restoration nurseries is highly cost-effective. Locally established plants also preserve the genetic identity of the site and region, are adapted to the local growing conditions, are usually superior in quality, and most importantly, increase the probability of successful reestablishment of pre-development plant community types over a shorter time interval.

If NSA Cutler determines that removal or replacement of any antennas is necessary, the action would provide an opportunity to restore the disturbed area. Careful documentation and monitoring of antenna removal procedures and peatland restoration methods will facilitate successful bog restoration. Wherever possible, the use of propagules transplanted from nearby will facilitate the most cost-effective method of restoration projects. The extreme maritime climate condition in the region is one of the most important variables for establishing and maintaining Coastal Plateau Bog communities, and these conditions are expected to continue as global warming models have predicted the continuation of nearshore maritime conditions, with cool summer temperatures, high incidence of fog, higher nutrient input from coastal fog and precipitation, and low winter snow cover (Famous 2009b).

☞ LA06 and FW05: Restore bog habitat affected by ground-disturbing activities. Bog restoration projects will be overseen by an ecologist who is experienced with peatland restoration, and post-restoration monitoring will be conducted for at least 5 years, or until post-restoration success is determined. If post-restoration monitoring determines that the restoration project is unsuccessful, an adaptive management/corrective action plan will be prepared and implemented to ensure success.

An ecologist should be present onsite during antenna removal and bog reconstruction to oversee the restoration work and perform the pre- and post-restoration monitoring work. During the bog restoration, the following procedures are recommended to promote the successful establishment of transplanted material:

1. Carefully remove sand and gravel fill to 12 to 18 inches below the present grade.
2. Add organic soil, such as peat, to recreate a low pH-low nutrient substrate similar to the adjacent existing plateau bog.
3. Restore or recreate wetland hydrology while excavating fill and replace fill with peat.
4. Add the prescribed amount of phosphorus to encourage sphagnum moss regeneration and expansion; phosphorus is used in restoration of low nutrient ombrotrophic bogs, such as Coastal Plateau Bogs, which are rain-fed and receive all of their water and nutrients through atmospheric deposition.
5. Revegetate by transplanting propagules from the perimeter of the existing antenna pad, from the perimeter of the pad surrounding the adjacent antenna, from the adjacent bog, or, if needed, from other naturally revegetating mined Maine bogs.
6. Monitor for a period of at least five years post-restoration, or until project success is established. Monitoring should include vegetation, supplemental plantings, addition of sphagnum mosses after companion plants are established, removal of non-peatland plant opportunist, water table depths, and water/peat chemistry, to ensure that the proper conditions are present. Additional monitoring for the presence of the crowberry blue butterfly and other rare animals and plants should also be included.
7. Develop and implement an adaptive management/corrective action plan if necessary, to ensure success.

- ☞ LA07 and FW06: Post-construction bog restoration monitoring will include presence/absence surveys for crowberry blue butterflies, and/or other rare species in the restoration area. Monitoring adjacent larger bogs would provide baseline population numbers for the broader population as well as the portion of the restored bog habitat. In addition, monitoring should include areas where black crowberry has formed larger lawn-like mats. These data will assist in formulating future decommissioning plans designed to insure the continuity of the black crowberry populations and attendant habitat for the rare crowberry blue butterfly. In addition, mapping extant black crowberry populations would help establish a protection/avoidance plan to help circumvent accidental vehicular damage to plant populations.

Vegetation management for protected bat species

In 2016, the USFWS listed the northern long-eared bat as a threatened species and established specific management measures associated with tree removal under the final 4(d) rule to protect the species. These measures are discussed in **Section 3.2.5.3**.

3.1.4 Invasive Plant Species Management

Invasive species control includes control of insect pests, invasive plant species, and noxious weeds, through treatment and prevention measures. Invasive species management can be implemented first by adopting an integrated pest management (IPM) strategy that will aid in control by changing routine practices or by making habitat and structural alterations. The integration of IPM strategies will reduce the use and need for application of chemical controls; however, chemical controls may be required if problems persist despite the use of IPM methods. If chemical controls are necessary, they will be applied carefully to kill only targeted pests, with minimum use of the least toxic product available.

Seven introduced plant species have been identified at NSA Cutler: reed canary grass, Japanese knotweed, ornamental jewelweed, spotted knapweed, Canada thistle, bittersweet nightshade, and common reed. Reed canary grass and common reed have the potential to spread and create dense monotypic stands. Dense stands of common reed substantially degrade wetland habitat and act as a source of propagules that spread to other, nearby wetlands. Once this large grass proliferates, it is extremely labor- and resource- intensive to remove. When possible, treating small patches of common reed and reed canary grass is preferred. Prescribed burns to remove unwanted vegetation are not allowed as a vegetation management technique due to potential polychlorinated biphenyl (PCB) and lead contamination of the soil (Joy 2009b).

- ☞ LA08: Conduct removal and restoration of areas infested with invasive species, such as common reed and reed canary grass. For small stands, manual removal of all above ground biomass as well as the underground rhizome by which they spread is preferred. However, this removal method is labor intensive and is feasible only if the stands are small. If manual removal is not appropriate, invasive species should be treated with a glyphosate herbicide.

- ☞ LA09: Conduct annual site surveys to proactively identify and treat new occurrences of invasive species, and to monitor restoration sites for regrowth.

The five-year (2016-2020) invasive plant species management plan was devised from the information collected during 2013 and 2015 surveys. Invasive plant species on the Installation have a large probability of colonizing and spreading to nearby areas. This management plan addresses current and future invasions while following the five main goals of the National Invasive Species Council (Tetra Tech, Inc. 2016b).

The immediate actions necessary following the 2015 survey include:

- ❖ Being preventative, early detection and rapid response actions.
- ❖ Appoint a designated point of contact for invasive species at NSA Cutler.
- ❖ Appoint someone to become or that is a certified herbicide applicator.

The first action against invasive species is prevention. Steps include: training NSA Cutler staff about invasive species threats, identification and awareness, establishing a response protocol for the detection of new invasive species, using noninvasive plants when planting, using certified "weed-free" seeds and mulch, ensuring that fill used in construction projects is free of nonnative species seeds and materials, minimizing new construction of roads and trails that could harm native communities to the extent possible, flagging invasive species in work areas, establishing a wash station to prevent the spread of invasive species, cleaning mowing and land management equipment after working in areas with known invasive species populations, and working with others to help control and prevent the spread of invasive species (Tetra Tech, Inc. 2016b).

The second step is early detection and rapid response. This is necessary to address invasions when populations are small, localized, and more easily contained and eradicated. Detecting and responding to invasions requires an established protocol and prompt reporting methods to a point of contact at the Installation. The protocol would include annual summer surveys with proper documentation of sites, data collection, and management; identification of species and risk sites within the Installation that have high priority for management to prevent or control invasive species; and identification of areas for restoration following control efforts. In addition, the Installation point of contact would keep current on research involving invasive species detection and management, understand relevant federal and state regulations, and be aware of invasive species identified in the MNAP, and collect and safely store specimens for identification and tanning (Tetra Tech, Inc. 2016b).

Control and management is based on the five IPMs including several techniques such as education, biological control, regulatory control, and at times use of least-hazardous pesticides. The geographical location, controlled access, security limits and type/volume of traffic on the installation reduce the some of the pathways for introducing invasive species. The invasive species populations that have been detected early and are at small population sizes provide advantageous opportunities for early eradication methods. There are four invasive species with low to moderate densities within the installation (Tetra Tech, Inc. 2016b).

Some ongoing management practices that will be implemented will have constraints on invasive species control. The proximity of invasive species to wetlands and ditches could cause an issue with the use of pesticides related to water contamination and non-target damage. The Navy will be consult with MDEP and Maine Board of Pesticides Control to ensure compliance with regulations (Tetra Tech, Inc. 2016b).

Invasive species control efforts should be prioritized to focus on the following: populations or species that threaten the most sensitive areas or resources; populations or species that can most effectively be controlled or eradicated; and populations or species that pose the greatest risk or are considered a high-priority species. The eradication of the common reed, Himalayan balsam, Japanese knotweed, reed canary grass, spotted knapweed, Canada thistle and bittersweet nightshade is highly encouraged. If the Navy is unable to eradicate all populations, it is recommended to prioritize the common reed because of its aggressive nature and ability to destroy wetlands. Since the population is small, eradication is likely to be successful (Tetra Tech, Inc. 2016b).

The four treatment methods include mechanical treatment, controlled burning (not available for use at NSA Cutler as discussed above), biological control, and chemical control. Mechanical treatment includes the mixing, cutting, flooding, desiccating, suffocating or physical removal of a species. Biological control involves utilizing animals, insects and other natural organisms to control or eradicate a species or population. Chemical control uses herbicides or other chemical to eliminate target species. (Tetra Tech, Inc. 2016b).

The management plan describes proposed treatment methods for the highest priority species found on the installation; common reed, Himalayan balsam, Japanese knotweed and reed canary grass. The proposed treatment and removal methods are described in **Table 3.1**.

Table 3.1 Treatment and Removal of the Highest Priority Species

Species Name	Suggested Type of Treatment	Treatment Method
Common reed	Mechanical and chemical	❖ Application of herbicide in late fall before first frost. ❖ Follow up applications of cut-and-drip or swab methods may be necessary ❖ Suggested herbicide; glyphosate, imazapyr and triclopyr. ❖ Mowing cannot occur three weeks prior to herbicide application. ❖ Minimum follow-up control effort/treatment should occur once during the first growing season.
Himalayan Balsam	Mechanical	❖ Mechanical eradication by hand and shovel. ❖ Must ensure all portions of the root mass are collected during removal. ❖ At a minimum, subsequent removals will occur during the first two growing seasons. ❖ If hand removal is unsuccessful, expensive or labor intensive chemical treatment similar to the common reed will be utilized.
Japanese knotweed	Chemical	❖ Application of herbicide should occur in late summer or early fall. ❖ Follow-up treatment should occur in the first and second growing seasons.
Reed canary grass	Chemical	❖ Application of herbicide should occur in late summer or early fall, three weeks prior to scheduled mowing. ❖ Suggested herbicide is glyphosate or similar pesticide.

Table 3.1 Treatment and Removal of the Highest Priority Species

Species Name	Suggested Type of Treatment	Treatment Method
		❖ Follow-up treatment should occur during subsequent growing seasons.

Source: Tetra Tech, Inc. 2016b

One of the most important steps in long-term invasive species management is to monitor treatment and restoration sites for efficacy. Photo monitoring points should be established, and sites should be inspected at least once in early summer and once in late summer. Monitoring should be well documented to allow replication by different personnel. If eradication is indicated to be successful for at least one year, monitoring efforts should be reduced to once in late summer every three to five years (Tetra Tech, Inc. 2016b).

After eradication is successful, restoration can occur, and it is important to ensure the reintroduction of invasive species does not reoccur. Use weed-free seed and mulch to reduce the threat of reintroducing species. For the germination and establishment of native plants, it is suggested to use lime and fertilizer appropriate for the site conditions (fertilizer application is not recommended in wetland areas). Winter rye (*Secale cereal)* is often used in wetlands as a temporary cover crop to provide soil stability until native species can repopulate the area (Tetra Tech, Inc. 2016b).

Collaboration with other local interest groups, state and federal agency partners and nongovernmental organizations is important in achieving long-term success. Use the MNAP's iMapInvasives online database to enter confirmed invasive terrestrial plant species or search for new invasive species identified in the area. This will allow others to search for invasive plants in the NSA Cutler region. Collaboration with neighbors and partners keeps everyone informed of invasive plants. It is important to share resources and information across jurisdictional boundaries and coordinate public communication and outreach efforts. (Tetra Tech, Inc. 2016b).

3.1.5 Wetland Management

The CWA provides a regulatory framework that allows activities affecting wetlands while preserving wildlife habitat and water quality. Section 404 of the CWA is the permitting program for regulating projects that have the potential to impact wetlands. The jurisdictional wetland delineation identified 1,426.0 acres of wetlands over the 3,002.4 acres in the VLF and HF areas. The most common wetland type was PEM, with 897 acres, and PSS was the second most common wetland type, with 724 acres (Tetra Tech, Inc. 2014b).

Suggestions for wetland management include (Tetra Tech, Inc. 2014b):

- ❖ Invasive plant species removal by following management suggestions described in **Section 3.1.4** for invasive plant species management. This will limit the treatment and control the growth and spread of invasive species growing in the wetlands.
- ❖ Use appropriate pesticides or herbicides.
- ❖ Develop an upland and wetland riparian zone protection and management plan that is repeatable by others.
- ❖ Utilize BMPS to create appropriate buffers around the wetlands during any activities that may occur on the Installation.

3.1.6 Pollinator-Friendly Management

Pollinators such as bees, other insects, and some birds are crucial in flowering plant reproduction that is essential to environment sustainability. Pollinators are extremely sensitive to insecticides or pesticides and caution must be taken in the use of these substances (NAVFAC 2014).

The pest management approach includes (NAVFAC 2014):

- Determining if the pest populations warrant control and selecting the best pest controls that minimize the risk to pollinators.
- Read herbicide or insecticide labels carefully and apply products consistent with labeled directions.
- Avoid applying pesticide to blooming plants that attract bees. Choose appropriate environmental conditions when applying an application and use insecticides with short residuals.
- The use of neonicotinoid pesticides should be avoided where pollinators could be present. For a list of the least hazardous pesticide formulation see **Table 3.2.**

Table 3.2 Least Hazardous Pesticide Formulation

Formulation	Hazard Level to Bees	Comments
Dust and Microencapsulated	Most Hazardous	Similar in size to pollen and tends to stick to bee hairs Dust drifts
Spray Formulations	Safer than Dusts	Water soluble safer than emulsifiable Fine spray less dangerous than course spray Undiluted sprays are more dangerous than diluted
Emulsifiable Concentrate	Less Hazardous	Less than wettable powders because the toxicity lasts longer in the field
Granular	Least Hazardous	Least likely to drift

Source: NAVFAC, 2014

The DoD policy when using pollinator friendly management prescriptions involves using native landscape plants and limiting the use of pesticides, to include herbicide, in sensitive habitats. Sensitive habitats encompass areas where listed species may occur or in wetlands. Another key factor in this policy is coordination with other agencies, governmental and non-governmental on habitat and pollinator issues (DoD 2014).

3.1.7 Wildland Fire Management

The NSA Cutler Fire Management Plan provides guidance to reduce fire potential (including wildland fires), outline program safety, protect and enhance valuable natural resources, protect Navy resources and facilities, integrate applicable federal and state fire reporting requirements, and implement ecosystem management goals and objectives (Tetra Tech, Inc. 2016e). Collaboration with other local interest groups, state and federal agency partners, and nongovernmental organizations is important in achieving long-term success of fire management on the Installation (Tetra Tech, Inc. 2016e).

Wildland fires are not an issue at NSA Cutler. The Installation is on the northern Maine coast and the climate is typical of most maritime regions. Frequent fog cover, high humidity, and moderate temperatures result in a low risk of wildfires for the general area. Year-to-year weather patterns, such as extended periods of warm temperatures and/or reduced rainfall, can increase the threat of wildfires, especially in grassland areas during very dry and drought conditions (Tetra Tech, Inc. 2016e).

The nature of the mission at NSA Cutler does not contribute to fire risks because there are no live fire exercises, active firing ranges, pyrotechnics, or explosives at the Installation. However, large quantities of fuels and oils are stored and used to support the Installation mission, including a fuel farm on the west side of the VLF between the north and south tower fields. Between 2004 and 2011, there were 11 documented fires within the Cutler Township. The causes of fires included incendiaries, debris, machine use, and children (Tetra Tech, Inc. 2016e).

The Installation contains a fully staffed Fire Station, which is across Cutler Road/Route 191 from the HF area access road. It is possible that the Fire Station would be moved near the main gate of the VLF area within the next 10 years. The Fire Station employs 12 firefighters and is staffed 24 hours a day, with four to six firefighters available during each shift. Control of fires can be assisted by local authorities, as needed, and the Cutler Fire Station can assist local authorities with wildland fires adjacent to the Installation. Local law enforcement is provided by Maine State Police, the Washington County Sheriff's Department, the Town of Machias Police Department, and the Washington County Emergency Management Agency. These local law enforcement agencies can be provided access to the Installation via the main gate (Tetra Tech, Inc. 2016e).

The Maine Forest Service is an additional resource in the event of a large grass or wildland fire. The primary goal of the Maine Forest Service is to contain fires from spreading to protect forest resources. The Maine Forest Service provides a daily fire danger rating for predicting and preparing for wildland fire outbreaks. Ratings are based on the national fire danger rating system and include: Low, Moderate, High, Very High, and Extreme. The Maine Forest Service can be provided access to the Installation via the main gate (Tetra Tech, Inc. 2016e).

In the case of a fire emergency, if evacuation of the Installation is necessary, it will be limited to immediate and endangered areas. Evacuation can be ordered by the Fire Station Captain or Senior Officer present. The Fire Station staff will report to a fire scene and, if appropriate, take charge of the firefighting effort. They also will dispatch fire equipment, as required; advise the security officer, Senior Officer present, and others of staff evacuation route options; determine whether additional firefighting assistance or equipment is required; and order its arrival (Tetra Tech, Inc. 2016e).

The primary goals of the Fire Management Plan are to protect human health and safety of Navy staff, civilian contractors, and visitors to the Installation. To meet these primary goals, the following goals and objectives have been established for fire management at NSA Cutler:

- Make firefighter and public safety the highest priority of every fire management activity.
- Protect Cutler personnel, contractors, and visitors from wildland fire hazards by establishing safety zones and identifying evacuation routes.
- Suppress all fires in a safe, efficient, and cost-effective manner.
- Prevent wildland fires through reduction of fire loads.

- Educate Cutler personnel about the scope and effect of fire management, including identification, prevention, hazard/risk assessment, rehabilitation, and fire's role in ecosystem management.
- Ensure access roads that are critical for fire suppression are maintained to a standard suitable for the Installation Fire Station and local fire department equipment.
- Collaborate with local, state, and federal partners when planning and implementing wildland fire preparedness, prevention, and suppression actions.
- Develop restoration guidelines for areas impacted by wildland fire (Tetra Tech, Inc. 2016e).

3.1.8 Rare Ecosystems and Significant Wildlife Habitat of NSA Cutler

The Maritime Slope Bog, Deer-hair Sedge Bog Lawn, and Kelley Heath are the rare community types that occur at the Installation. These rare ecosystems provide essential habitat (black crowberry) for the crowberry blue butterfly. Management recommendations for these rare communities include monitoring to ensure erosion and pollution do not impact these areas and maintaining existing sensitive areas and preventing destruction by ground-disturbing activities (see **Sections 3.1.1, 3.1.3,** and **3.1.4**). Invasive species in these areas are currently not a problem and monitoring should be done to ensure they do not become established. If necessary, removal of invasive species should be conducted carefully and by hand to minimize impacts to soil and non-target species. If antenna maintenance or removal activities are conducted in proximity to, or within the Coastal Bog Plateau habitat, these areas will need to be restored (see **Section 3.1.3**). Additional habitat restoration will be required following remediation of any of the IRP sites.

☞ LA10: Coordinate with MNAP to conduct a general rare plant survey that focuses on rare ecosystem types present at the Installation.

Vernal pools that meet certain criteria as defined by MDIFW for Significant Wildlife Habitat are considered significant. These significant vernal pools are important habitat for several species of vernal-pool dependent, or 'obligate', amphibians and reptiles. The 2014 wetland surveys recorded potential vernal pool habitats at NSA Cutler (Tetra Tech, Inc. 2014b). The 2013 baseline survey for amphibian and reptiles did not identify the presence of vernal pools (NAVFAC 2013).

MDIFW has also designated deer wintering habitat to be significant. These conifer-dominated areas are essential to winter survival of Maine's herd. The Installation's mature forest habitat has been assessed for the presence of deer wintering habitat. Based on the most recent survey estimates, there are between 10.6 and 15.3 deer per square mile on NSA Cutler, which exceeds the target density of 10 deer per square mile. Incidental observations by long-term staff indicate there was a high level of winter kill of deer in 2014-2015. It is possible that the deer population was at a low point during the 2015 deer surveys. Therefore, additional surveys would allow for annual and seasonal variation (Tetra Tech, Inc. 2017). A discussion on deer management and deer population is provided in **Section 3.2.3**.

☞ LA11 and FW07: Conduct follow-up Installation-wide vernal pool surveys during the appropriate survey window, and in accordance with MDIFW protocols. The surveys should include identifying all potential vernal pools using a combination of desktop review and site visits to ground-truth and survey each potential vernal pool for evidence of use by breeding, obligate vernal pool species. Surveys should record the unique features of the pools, collect photographic documentation, and map the geographic position of each pool.

☞ LA12, FW08 and FO02: Conduct additional deer population surveys over multiple years to allow for annual and seasonal variation as funding allows. The findings of these surveys should be incorporated into the deer management plan. (see **Sections 3.2.3** and **3.3.2**).

3.1.9 Climate Change Management Strategies

Sea level rise, increases in global temperatures, and ocean acidification are examples of how climate change adversely affects coastal areas. The survival and sustainability of many ecological systems depends on how they adapt to environmental fluctuation, including changing climate. The Maine Department of Agriculture provides sea, lake, and overland surges from hurricane (SLOSH) maps. Most of the coastal sections of the VLF area are subject to inundation from Category 1, 2, 3, or 4 hurricanes at mean high tide (MDACF, 2016).

Knowing the exposure, sensitivity, and the adaptive capability of systems to climate change is vital in predicting and anticipating future impacts. The development and updating of a Climate Change Vulnerability Assessment involves several key factors (Friggens et al. 2013).

- Observe changes in climate (recent vs. historic) and the associated impacts.
- Observe the vulnerability and impacts to the region.
- Estimate the vulnerability and adaptive capacity of a system to future conditions.
- Devise a model to address future impact of species distributions, biodiversity, and other measures from baseline observation.
- Devise and create a planned research method to improve the understanding of climate change impacts and vulnerability and adaptive capacity of a system to future conditions.

Many of these factors are performed in conjunction with partners, such as Landscape Conservation Cooperative, Acadia National Park, Gulf of Maine Council, Northeast Climate Science Center, University of Maine, and/or Climate Science Centers with other DoD installation agencies.

3.1.10 Installation Restoration Program

The IRP is responsible for the restoration and maintenance of all sites where buildings or other facilities have been demolished, and for the long-term maintenance of any sites that have undergone, or are undergoing, remediation. The goals of the IRP include restoration of sites to a natural ecological community to prevent erosion, enhance wildlife habitat, and reduce maintenance costs.

In accordance with RCRA and CERCLA, the Navy retains contractors for regionally-based Comprehensive Long-Term Environmental Action–Navy (CLEAN) contracts. The primary focus of the CLEAN contracts is the study and design phases of the IRP and post-remediation inspection services, such as remedial investigation, remedial design, environmental documentation for installation closure efforts, and support of expedited response actions. Management of the IRP at NSA Cutler, including the four waste disposal sites and AOCs, falls under the Northeast Region CLEAN contract. Restoration work associated with the waste disposal sites should be coordinated with the NRM to ensure compliance with natural resource regulations and protection of natural resources at the NSA Cutler site.

3.1.11 Hazardous Waste Management

NSA Cutler has adopted a comprehensive hazardous waste management plan (HWMP) that details the likely sources of hazardous materials at the Installation, their respective handling and disposal protocols, and protocols to be implemented by the Installation environmental coordinator (NCTAMSLANT DET Cutler 2007a). The Installation also has adopted an updated Integrated Contingency Plan (ICP) that details the procedures required for responding to releases and other emergencies involving hazardous waste and materials (NCTAMSLANT DET Cutler 2007b).

For spills that have the potential to impact marine resources, the first points of contact should be the **Coast Guard National Response Center** (1-800-424-8802) and the regional Navy On-scene Coordinator.

The ICP prepared for NSA Cutler details the procedures required for responding to releases and other emergencies involving hazardous waste and materials (NCTAMSLANT DET Cutler 2007b). NSA Cutler is considered a large-quantity hazardous waste generator, and the HWMP details the likely sources of hazardous materials at the Installation, their respective handling, accumulating, containerizing, inspecting, labeling, recordkeeping, temporary storage, disposal, and training procedures and protocols to be implemented by the Installation environmental coordinator (NCTAMSLANT DET Cutler 2007a). All NSA Cutler personnel should be familiar with the ICP and HWMP, and persons responsible for handling hazardous materials should receive regular training, including rehearsing response to a spill. Spills require immediate and well-rehearsed responses in order to minimize impacts. The inclusion of natural resource damage assessment training in their spill response training would be beneficial.

Compliance with the HWMP will prevent adverse impacts to human health and natural resources. This is ensured through accurate container labeling and handling instructions, and frequent inspections by the hazardous waste facility officer under the supervision of the environmental coordinator.

3.1.12 Regional Conservation Lands

The INRMP management measures would indirectly benefit regional conservation lands in the vicinity of the Installation through improvement of local water quality, habitat, air quality, and other natural resources. However, there are no regional conservation lands at NSA Cutler, and none of the activities or proposed INRMP projects directly benefit any known regional conservation lands.

3.1.13 Leases

There are no leases in effect for NSA Cutler.

3.1.14 Cultural Resources Management

NSA Cutler has been designated as Cutler VLF and HF Communications Historic District and comprises 140 contributing architectural resources, including 118 in the VLF area and 22 in the HF area (NCTAMSLANT DET Cutler 2003). Cultural resources management is necessary to ensure the cultural and historical resources of NSA Cutler are protected during all management and facilities activities. Plans for proposed land-disturbing activities must be processed through the NRM.

Cultural resources of the Installation are managed by the PWD-ME Environmental CRM. The CRM is responsible for routine cultural resources compliance functions at the various installations in

PWD-ME's area of responsibility, including NSA Cutler. The CRM inventories, evaluates, and protects historic buildings, structures, districts, and other cultural resources in accordance with Section 110 of the National Historic Preservation Act (NHPA) and Navy policy. Coordination with the CRM is essential on natural resources projects to ensure timely interagency consultation and compliance with Section 106 of NHPA whenever a Navy-funded, licensed, permitted or assisted undertaking may affect historic properties. In accordance with 36 CFR 800 of the NHPA, the CRM will coordinate with the State Historic Preservation Officer (SHPO) to ensure that appropriate steps are taken to protect cultural and archaeological resources, ensure compliance with relevant federal and state regulations, and to determine if additional archaeological surveys are required.

For management purposes, sites that are eligible for inclusion in the NRHP shall be treated in the same manner as sites that are actually listed in the NRHP. Proposed land disturbances may require modifications to the design plans to protect these sites. If any major land-disturbing activity is undertaken at NSA Cutler, the NRM and CRM will ensure that consideration is given to the protection of known cultural resources and the potential to uncover new cultural resources. In the event of an inadvertent archaeological discovery, all work would stop immediately until further directed by the CRM, and the Navy would follow the required procedures for inadvertent discoveries as outlined in 36 CFR 800. Specific standard operating procedures are outlined in the ICRMP (NAVFAC Mid-Atlantic 2012).

3.1.15 Training of Natural Resources Personnel

Environmental staff should participate in periodic training courses and workshops to keep up-to-date on natural resources management issues and laws as they relate to natural resources management at military installations. Other environmental and natural resources training activities should be undertaken, as needed, to ensure that natural resources personnel are prepared to handle any land management issues that may occur.

- ☞ LA13: Environmental staff should receive periodic training for implementation of erosion and sediment control measures and use of effective BMPs. MDEP provides annual erosion and sediment control courses.

- ☞ LA14: Training for environmental staff and grounds maintenance personnel for identification of wetlands, and plants, trees, and shrubs to avoid impacts to key vegetation species and wetland habitats identified in this INRMP for conservation and protection.

3.1.16 Geographic Information System (GIS) Management, Data Integration, Access and Reporting

GIS is an integral part of natural resources and environmental protection and planning. This powerful management tool provides the Installation and NRMs with a comprehensive database that includes a spatial component. Information such as aerial photographs, survey and monitoring data, and various other natural resource information are all tied to a geographical coordinate system which enhances the Installation’s ability to effectively coordinate and ensure that current and planned mission activities do not adversely impact watersheds, wetlands, floodplains, natural landscapes, soils, forests, vegetation and wildlife, prime and unique farmland, and other natural resources that must be protected, conserved, and managed using an ecosystem approach. Additionally, efficient and effective land use planning supports military readiness and sustainability, while protecting and enhancing the natural resources for multiple use, sustained yield, and biological integrity.

In accordance with the OPNAVINST 5090.1D, NRMs are encouraged to use GIS as the basis of their INRMP, and thus all data layers with a spatial component are provided in a GIS-compatible format. To make use of this real-time technology and the benefits it offers, NRMs must receive training on this integrated system to fully implement a proactive natural resources management program that supports the military mission and ecosystem integrity. Adequate training in data collection using global positioning systems (GPS) technology is another essential aspect of building and maintaining an up-to-date GIS that meets natural resources planning needs.

☞ LA15, FW28, FO03, and OR03: Develop a GIS system for natural resources data at NSA Cutler and provide training to environmental staff to maintain the GIS database.

The map figures presented in this INRMP were developed using existing digital data files provided by the Navy, through photo interpretation and field reconnaissance of aerial photography, from data collected during field surveys, and from other GIS databases available to the public. The base imagery used is an image mosaic of true color (24-bit), 2-ft ground sample distance (GSD), high resolution digital orthophotographs produced from aerial photos collected over southwestern, central, and northeastern Maine in the spring of 2003, 2004, and 2005. The imagery is projected to Universal Transverse Mercator, Zone 19 North, North American Datum 1927. The data produced from this effort are provided in Universal Transverse Mercator, World Geographic System 1984, Zone 19N. All GIS data created or modified for use in this INRMP will be submitted to NAVFAC Atlantic, PWD-ME, and the Installation upon completion of this project.

3.2 Fish and Wildlife Management

OPNAVINST 5090.1D (Navy 2014) defines fish and wildlife management as those actions designed to preserve, enhance and regulate indigenous wildlife and its habitats, including conservation of protected species and non-game species, management and harvest of game species, bird/wildlife aircraft strike hazard reduction, and animal damage control.

Fish and wildlife management at NSA Cutler includes:

- Aquatic species management (marine mammals, birds, herpetofauna, fish, and invertebrates) and habitats (marine and freshwater surface waters, wetlands and vernal pools)
- Terrestrial species management (mammals, birds, herpetofauna, and invertebrates)
- Threatened, endangered, and special concern species known to occur (including Canada lynx, piping plover, roseate tern, and crowberry blue butterfly) and other protected or special concern species (i.e., birds protected by the MBTA or the Bald and Golden Eagle Protection Act), and their habitat (grasslands, peatlands, and forests) management
- Invasive species and nuisance wildlife management
- Partnership development with federal, state and local agencies, and NGOs to establish Installation wildlife monitoring and protection programs
- Conservation law enforcement
- Environmental and natural resources training
- GIS management

Fish and Wildlife Management Programmatic Objectives

The programmatic objectives that have been established for fish and wildlife management at NSA Cutler are as follows:

1. Protect, conserve, and promote native terrestrial and aquatic fauna.
2. Provide adequate special management or protection of threatened, endangered and rare species, species at risk, and their habitats.
3. Prevent and control invasive species and nuisance wildlife.
4. Develop or re-establish partnerships with federal, state and local agencies and NGOs to implement Installation wildlife monitoring and protection programs.

Several of the land management projects described in **Section 3.1** that are intended to protect and conserve physical natural resources will also benefit the fish and wildlife resources of the Installation. Land management projects that overlap with fish and wildlife management are listed under the appropriate fish and wildlife management sections that follow.

3.2.1 General Fish and Wildlife Management

In 2001 and 2002, Congress established the Wildlife Conservation and Restoration Program and State Wildlife Grant Program. These programs were developed to provide financial assistance to state and tribal fish and wildlife entities for the conservation of a multitude of wildlife species, including threatened and endangered species. Prior to these programs, there was little financial assistance available to states for conservation efforts targeting non-game wildlife species. In order to be eligible for federal grants and to adhere to the requirements for participating in the State Wildlife Grant Program, each state was required to develop and submit for approval a statewide Comprehensive Wildlife Conservation Strategy (CWCS) by October of 2005. The purpose of these strategies was to summarize the abundance and distribution of each state's wildlife resources, identify Species of Greatest Conservation Need (SGCN), threats to SGCN, and key habitats. In addition, the Strategies were to include conservation actions designed to address the threats to SGCN. Maine's CWCS was developed in 2005 and serves as a broad strategy for coordinating conservation efforts in Maine. In addition, Maine's Strategy fosters coordination between conservation partners for prioritizing individual and collaborative conservation efforts.

Information on Maine's **Comprehensive Wildlife Conservation Strategy** can be found at: http://www.maine.gov/

Land management projects that are also applicable to general fish and wildlife management include the following projects, which will assist in identifying, creating, or restoring wildlife habitat.

- ☞ LA04 and FW03: Conduct a natural community type survey of the Installation to collect ground-truthed GIS data of the vegetative community types present (see **Section 3.1.3**).
- ☞ LA05 and FW04: Map the general distribution of larger populations of sensitive wildlife habitats (e.g., black crowberry plants and clusters of bog inhabiting plants, such as pitcher plants, ericaceous shrubs, mare's tail sedge), and avoid and minimize inadvertent crushing, burying and other forms of mechanical disturbance in these areas (see **Section 3.1.3**).

☞ LA06 and FW05: Restore bog habitat affected by ground-disturbing activities. Bog restoration projects will be overseen by an ecologist who is experienced with peatland restoration, and post-restoration monitoring will be conducted for at least 5 years, or until post-restoration success is determined. If post-restoration monitoring determines that the restoration project is unsuccessful, an adaptive management/corrective action plan will be prepared and implemented to ensure success (see **Section 3.1.3**).

☞ LA07 and FW06: Post-construction bog restoration will include presence/absence surveys for crowberry blue butterflies and/or other rare species in the restoration area. Monitoring adjacent larger bogs would provide baseline population numbers for the broader population as well as the portion of the restored bog habitat. In addition, monitoring should include areas where black crowberry has formed larger lawn-like mats. These data will assist in formulating future decommissioning plans designed to insure the continuity of the black crowberry populations and attendant habitat for the rare crowberry blue butterfly. In addition, mapping extant black crowberry populations would help establish a protection/avoidance plan to help circumvent accidental vehicular damage to plant populations (see **Section 3.1.3**).

☞ LA11 and FW07: Conduct an Installation-wide vernal pool survey during the appropriate survey window, and in accordance with MDIFW protocols. The should include identifying all potential vernal pools using a combination of desktop review and site visits to ground-truth and survey each potential vernal pool for evidence of use by breeding, obligate vernal pool species. Surveys should record the unique features of the pools, collect photographic documentation, and map the geographic position of each pool (see **Section 3.1.8**).

The Installation is considered a valuable location for shorebird feeding and roosting. Monitoring shorebird use of the Installation to collect data on feeding, roosting, and migration, would produce valuable data that could be shared with the IBP, MDIFW, and USFWS to ensure adequate conservation and protection measures are developed. **Section 3.1.3**. contains specific recommendations for vegetation management for shorebird habitats at the Installation, **Section 3.2.6** contains projects and recommendations that will benefit migratory birds and specific recommendations and projects for protection of shorebirds.

The forested areas of the Installation provide important wildlife habitat to a variety of songbirds, amphibians, reptiles and mammals. NSA Cutler does not have any timber harvesting activities planned, and the best way to maintain the forest habitat of the Installation and its value to wildlife is to retain it in its natural condition, especially the Maritime Spruce-Fir Forest habitat. The mature coniferous forest habitat provides shelter to wildlife during severe winter weather, and as mature trees die, snags will become available for wildlife. A basic forest characterization and management plan, and semi-regular monitoring of forest health are recommended, which will assist in identifying and managing the forest habitat of the Installation that provides habitat for wildlife.

☞ FW09 and FO01: A forest management plan should be developed upon completion of the forest characterization assessment. The management plan should include a summary of field characterization data, including the stand boundaries, a description of each stand including but not limited to dominant and common tree species, sizes, age class, absolute density, soils, topography, key habitat features, and any other distinctive features. In addition, the plan should include a prescription for each stand and a schedule for conducting forest health monitoring. Because timber harvesting is not planned, this management plan will focus on opportunities for improving the forest for wildlife habitat. Forest health monitoring should be conducted once every five years and the results incorporated into the forest management plan as an update to reflect the findings of the monitoring and management recommendations if appropriate (see **Section 3.3.2**).

Baseline surveys on the terrestrial invertebrate community at the Installation were conducted in 2015. Between the VLF and HF areas, 45 non-protected terrestrial invertebrates were collected representing 14 species (10 butterfly species; 2 dragon fly species, and 2 damselfly species), as described in **Section 2.6.5** (Tetra Tech, Inc. 2016). Follow-up surveys should be conducted as species diversity and abundance is expected to change with the seasons and environmental conditions. The following recommendations are designed to address gaps in baseline information present at NSA Cutler:

☞ FW10: Follow-up surveys, every three to five years, should be conducted to assess terrestrial invertebrate communities at the Installation. The survey methods should yield representative data for the diversity and relative abundance of the invertebrates of NSA Cutler. Reports should include management recommendations for general invertebrate habitat.

Bats play an important role in healthy ecosystems by foraging heavily on insect populations, helping to maintain a balanced ecosystem. However, in recent years many species of bats have been experiencing alarming declines across their ranges due to habitat destruction, human disturbance, and disease. Properly placed bat houses can provide important roosting habitat for many species of bats including big brown bat, little brown bat, northern long-eared bat, and eastern pipistrelle (Pipistrellus subflavus). Bat houses in rural areas typically are very well used (Bat Conservation International [BCI], 2010).

Four white-tailed deer bucks foraging at VLF area.

☞ FW11: Install bat houses where appropriate habitat exists at NSA Cutler. Bat house construction methods and placement should follow guidelines provided by BCI.

Fish sampling conducted at NSA Cutler to characterize the fish population present within the ponds and streams was limited to dip net and beach seine sampling. To provide more robust information on the fish composition for the Installation, a comprehensive fish survey should be conducted.

☞ FW12: Conduct a comprehensive fish survey of the Installation within a variety of habitats, including streams and ponds. Surveys should be conducted seasonally in the spring, summer, and fall, and should include a combination of beach seining and electrofishing methods. Data on species, size, and health will be collected, and the survey also will identify any barriers to fish passage such as dams or hanging culverts located along streams or pond outlets/inlets.

Seven Watchable Wildlife Areas are proposed for the Installation in areas that overlook important shorebird and waterfowl feeding sites. The location of these Watchable Wildlife Areas and the wildlife species most likely to be observed at each are described in **Section 4.4**. If it is determined that any watchable wildlife viewing areas have the potential to disturb migrating shorebirds, or have any other negative impacts to wildlife, they should be removed from consideration.

☞ FW13 and OR01: Install benches and interpretive signage at each of the Watchable Wildlife Areas to enhance and promote the use of these areas, and to encourage viewers to remain in the viewing are to avoid disturbing the wildlife being viewed. Access to the Watchable Wildlife Areas will be developed in accordance with the Americans with Disabilities Act to afford disabled veterans access to these areas (see **Sections 3.4.3.2** and **4.4**).

3.2.2 Marine Wildlife Strandings

All marine mammals are protected by the Marine Mammal Protection Act of 1972 (16 U.S.C. Chapter 31) and all species of sea turtles are protected under the ESA. Many species of marine mammals are known to occur within offshore waters of the VLF peninsula, and harbor seals are known to haul out onto the shoreline rocks and beaches. The land management measures described in **Section 3.1** to protect water quality within the watershed will indirectly benefit marine mammals known to occur in the region.

Periodically, stranded sea turtles and marine mammals, including seals and whales, alive and dead, wash up on shores of the VLF area. In these instances, individuals responding to such strandings should adhere to the protocol established by the Chief of Naval Operations (CNO) (OPNAVINST 3100.6H, Special Incident Reporting) Environmental Readiness Division, as outlined in the recommendations provided below. These recommendations apply to any stranded marine mammal that appears to be injured, disoriented, or dead:

- ❖ The Installation Commander will immediately contact the NMFS regional stranding coordinator in the event of a live or dead marine mammal stranding at the Installation, with notification to CNO Environmental Readiness Division (OPNAV N45) occurring immediately thereafter. The NMFS Regional Stranding Coordinators for the northeast region are Mendy Garron or Sandy McNulty, who can be reached at (978) 281-9351.
- ❖ In addition to contacting the NMFS Regional Stranding Coordinator and notifying CNO Environmental Readiness Division (OPNAV N45), the Northeast Region Stranding Network will be contacted, which is authorized by Federal law to respond to marine mammal and sea turtle strandings. Allied Whale at College of the Atlantic responds to most strandings near NSA Cutler and should be contacted immediately in the case of a stranding. The Maine Department of Marine Resources contact information has been provided as an alternate contact, if necessary.

Allied Whale, College of the Atlantic
Rosie Seton
Office (207) 288-5644
Alternate (207) 266-1326

Maine Department of Marine Resources
(800) 532-9551

- ❖ Monitor the animal from a safe distance. Remain a minimum of 100 yards from the stranded animal. Crowding the animal is unsafe for the observer as well as the animal. Do not touch the animal, alive or dead, as wild animals can carry many diseases, parasites, and bacteria, some of which can be transmitted to humans. Do not attempt to push the animal back into the water and if it goes back into the water on its own, do not attempt to follow after or swim with it.

- Carefully observe the animal. Observe the position of the alive or dead animal and monitor its breathing. Wait for responders from NMFS and or the Northeast Stranding Network to arrive and direct them to the animal. Relay all observations to the responders so that they can provide the best possible care for the stranded mammal or sea turtle.

More information on the Northeast Stranding Network is provided in **Appendix I**.

3.2.3 Deer Management

Because few natural predators of deer remain in many areas, deer populations can increase to levels that impact habitat for other species, and lead to high risk of collisions with vehicles. To address these risks, hunting programs have been created at many installations to help control populations of deer and other game species.

MDIFW has designated deer wintering habitat to be significant, as conifer-dominated areas are essential to winter survival of Maine’s herd. During the winter months, Maine’s deer herds rely on specific yet varied habitat to survive the harsh weather and dearth of forage. As weather becomes more severe and snow depths increase, deer seek older, conifer-dominated forest communities that are associated with rivers or streams and valleys (MDIFW undated).

Surveys were conducted to assess the white-tailed deer population and availability of winter habitat, including deer wintering areas and primary winter shelter or secondary winter shelter, on the VLF and HF areas. (Tetra Tech, Inc. 2017a)

The snow tracking surveys determined the HF area has limited deer activity during the winter. The VLF area snow tracking surveys demonstrated that deer use increases within softwood stands on the Sprague Neck peninsula as the snow depth increases. In addition, a group of deer traveled down to the shore potentially feeding on seaweed along the shore of Davis Beach. (Tetra Tech, Inc. 2017a)

It is unclear how much of the summer population remains on the Installation during a heavy snow year. Primary winter shelter and secondary winter shelter may be a limiting factor on the Installation during heavy snow years. But deer wintering areas with the heaviest use are on the northern portion of the Sprague Neck peninsula. The grassland and shrubland habitat in the VLF tower fields provide abundant forage and solar exposure during low to no snow periods. (Tetra Tech, Inc. 2017a)

The white-tailed deer is the most abundant large mammal at NSA Cutler. Observations by Installation personnel (Fugger and Burns 2009) suggest that the existing deer population at NSA Cutler may exceed the carrying capacity – or the maximum population an area can sustain without causing damage such as overbrowsing – of the area. These elevated population levels may be impacting the health of other plant and animal species, conflicts with land-use practices, and presents potential impacts human safety and health at the Installation.

In conjunction with the state hunting program, which seeks to promote a sustainable population of deer, MDIFW has established a target density of 10 deer per square mile, which represents the maximum number of deer the habitat can support in winter (Lavigne 2009). This target density would allow for a maximum sustained deer harvest, while ensuring a productive and reasonable deer population remains.

The calculated deer density in the VLF area (11.7 square kilometers or 4.5 square miles) is between

10.6 and 15.3 deer per square mile, which exceeds the target density of 10 deer per square mile. Incidental observations by long-term staff indicate there was a high level of winter kill of deer in 2014-2015. It is possible that the deer population was at a low point during the 2015 deer surveys. Therefore, additional surveys would allow for annual and seasonal variation. (Tetra Tech, Inc. 2017a)

☞ LA12, FW08 and FO02: Conduct additional deer population surveys over multiple years to allow for annual and seasonal variation as funding allows. The findings of these surveys should be incorporated into the deer management plan.

The high deer population levels justify development of a hunting program that would be the foundation for sustainable deer management at NSA Cutler. A deer management plan is being developed and will be incorporated into the INRMP once it has been finalized. **Appendix L** provides some guidance for developing a deer management plan. MDIFW would be consulted during development of the management plan for NSA Cutler.

☞ FW14: Implement the NSA Cutler deer management plan, once available.

3.2.4 Reptiles and Amphibians Management

The baseline amphibian and reptile survey provided documentation of herpetofauna species present on the Installation and what species could be present at NSA Cutler based on available habitat. Nine species were confirmed to occur within the Installation and 15 additional species have the potential to occur at NSA Cutler (NAVFAC 2013).

❖ An amphibian and reptile assessment should be conducted every year at NSA Cutler to determine if populations or number of individual species is growing or if new populations are introduced. A habitat assessment should be conducted in conjunction with the herpetofauna species assessment. Continued education of species and their habitat is necessary in increasing the project efficiency and accuracy. The survey methodology that is chosen for the assessment should be repeatable so that it may be used as a tool for ongoing monitoring of the herpetofauna on the Installation.

3.2.5 Threatened and Endangered Species and Special Concern Species Management

3.2.5.1 Endangered Species Act of 1973

The primary regulatory protection for threatened and endangered species on federal lands is the ESA of 1973 (16 CFR §1531 to §1544). The federal ESA is intended to serve as a mechanism for conservation of ecosystems upon which threatened and endangered species depend, as well as to provide programs for species conservation that reduce their potential for becoming extinct. ESA is administered by the USFWS (terrestrial and freshwater wildlife), and NOAA's, NMFS (marine species). Section 7 of the ESA requires all federal agencies, in consultation with USFWS or NMFS, to use their authority to further the purpose of the ESA, and to ensure that their actions are not likely to jeopardize the continued existence of listed species as a result of destruction or adverse modification of critical habitat.

When the USFWS initiated a court-ordered effort to designate critical habitat for all federally listed species, the DoD became concerned that the designation of critical habitat on military lands would add an excessive amount of burden (through administrative compliance and consultation requirements) on military installations, with limited benefit afforded to listed species (Benton et al. 2008). In defense, the DoD argued that it was providing extensive protection to listed species through the formal consultation process with the USFWS and via conservation measures specified in installation INRMPs. To address this, the Defense Authorization Act for fiscal year 2004 [2](Public Law 108-136, November 24, 2003) granted the USFWS specific authority to exempt DoD lands from the designation of critical habitat provided a comprehensive and approved INRMP was in effect; the INRMP specifically addressed the conservation of species under consideration; and the INRMP was implemented.

No critical habitat has been designated for the federally listed red knot and northern long-eared bat. Atlantic salmon critical habitat has been designated within the nearshore areas of the Installation. Under section 4(a)(3)(B)(i) the Navy commented saying they are opposed to the Atlantic Salmon on properties owned or controlled by or designated for use by the DoD. Under the same ruling, the Navy states that if the INRMP provides any benefit to the Atlantic salmon, the designation of habitat would be precluded. Cutler provides a benefit to the Atlantic salmon therefor it does not meet the definition of critical habitat. This ruling is also excluded by section 4(b)(2) of the ESA that states the determination of endangered species and threatened species is the overutilization for commercial, recreational, scientific or educational purposes is with respect to any species over which program responsibilities have been vested in the Secretary of Commerce pursuant to Reorganization Plan Numbered 4 of 1970 (USFWS 2013). One critical management practice of threatened and endangered species is continuous tracking and control for federally listed species habitat within the Installation. **Table 3.3** shows threatened and endangered species that could occur or do occur on the Installation based on vegetation types.

Table 3.3 Threatened and Endangered Species Based on Vegetation Types

Habitat	Vegetation Community	Location	Wildlife Species	Usage
Dense forested areas[1]	Late spring and summer forages in upland forests[1]	Dense forest and cave structures[1].	Northern long-eared bat[2]	Breeding and Migratory[1]
Water source and manmade structures[1]	Foraging in proximity to man-made structures[1]	Proximity to water sources and manmade structures[1]	Little brown bat[1]	Breeding and Migratory[1]
Riparian areas[1]	Conifer and mixed hardwood forest[1]	Generally found in association with riparian areas and rocky outcrops or talus[1]	Eastern Small-Footed bat[1]	Breeding and Migratory[1]
Intertidal Maine habitat[4].	Coastal inlets, bays and estuaries[4]	Potential to occur on the installation	Red Knot[3] Roseate Tern	Migratory[4]

2 Defense Authorization Act (2004), Section 318, see http://www.dod.mil/dodgc/olc/docs/2004NDAA.pdf.

Table 3.3 Threatened and Endangered Species Based on Vegetation Types

Habitat	Vegetation Community	Location	Wildlife Species	Usage
Grasslands	Grasslands and old fields	Potential to occur on the installation	Rusty patched bumble bee	Potential habitat occurs in the VLF area
Typically spend 2-3 years in freshwater and 2-3 years in the ocean and return to natal river to spawn[5]	High sea ocean[5]	Potential to occur on the installation	Atlantic Salmon[2]	Spawning and critical habitat[5]

Sources: (Tetra Tech, Inc. 2014a)[1]
(USFWS 2016a)[2]
(USFWS 2016b)[3]
(Cornell Lab of Ornithology 2015)[4]
(NOAA 2016)[5]

3.2.5.2 Maine Endangered Species Act

The Maine ESA was passed by the Maine Legislature in 1975, and the Commissioner of the Department of Inland Fisheries and Wildlife is designated with the authority to oversee implementation of the Maine ESA. Current 33 species of fish and wildlife are listed as endangered or threatened under the Maine ESA. Plants are not covered by Maine’s ESA. Although the federal ESA considers species status as part of a national or range-wide perspective, Maine's ESA protects only those species that are vulnerable from disappearing within Maine, and to ensure native species continue to survive in Maine. Progress of Maine's ESA Program is reported annually in the annual Wildlife Division Research and Management Report prepared by MDIFW. This annual report should be referenced to obtain the most up-to-date information for species listed under Maine’s ESA.

3.2.5.3 Species Protected by Federal and Maine Endangered Species Acts

The Installation area includes three rare ecosystems, the Maritime Slope Bog, Deer-hair Sedge Bog Lawn, and Kelley Heath. These rare ecosystems provide essential habitat (black crowberry) for the crowberry blue butterfly, a Maine species of special concern. Management recommendations for these rare communities are described in **Section 3.1.8**.

☞ FW15: Surveys for crowberry blue butterflies are recommended during the flight season for this species (early July through mid-August) to verify the unconfirmed sighting of this species during 2009 field activities and to determine the presence and extent of this rare species elsewhere at NSA Cutler. Multiple surveys scheduled throughout the flight season are recommended to ensure that survey efforts do not miss extant populations due to poor weather conditions or inadequate sampling.

Several projects and recommendations described in other sections of this document will provide benefit and management of federal and state protected wildlife species known to occur at the Installation. The red knot, a federally threatened shorebird, does not have critical habitat designated on NSA Cutler. Protective measures for shorebirds and grassland bird species will be included in the management plans described in **Section 3.2.6**, and forest species such as the peregrine falcon will benefit from implementation of the Eagle Protection Plan described in **Section 3.2.6**. The placement of nest boxes in areas that are protected from mowing will encourage grassland bird species, such as the grasshopper sparrow, to nest in areas where they will have limited disturbance from mowing activities, and mowing recommendations described in **Section 3.2.6** will ensure that impacts to nesting grasshopper sparrows in the antenna fields are minimized. The protection of the bald eagle will be afforded by complying with the National Bald Eagle Management Guidelines as described in **Section 3.2.6** and the implementation of the Eagle Protection Plan described in **Section 3.2.6**. Conservation and restoration of vegetation at the Installation may provide an indirect benefit to Canada lynx, by attracting its prey to reside and forage in these habitats.

The northern long-eared bat, little brown bat, eastern small-footed bat; and tricolored bat were identified as occurring at the Installation through bat acoustic monitoring (Tetra Tech, Inc. 2014a; Tetra Tech, Inc. 2018a). The northern long-eared bat is listed as a federally threatened species and a state endangered species (MDIFW 2015). The little brown bat is listed as state endangered and the eastern small-footed bat is listed as state threatened (MDIFW 2015). USFWS has issued a 90-day finding and is evaluating the tricolored bat to determine if listing is warranted under the ESA (USFWS 2017).

In 2016, the USFWS determined designating critical habitat for the northern long-eared bat was not prudent because the summer habitats used do not meet critical habitat criteria and if critical habitat was designated for winter habitat it would potentially increase the threat from disturbance and vandalism to winter habitat locations and increase the spread of white-nose syndrome (USFWS, 2016b).

The USFWS established specific management measures to protect the northern long-eared bat under the final 4(d) rule issued when the northern long-eared bat was listed as threatened. The USFWS noted that in areas impacted by white-nose syndrome, the most important conservation actions for the northern long-eared bat are to protect bats in hibernacula and maternity roost trees, and to continue to monitor populations in summer habitat while developing methods to abate white-nose syndrome as quickly as possible.

Because NSA Cutler is within an area affected by white-nose syndrome, incidental take is prohibited if it occurs within a hibernaculum or if it results from tree removal activities and the activity occurs within 0.25 mile of a known hibernaculum or the activity cuts or destroys a known, occupied maternity roost tree or other trees within a 150-foot radius of the maternity roost tree during the pup season (June 1 through July 31). However, under this rule, take of the northern long-eared bat is not prohibited for the removal of hazardous trees for protection of human life and property; in defense of life; and take by an employee or agent of the Service, of the NMFS, or of a State conservation agency that is operating a conservation program pursuant to the terms of a cooperative agreement with the Service (USFWS 2016c).

Maine also adopted rule 2017-057, which provides protection guidelines and exemptions for certain activities as they relate to bat species protected under the Maine ESA (MDIFW 2017).

There is no known hibernaculum at NSA Cutler. NSA Cutler will comply with all federal and state guidelines. NSA Cutler would comply with the final 4(d) rule by conducting habitat surveys prior to activities in forested areas to identify potential maternity roost trees. Acoustic surveys and mist netting for bat species may also be deemed necessary for specific projects to determine the presence or absence of the protected bat species.

To adequately assess the status of other threatened, endangered, rare, and special concern species, periodic surveys are recommended during the appropriate season for each species known to occur at the Installation. Upon the listing of a new threatened, endangered, or species of concern a survey should be conducted, in a timely manner, and the INRMP updated with the species information and occurrence information at the installation.

☞ FW16: Conduct periodic follow-up surveys for threatened, endangered, rare, and special concern species known to occur at the Installation during the appropriate season. Surveys should be compiled every 3 to 5 years and include a review of federally and state protected species lists as well as species of special concern added since completion of the last survey.

The Installation is located within designated critical habitat for Atlantic salmon; however, the Installation does not contain any suitable habitat to support migrating or spawning salmon. Because the entire Installation is located within designated critical habitat for Atlantic salmon, INRMP activities that protect and improve water quality would contribute to protection of Atlantic salmon habitat within the HUC 10 watershed. Measures to prevent erosion and sedimentation into waterbodies, and wetland protection efforts described in **Section 3.1** would provide an indirect benefit to Atlantic salmon and designated critical habitat located downstream or immediately offshore of the Installation. The water quality protection measures and BMPs (such as erosion and sediment control, wetland protection, monitoring of nonpoint source pollution, protection of watersheds from hazardous materials, use of environmentally beneficial landscaping, and monitoring for and management of forests as shoreline buffers) would indirectly benefit Atlantic salmon critical habitats. Additionally, the management measures that would provide watershed benefits, would also provide indirect benefit to marine mammals protected by the Marine Mammal Protection Act that are known to occur immediately offshore of the Installation.

3.2.6 Migratory Bird Management

To address the unintentional take of migratory birds as a result of activities necessary to support the military mission, a Memorandum of Understanding (MOU) was adopted between the DoD and the USFWS, as required by Executive Order (EO) 13186, *Migratory Birds*, on 31 July 2006 (Benton et al. 2008).[3] This MOU allows the military to obtain permits for the “unintentional take” of a migratory bird if it is in support of a military readiness operation (Benton et al. 2008). The procedures contain significant safeguards to ensure that the taking of birds is minimized when the new rule is used and that conservation measures are employed to compensate for the losses that may occur. The following sections describe such minimization and compensation measures that are employed at NSA Cutler.

Due to the high diversity of bird species that utilize NSA Cutler, protection of existing habitat for many species of migrating landbirds and shorebirds is one of the key natural resource management principles of this INRMP. Simultaneously, the active maintenance of other areas located at NSA Cutler creates habitat for other species of shorebirds, water birds, songbirds, and raptors, as well as species associated with streams and wetlands. For example, maintenance of successional scrubland by mowing supports game birds such as ruffed grouse (*Bonasa umbellus*) and American woodcock. Fish and wildlife habitat management measures must address the preservation of extensive areas of intertidal and deepwater marine environments immediately adjacent to the site that support a large

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[3] Additional details associated with the MOU and details of the memorandum issued on April 3, 2007 that provides specific guidance on implementation of the MOU can be found at: https://www.denix.osd.mil/portal/page/portal/content/environment/NR/PolicyGuidance/MIGRATORY-BIRD-MEMO-AND-TOOLS-FOR-MOU-3-APR-07.PDF

variety of marine mammals, fish and shellfish, and which also serve as breeding and foraging areas for many shorebird species. Special management measures must also include protection for threatened or endangered species, such as migratory waterfowl that have been documented on site.

Grassland bird stewardship is important at NSA Cutler due to the use of habitats by migratory grassland birds. Grassland bird surveys should be conducted to get a comprehensive list of grassland bird species, abundances and information pertaining to the grassland habitat availability and usage at the installation and would serve as the base for a protocol-based shorebird monitoring. The development of migratory shorebird management plans described below (Project FW18) should include appropriate management measures identified in the results of the grassland bird survey report and Bird and Bat Conservation Strategy report (See **Appendix K**).

- ❖ Routine mowing of grassland habitats helps to control the spread of invasive species; however, many bird species are known to nest within the grassland habitats. To minimize impacts to nesting birds, it is recommended that mowing be avoided from May 15 to July 15 to allow time for nesting chicks to fledge. If mowing is necessary during the nesting season, then the minimum necessary footprint should be mowed, and mower height should be set no lower than 10 inches to minimize destruction of nests. The grassland habitats provide foraging habitat for the state threatened short-eared owl (breeding population) and upland sandpiper, and the state endangered grasshopper sparrow. Several bird species that are state species of special concern also utilize the grassland habitat of the Installation. Although not specifically associated with the grassland habitat, the Canada lynx, a federally threatened species and a Maine species of special concern, was observed in near grassland habitat at the Installation, and may use this habitat for foraging for prey.

- ☞ FW17: Existing bird habitat can be enhanced through the installation of nest boxes. Several birds that have been observed on NSA Cutler and that may benefit from and readily use properly placed nest boxes include wood ducks, eastern bluebirds, wrens, swallows, purple martins, chickadees, nuthatches, great-crested flycatchers, brown creepers, titmice, northern flicker, woodpeckers, and barred owls (USFWS NCTC 2009). When targeting specific bird species, nest box dimensions, size of entrance opening, and placement height and location should be taken into consideration. The USFWS NCTC provides guidance in planning nest box programs.

- ☞ FW18: Migratory bird monitoring plans (e.g., for grassland and shorebird species known to occur at the Installation) should be developed in coordination with IBP, MDIFW and USFWS.

Large numbers of birds would be expected to attract raptors. Foraging raptors and eagles are at risk for collision with the tower antenna arrays. Species that dive on or pursue prey would likely be particularly vulnerable. The raptor migration surveys identified bald eagles as the most commonly observed raptor species at the Installation and some of the bald eagles observed were residents. While resident bald eagles did not avoid the hazard areas, they spent little time flying in the hazard areas. Fatality monitoring surveys over a three-year period (2015-2017) did not find eagle carcasses and the collision fatality rate estimation for eagles is zero (Tetra Tech, Inc. 2018b) However, prior to the surveys, eagle mortality was documented in multiple years.

As the bald eagle population grows, the risk to the species at the facility increases. A bald eagle fatality or serious injury has been recorded five times at NSA Cutler since 1980 (early 1980s, 1985, 1996, 2005, and 2013). It is unknown if resident nesting eagles avoid the facility and associated hazards. The limited data suggest higher probability of entering into the buffered hazard area/hazard area during the fall/early winter versus summer. Additional surveys to document nesting and migratory eagle movements in relation to the antenna fields at the VLF and HF areas should be conducted to determine whether eagles avoid the antenna array and/or if the time of year affects entering the hazard area. (USFWS 2012)

- ❖ The bald eagle is protected by the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). Due to the high likelihood for bald eagles to use the coastal areas for foraging, natural resource management of the Installation should follow the recommendations outlined in the National Bald Eagle Management Guidelines and the Eagle Protection Plan.

The raptor migration survey also suggested that some raptors, including northern harrier and rough-legged hawk, did not exhibit avoidance behaviors in the hazard areas; instead they were using the towers and guy wires as perch locations for hunting. There remains a significant risk of collision mortality of migratory birds because of the extensive tower antenna array at VLF area and to a lesser extent at the HF area. In addition, the ground at the base of the towers is known to be contaminated.

NSA Cutler needs to identify the reasonably foreseeable threats to birds and bat species and develop effective response measures to avoid or minimize these potential impacts. The USFWS recommends that an adaptive management approach should be taken to address bird and bat conservation. This approach is systematic approach for improving resource management by learning from management outcomes. A Bird and Bat Conservation Strategy Report (See **Appendix K**) has been prepared and identifies adaptive management measures that will be reviewed and implemented over the long-term operation of NSA Cutler to reduce risks to birds and bats (Tetra Tech, Inc. 2018c). It is a living document and will be reviewed and updated. Eagle conservation measures were not included because a separate Eagle Protection Plan (See **Appendix J**) has been prepared for NSA Cutler (Tetra Tech, Inc. 2018d).

☞ FW19: Implement the bird and bat conservation strategy.

☞ FW20: Conduct follow-up raptor migration surveys. Surveys should be conducted in accordance with the Eagle Protection Plan.

☞ FW21: Continue to conduct eagle use surveys to document nesting and migratory eagle movement in relation to the antenna fields.

Given the nature of the facility and its military mission, collision mortality of birds and bats is unavoidable. Surveys have been conducted to determine if bird and bat fatalities resulted from collisions with structures at the Installation, such as communication towers and guy wires, and whether any of the fatalities were federal or state-listed species. The hazardous area of the VLF area was defined as the 800-acre area beneath all towers and guy wires. The helix houses or zero towers, which can produce dangerous levels of radioactivity when transmitting, also were a concern for fatalities. However, steps to minimize the mortality and to mitigate for unavoidable losses cannot be taken unless the mortality to migratory birds and bats is known. The baseline fatality surveys were conducted at the VLF area from 2015 through 2017. The mean per plot modeled estimated fatality rate over the three survey years was 7.77 fatalities per plot. Twenty-seven species of birds were identified as confirmed fatalities during the surveys with approximately 50 percent categorized as unknown small birds; identified birds included waterbirds, shorebirds, songbirds, and raptors. No bat carcasses were found during the surveys. In spring 2016, the fatality data and the radar data were concurrent, and the bird fatalities were less than one percent of the total number of migrants, which suggests that most migrants with flights below the maximum tower height are not colliding with the towers and guy wires. However, it is likely that weather events, such as fog or rain, that overlap during the spring and fall peak migration periods increase the risk for collision in the hazard areas. (Tetra Tech, Inc. 2018b)

☞ FW22: Conduct follow up surveys to monitor and estimate take of migratory birds and bats. Surveys should be conducted in accordance with the bird and bat conservation strategy to evaluate the effectiveness of the proposed avoidance and minimization measures.

Mitigation measures that may be included in the bird and bat conservation strategy and the Eagle Protection Plan include potential changes to the artificial lighting scheme at the Installation to reduce mortality risks to birds. Current federal regulations require the use of the nighttime lighting for aviation safety on tall structures over 200 ft. At present, 13 of the 26 towers contain Federal Aviation Administration (FAA)-compliant red strobed and non-strobe lighting to meet federal regulations. Any changes to facility lighting must be consistent with these regulations. In addition, exterior building lights and light that bleeds through windows present hazards to nocturnal migrants. Current lighting at the installation is compliant with the Navy's anti-terrorism force protection security standards and any changes would require anti-terrorism force protection review and approval. However, the VLF area lighting should be evaluated to determine if lighting can be modified to pose less risk to migrating birds and still meet anti-terrorism force protection requirements and new FAA obstruction lighting and marking standards for aircraft safety.

❖ During routine lighting maintenance, evaluate whether changes to lighting could be made, such as replacing steady-burning lights with flashing omnidirectional red lights.

Removal of road-killed animals or other carcasses on or near roads promptly would limit readily available food sources for raptors and owls which would limit attraction.

Evaluate whether installation of day visual markers for bird deterrent devises on guy wires in known raptor or waterbird concentration areas and other areas where these species are known to stop may be effective and implementable.

An additional minimization measure to evaluate would be habitat modification to reduce prey habitat. However, some of the prey habitats may be considered jurisdictional resources and may require federal and state permitting prior to implementation of habitat modification.

The **National Bald Eagle Management Guidelines** can be found at:
https://www.fws.gov/northeast/ecologicalservices/eaglenationalguide.html

After the completion of the avian radar and acoustic survey a few recommendations were made to help reduce error and become more cost-effective.

❖ Manual review has been determined to be the most cost-effective and accurate method to vet data during the avian acoustic survey. Manual review allows for a more complete description of species composition, richness and abundance within specific survey areas (Tetra Tech, Inc. 2014a). The continued education and increased efficiency of personnel is essential for an even greater long-term benefit.

- ❖ Provide and perform a similar sampling plan to point counts and apply it to the seasonal data set. This would help provide an accurate, quick view of species within the survey areas including species richness, distribution and abundance, while reducing the time spent on Song Scope processing. Increasing the repeated sample days during seasonal acoustic data sets with the greatest likelihood of detection would allow for more accurate results (Tetra Tech, Inc. 2014a).
- ❖ After the completion of the avian radar and acoustic survey a few recommendations were made to help reduce error and become more cost-effective.

The Installation NRM may want to consider scheduling fatality surveys at the same time as the avian radar surveys to create a ratio of fatalities to the total number of migrants passing over, through, and around the installation.

☞ FW23: Conduct avian radar and acoustic surveys every two to three years to collect near continuous radar data on bird and bat activity across the installation.

Shorebird Management

Shorebird stewardship is especially important at NSA Cutler due to the use of habitats by a nationally significant number of two species in particular: purple sandpipers and whimbrels (**Appendix H**). The Installation is among the most important shorebird roosting or resting sites in Maine for seven species, and it has one of the most diverse shorebird communities in the entire state. Shorebird protection, habitat enhancement and creation, population monitoring, and migration research have been conducted in various forms since the Installation went on line in 1960.

The 2016 Shorebird Monitoring Survey fulfills several DoD Coordinated Bird Monitoring Program and the program for Regional and International Shorebird Monitoring goals including:

- Goal #1: Maintain or enhance vital shorebird staging and wintering habitats in Maine (Tetra Tech, Inc. 2016c)
- Goal #2: MDIFW shorebird management (Tudor 2000b; Bart et al. 2005)
- Goal #3: Management and stewardship (Tetra Tech, Inc. 2016c)
- Goal #4: Monitor shorebird numbers at stopover locations (Tetra Tech, Inc. 2016c).

The survey results provided a comprehensive list of shorebird species, species abundance, and information pertaining to the shorebird habitat availability and usage at the Installation. This study serves as the base for a protocol-based shorebird monitoring program and contributes to the Navy's mission (Tetra Tech, Inc. 2016c). The development of migratory shorebird management plans described in **Section 3.2.6** (Project FW18) should include management measures identified in the 2016 Shorebird Monitoring Survey and Report and described below:

- ❖ Minimize disturbance to foraging and roosting shorebirds. Currently, little activity occurs near the shore, indicating that disturbance to roosting habitat could be minor. The greatest disturbance is presumed to occur in Little Machias Bay and Holmes Bay when humans are clamming. Little Machias Bay mudflats can be accessed with trucks and all-terrain vehicles

(ATVs) at low tides. This poses a greater disturbance threat and it is recommended that additional signage be placed to inform individuals of when they should avoid the area during peak migratory times and to allow a 300-foot buffer (Tetra Tech, Inc. 2016c).

- ❖ Continue to monitor shorebirds. Follow-on surveys should be conducted every two to three years. Additional surveys will aid in developing population estimates. The data can be submitted to the ISS through the eBird portal (Tetra Tech, Inc. 2016c).
- ❖ Continued collaboration and maintenance of existing relationship with collaborators. Continue to build new relationships with outside organizations and build facility research opportunities, as appropriate. These relationships can provide valuable information to benefit shorebirds and other species. In addition, some of these efforts could reduce cost through cost-sharing with other ongoing research efforts (Tetra Tech, Inc. 2016c).

3.2.6.1 NSA Cutler Osprey Nesting Management Plan

Osprey frequently establish nests on the antenna arrays and support towers at the Installation. The placement of these large nests on the antennas and towers make routine maintenance activities difficult to conduct without disturbing the nest. To address the management needs of osprey at the Installation, especially in consideration of the operating and routine maintenance requirements of the antennas, the Navy developed the Osprey Nesting Management Plan (Navy 2007). This plan promotes nesting, feeding, and raising of osprey chicks while preserving the integrity of the NSA Cutler military mission. One of the key tools utilized in development of the plan was USFWS's Gulf of Maine Osprey Habitat Model (USFWS 2000). The complete Osprey Management Plan for NSA Cutler is provided in **Appendix M**.

The NSA Cutler Osprey Nesting Management Plan utilizes a three-tiered management approach. The three key management objectives of the plan include promotion of natural nesting sites, provision of alternate sites on viable platforms, and removal of active nests (Navy 2007). Protection of this habitat has been identified as one of the key osprey management objectives. Signage to identify a no trespassing buffer zone of 200–300 ft around nesting trees, will also serve to inform military personnel utilizing this area for recreational activities that these areas should be avoided to protect this species.

To encourage the use of alternative viable nesting platforms, alternative platforms should offer an elevated, unrestricted view and access to a food supply. Platforms should be placed as high as possible within site of the water's edge and contain pre-weaved driftwood and debris material that have been removed from other nest sites to encourage selection of the platform for nesting. Efforts to prevent disturbance to successful nesting platforms should be employed. Platform design suggestions are detailed in the plan (Navy 2007). As of the summer of 2018, the platforms that were identified as suitable nesting sites have not been utilized by osprey.

If there are concerns over an osprey or raptor nesting in a problematic location, it is recommended that modifications, such as a physical barrier, be used to deter nesting attempts (Tetra Tech, Inc. 2018d).

Active nests are defined as any nest or nest site that contains eggs or hatchlings. If removal of an active nest is required because it is having a negative impact to the military mission or to the osprey's health (i.e., radiation hazards from electromagnetic energy), an MBTA Depredation Permit will be obtained from the USFWS. Removal of active nests will be conducted in cooperation with a certified wildlife biologist that is experienced with the safe removal of eggs/hatchlings, and they will remove and/or transport the eggs/hatchlings from the nest to federally permitted wildlife rehabilitator where they can be cared for until release into the wild. Removal of inactive nests can be conducted in coordination with the NRM, without the need to obtain an MBTA Depredation Permit.

☞ FW24: For active osprey nests that are identified as having a negative impact on the military mission, or to the osprey's health, the Installation will obtain a MBTA Depredation Permit from USFWS, and removal of active nests will be conducted in cooperation with a certified wildlife biologist, and in accordance with the recommendations outlined in the Installation Osprey Management Plan.

☞ FW25: A feasibility assessment should be conducted for the installation of artificial nesting platforms for osprey.

3.2.7 Nuisance Wildlife Management

Nuisance wildlife, such as beavers or bats, are not a significant problem at NSA Cutler. Beaver lodges may affect water drainage, impede water flow, and impact water quality; bats may roost in Installation buildings. Routine monitoring should be conducted to determine if nuisance wildlife removal or relocation actions are necessary to protect natural resources and human health and safety.

☞ LA01 and FW01: Conduct annual monitoring of invasive and nuisance wildlife, such as beavers and bats, to determine if habitat modification to discourage beavers or wildlife removal of nuisance bats (excluding federally or state protected bat species) or other remedial actions of both species are necessary to protect natural resources and/or human health and safety. Create a habitat modification plan to address beaver activity.

The MDIFW Regional Fish and Wildlife Office should be contacted in the event that stray, injured, or disoriented fish or wildlife are observed on the Installation.

❖ If any deer, moose, or other stray, injured, or disoriented animal is observed on the Installation, the MDIFW Regional Fish and Wildlife Office should immediately be contacted for assistance. The Regional Fish and Wildlife Office for the Cutler region is located in Jonesboro, Maine (Region C). Fisheries issues should be directed to (207) 434-5925, and wildlife issues directed to (207) 434-5927.

3.2.8 Partnerships and Outreach

Public access and partnerships with natural resource management organizations includes but is not limited to allowing National Audubon Society representatives to access the Installation during the month of December to conduct the annual Christmas Bird Count (Fugger and Burns 2009), Department of Defense Partners in Amphibian and Reptile Conservation, USFWS, MDIFW, and the University of Maine (various programs). As described below, the management recommendations proposed in this INRMP include establishing future partnerships with the DoD PIF, Biodiversity Research Institute, Atlantic Salmon Federation, and other private organizations such as Ducks Unlimited and the Nature Conservancy.

Surveys to support a five-year MAPS study were conducted in the VLF area beginning in 2015. The MAPs survey area, approximately 20 acres in the northwest portion of the VLF area, includes four habitat types: field, shrub dominated by gray alder, conifer forest dominated by red and black spruce, and deciduous forest dominated by paper birch. The establishment of these MAPS stations at the Installation will provide valuable information on utilization of these forests by neotropical migrants, and the information can be added to the long-term avian productivity and survivorship database maintained by the IBP. The NRM should contact the DoD PIF Program Manager for the northeast region for more information on partnering with IBP.

☞ FW26: Continue to coordinate with interested federal or state agencies, NGOs, or private entities (i.e., DoD PIF and IBP) to establish wildlife monitoring programs.

The DoD has initiated action to protect habitat at NSA Cutler through the identification of the Sprague Neck ERA.

☞ FW27 and OR02: Re-engage partnership and cooperative agreement discussions that were initiated during the establishment process of the Sprague Neck ERA. Agencies and organizations that should be part of this process include, but are not limited to DoD PIF, USFWS, MDIFW, University of Maine–Machias, Ducks Unlimited, and the Conservancy.

3.2.9 Conservation Law Enforcement

The Sikes Act requires that natural resources law enforcement be provided on military lands (Benton et al. 2008). The DoD has developed a very general law enforcement policy in DoD Directive 4715.03, however, comprehensive DoD law enforcement policy is lacking, and each branch of the military has historically addressed the subject individually on an installation-by-installation basis. This has included a range of law enforcement options ranging from employment of civilian game wardens, military police, or combinations of civilian game wardens and military police. DoD does not have a standard for law enforcement training, firearms, or civilian job descriptions. Although the U.S. Marine Corps has developed a standard law enforcement policy, and the Air Force is making strides to develop a similar program, a standard DoD policy on natural resources law enforcement remains to be developed.

NSA Cutler security staff provide law enforcement for the Installation; however, these staff are not trained specifically to deal with natural resources law enforcement issues. The limited access to the public reduces the need for security staff to deal with common public access law enforcement issues such as vandalism and unauthorized ATV access, however trespassing on the Installation does occur periodically.

The primary natural resources law enforcement issue for the Installation is associated with the periodic stranding of marine mammals along the coastline and nuisance wildlife. Environmental staff stationed at the Installation should become familiar with the procedures outlined in Section 3.2.2 of this document and refer to the Stranding Network fact sheet included in **Appendix I** for the appropriate course of action when dealing with these natural resources law enforcement issues.

3.2.10 Training of Natural Resources Personnel

Training of natural resources personnel is also applicable to fish and wildlife management at NSA Cutler. Training of natural resources personnel is described under the land management programmatic objective in Section 3.1.12. Other environmental and natural resources training activities should be undertaken, as needed, to ensure that natural resources personnel are prepared to handle any fish and wildlife management issues that may occur.

3.2.11 Geographic Information System (GIS) Management, Data Integration, Access and Reporting

GIS management, data integration and access, and reporting are applicable to fish and wildlife management at NSA Cutler. GIS management is described under the land management programmatic objective in Section 3.1.13.

☞ LA15, FW28, FO03, and OR03: Develop a GIS system for natural resources data at NSA Cutler and provide training to environmental staff to maintain the GIS database.

3.3 Forestry Management

OPNAV M-5090.1D (Navy 2014) describes Navy policy on managing forestlands as the restoration, enhancement, and improvement of forest resources and related ecosystems through an active program of professional forest management, based on soil-site capabilities, in a multi-disciplinary, ecologically sound manner. It further describes Navy forest management as including harvest, reforestation, afforestation, and silvicultural treatments that shall foster forest health and vigor, structural and biological diversity, and regeneration. These actions will produce financial returns to the government, contribute commercial forest products to the economy, and maintain and improve the economic and ecological value, health, and diversity of the forest resources and related ecosystems.

Forestry management at the Installation includes:

- General forestry management, including mature tree stands protection, impact avoidance to tree species that provide important forage for birds and other wildlife, and forest characterization and management
- Environmental and natural resources training
- GIS management

Forestry Management Programmatic Objectives

The programmatic objectives that have been established for forestry management at NSA Cutler are as follows:

1. Protect and promote sustainable management of forest resources.
2. Manage forest habitats to promote use by a diverse range of wildlife species, including protection of mature tree stands and snags, and protection of tree species that provide suitable nesting and foraging habitat for wildlife.
3. Manage forest habitats to maintain wildlife travel corridors, streamside protection, and aesthetic buffer zones.
4. Maintain forest habitats to enhance plant community diversity.
5. Maintain forest habitats to ensure consistency with an ecosystem approach to forest management.

3.3.1 General Forestry Management

The forested areas of the Installation provide important wildlife habitat to a variety of songbirds, amphibians, reptiles and mammals. NSA Cutler does not have any timber harvesting activities planned, and the best way to maintain the forest habitat of the Installation and its value to wildlife is to retain it in its natural condition.

The programmatic objectives that have been established for forestry management would encourage use by a diverse range of wildlife species; maintain wildlife travel corridors, streamside, and aesthetic buffer zones; enhance diversity in plant communities; and ensure consistency with an ecosystem approach to forest management. Upland Maritime Spruce-Fir Forests provide a natural buffer along the Installation perimeter and serve to visually separate different land use zones. The Maritime Spruce-Fir Forest habitat should be retained in its natural condition to afford the greatest value to wildlife. The mature coniferous forest habitat provides shelter to wildlife during severe winter weather, and as mature trees die, snags will become available for wildlife as well as create small forest openings that promote regeneration. Tree species that provide suitable nesting and foraging habitat for wildlife should be protected.

> The **forested areas** of the Installation, especially on the Sprague Neck peninsula provide **important wildlife habitat** to a variety of songbirds, amphibians, reptiles and mammals.

3.3.2 Forest Inventory

A forest inventory was conducted as described in Section 2.5.3. The majority of the 494 acres of forested land on the VLF and HF areas of the installation comprises mixed hardwood/pine. Typical harvestable hardwood species include birch, maple and aspen. The softwood forested areas comprise spruce, fir and larch, with some birch included in these areas as well (PCMC 2015). At this time, there are no plans to implement timber harvesting on the property. However, a basic forest management plan, and semi-regular monitoring of forest health, are recommended.

☞ FW09 and FO01: A forest management plan should be developed using the completed forest characterization assessment. The management plan should include a summary of field characterization data, including the stand boundaries, a description of each stand including but not limited to dominant and common tree species, sizes, age class, absolute density, soils, topography, key habitat features, and any other distinctive features. In addition, the plan should include a prescription for each stand and a schedule for conducting forest health monitoring. Because timber harvesting is not planned, this management plan will focus on opportunities for improving the forest for wildlife habitat. Forest health monitoring should be conducted once every five years and the results incorporated into the forest management plan as an update to reflect the findings of the monitoring and management recommendations if appropriate. The plan should include measures for protection of standing dead trees (snags) and trees with loose bark or cavities, which represent important roosting habitat for bats.

In the event that timber harvesting is proposed, this forest management plan will serve as a foundation for conducting a comprehensive forest inventory to determine what types of timber harvest practices should be applied to ensure sustainable use and continued ecological value of forested habitat.

MDIFW has designated deer wintering habitat to be significant, as conifer-dominated areas are essential to winter survival of Maine's herd. Surveys were conducted to assess the availability of deer wintering habitat on the VLF and HF areas. Appropriate conifer-dominated forest stands were identified along the northern VLF area boundary and in the Sprague Neck peninsula. The VLF area surveys demonstrated that the deer use increases within softwood stands on the Sprague Neck peninsula as the snow depth increases. Primary winter shelter and secondary winter shelter may be a limiting factor on the Installation during heavy snow years. The grassland and shrubland habitat in the VLF tower fields provide abundant forage and solar exposure during low to no snow periods. Based on the current survey estimates, the calculated deer density in the VLF area is between 10.6 and 15.3 deer per square mile, which exceeds the target density of 10 deer per squure mile. Incidental observations by long-term staff indicated there was a high level of winter kill deer in 2014-2015. It is possible that the deer population was at a low point during the 2015 deer surveys. Therefore, additional surveys would allow for annual and seasonal variation. (Tetra Tech, Inc. 2017)

☞ LA12, FW08 and FO02: Conduct additional deer population surveys over multiple years to allow for annual and seasonal variation as funding allows. The findings of these surveys should be incorporated into the deer management plan. (see **Sections 3.1.8** and **3.2.3**)

3.3.3 Insects and Diseases

No evidence of forest insect or disease damage has been found on NSA Cutler, which indicates a healthy overall forest condition. However, NSA Cutler forest resources should be periodically monitored to ensure advanced detection of insect and/or disease damage early on, and to determine management practices or treatments that may be necessary to prevent widespread damage from occurring due to insects and diseases. Proactive forest management, such as thinning stands to stocking levels to promote health and vigor of existing forest resources, should be considered to minimize pest and disease outbreaks and spread. (Tetra Tech, Inc., 2015)

3.3.4 Training of Natural Resources Personnel

Training of natural resources personnel is also applicable to forestry management at NSA Cutler. Training of natural resources personnel is described under the land management programmatic objective in **Section 3.1.12**. Other environmental and natural resources training activities should be undertaken, as needed, to ensure that natural resources personnel are prepared to handle any forestry management issues that may occur.

3.3.5 Geographic Information System (GIS) Management, Data Integration, Access and Reporting

GIS management, data integration and access, and reporting are applicable to forestry management at NSA Cutler. GIS management is described under the land management programmatic objective in **Section 3.1.13**.

☞ LA15, FW28, FO03, and OR03: Develop a GIS system for natural resources data at NSA Cutler and provide training to environmental staff to maintain the GIS database.

3.4 OUTDOOR RECREATION MANAGEMENT

The Sikes Act requires that the public be allowed access to military lands for recreational purposes, and the Defense Authorization Act of 1999 expanded this requirement to specifically encourage access to hunting, fishing, and other outdoor recreation opportunities for disabled veterans (Benton et al. 2008). However, DoD policy also states that the local military commander has the authority to decide the extent of public access to his or her installation, based on security and safety considerations. Following the events that occurred on September 11, 2001, public access to most military installations has been significantly reduced. There is no formal DoD policy that requires public access to military bases and ranges. Due to security restrictions at NSA Cutler, public access to the Installation for recreation (including fishing) or wildlife viewing is not allowed. However, public access may be granted on a case-by-case basis with the review and approval of security clearance information for each person requesting access.

OPNAVINST 5090.1D (Navy 2014) defines outdoor recreation management as those natural resources actions designed to provide recreation opportunities that are sustainable, within the military mission, within established carrying capacities, and consistent with the natural resources upon which they are based.

Outdoor recreation management at the Installation includes:

- Outdoor recreation opportunities
- Partnerships and outreach
- Special natural areas management, including Sprague Neck ERA and Watchable Wildlife Areas
- Environmental and natural resources training
- GIS management

Outdoor Recreation Management Programmatic Objectives

The programmatic objectives that have been established for outdoor recreation management at NSA Cutler are provided below.

1. Evaluate opportunities for natural resource-related outdoor recreation.
2. Provide and promote passive outdoor recreation opportunities (e.g., wildlife observation, photography) to Cutler personnel.
3. Provide and promote passive outdoor recreation opportunities to the public.
4. Promote education awareness of the Installation natural resources and the importance of natural resources stewardship.

3.4.1 Outdoor Recreation Opportunities at NSA Cutler

Much of the Installation is restricted from leisure use; however, there are some areas where recreational activities are allowed for Installation personnel (i.e., fishing and wildlife viewing), Public access to the Installation is restricted, so available recreational areas are limited to use by only authorized NSA Cutler personnel. Maintenance of grounds for wildlife viewing opportunities in designated recreational areas, and preserving the integrity of the surrounding marine habitats will help to support active fishery and shellfishing grounds.

In 1988, Paralyzed Veterans of America was responsible for getting the Disabled Sportsmen's Access Act of 1998 enacted (Public Law 105-261). This law establishes a mechanism for natural resource managers to develop programs that facilitate access to outdoor recreation opportunities, such as fishing, hunting, trapping, wildlife viewing, boating, and camping on military installations for disabled veterans, dependents with disabilities, and all others with disabilities. The Watchable Wildlife Areas described in **Sections 3.4.3.2 and 4.4** will be developed in accordance with the Americans with Disabilities Act to provide disabled veterans access to these areas.

3.4.2 Partnerships and Outreach

Public access and partnerships with natural resource management organizations include but is not limited to allowing National Audubon Society representatives to access the Installation during the month of December to conduct the annual Christmas Bird Count (Fugger and Burns 2009), DoD Partners in Amphibian and Reptile Conservation, USFWS, MDIFW, and the University of Maine (various programs). Establishing future partnerships with the USFWS, the University of Maine – Machias, the University of Maine – Orono Wildlife Ecology Department Wildlife Summer Camp Program, Humboldt Field Research Institute in Steuben, Maine, and private organizations such as Ducks Unlimited is being considered by NSA Cutler. **Section 3.2.8** contains information on the establishment of a MAPS program at the Installation through partnerships.

3.4.3 Special Natural Areas Management

Areas on DoD installations with natural resources that warrant special conservation efforts may be designated as special natural areas, such as Navy ERAs and Watchable Wildlife Areas (DoDI 2011). These areas are recognized for their unique or exceptional natural resources or cultural qualities and attributes. In most cases, management is directed at preservation and/or protection of the area with very specific management objectives. However, special natural area designations on military lands can no longer be set aside as permanent environmental preserves due to DoD's requirement to maintain flexibility to adapt the defense mission to political and technological developments (DoD Instruction 4715.03). Even though an installation is precluded from establishing permanent environmental preserves, these special natural areas can make a significant contribution to conservation of regionally important natural resources.

3.4.3.1 Sprague Neck ERA

The DoD has initiated action to protect habitat at NSA Cutler through the identification of the Sprague Neck ERA. The Installation should re-engage discussions with agencies and organizations including DoD PIF, USFWS, MDIFW, University of Maine - Machias, Ducks Unlimited, and the Conservancy that were involved with the establishment of the ERA at Sprague Neck to evaluate the potential for partnerships or cooperative agreements.

During the July to early September migration period, the area should be closed to prevent human and pet access during this critical time.

FW27 and OR02: Re-engage partnership and cooperative agreement discussions that were initiated during the establishment process of the Sprague Neck ERA. Agencies and organizations that should be part of this process include, but are not limited to DoD PIF, USFWS, MDIFW, University of Maine–Machias, Ducks Unlimited, and the Conservancy.

3.4.3.2 Watchable Wildlife Areas

The DoD may afford limited controlled access at NSA Cutler to special natural areas that have been identified as Watchable Wildlife Areas that overlook the most important shorebird and waterfowl feeding sites in Machias Bay. Seven potential watchable wildlife viewing areas have been identified throughout the course of conducting field surveys in support of development of the NSA Cutler INRMP. The Watchable Wildlife Areas proposed for the Installation are described in **Section 4.4**. If it is determined that any of these watchable wildlife viewing areas have the potential to disturb migrating shorebirds, or have any other negative impacts to wildlife, they should be removed from use by viewers.

☞ FW13 and OR01: Install benches and interpretive signage at each of the Watchable Wildlife Areas to enhance and promote the use of these areas, and to encourage viewers to remain in the viewing are to avoid disturbing the wildlife being viewed. Access to the Watchable Wildlife Areas will be developed in accordance with the Americans with Disabilities Act to afford disabled veterans access to these areas.

3.4.4 Training of Natural Resources Personnel

Training of natural resources personnel is also applicable to outdoor recreation management at NSA Cutler. Training of natural resources personnel is described under the land management programmatic objective in **Section 3.1.12**. Other environmental and natural resources training activities should be undertaken, as needed, to ensure that natural resources personnel are prepared to handle any outdoor recreation management issues that may occur.

3.4.5 Geographic Information System (GIS) Management, Data Integration, Access and Reporting

GIS management, data integration and access, and reporting are applicable to outdoor recreation management at NSA Cutler. GIS management is described under the land management programmatic objective in **Section 3.1.13**.

☞ LA15, FW28, FO03, and OR03: Develop a GIS system for natural resources data at NSA Cutler and provide training to environmental staff to maintain the GIS database.

4.0 NSA CUTLER NATURAL RESOURCES PROGRAMMATIC OBJECTIVE MANAGEMENT AREAS

To better facilitate effective management of the natural resources of NSA Cutler, natural resources management has been divided into the four programmatic objective management areas described in **Section 3.0**. **Figure 4.1** and **Figure 4.2** identify the areas of the VLF and HF where the programmatic objectives are focused. **Figure 4.3** identifies the areas of the Howard Cove parcel where the programmatic objectives are focused. Primary management issues are identified and discussed for each programmatic objective, and general management recommendations are made to address each objective. Details for these recommendations are provided in **Section 3.0**. A brief description of the extent of each programmatic objective management area on the Installation parcels is provided below.

- **Land Management Areas** encompass a large portion of the VLF and HF area parcels. Land Management Areas define the areas of the Installation that are needed to support the current or future military mission, and areas that where the land management programmatic objectives are focused. These include the communications and antenna towers, operations and maintenance buildings, as well as areas along major roadways.
- **Fish and Wildlife Management Areas** of the VLF and HF areas are largely located outside the areas that directly support the military mission, and include important fish and wildlife habitats, such as peatland and bog habitats, areas located along the coast, and freshwater habitats.
- **Forestry Management Areas** are limited to the VLF area, and include the Sprague Neck peninsula, and two areas located along the northern boundary of the VLF parcel. Included in the Forestry Management Areas of the VLF is high quality Maritime Spruce-Fir Forest habitat that provides valuable habitat for a variety of wildlife species.
- **Outdoor Recreation Management Areas** are located on Sprague Neck, and around the perimeter of the VLF peninsula. This area includes the proposed locations of the seven Watchable Wildlife Areas.

Figure 4.1 and **Figure 4.2** also depict the boundary of the NSA Cutler Historic District. The NSA Cutler Historic District will be managed by the CRM in accordance with the ICRMP that is under development for the Installation. The NSA Cutler Historic District has been included on these figures for planning purposes only, as management of cultural resources is not covered by this INRMP.

Although not specifically tied to a particular management area of the Installation, training of natural resources personnel; and GIS management, data integration, access, and reporting are included under each of the four programmatic objectives described in the following sections.

4.1 LAND MANAGEMENT AREAS

Land management includes protection of land and water resources, as described in **Section 3.1**. The Installation will continue to implement land management practices and programs that have been occurring at the Installation associated with meeting the military mission and federal and state regulatory and permitting requirements, as well as those recommended by this INRMP, as funding allows.

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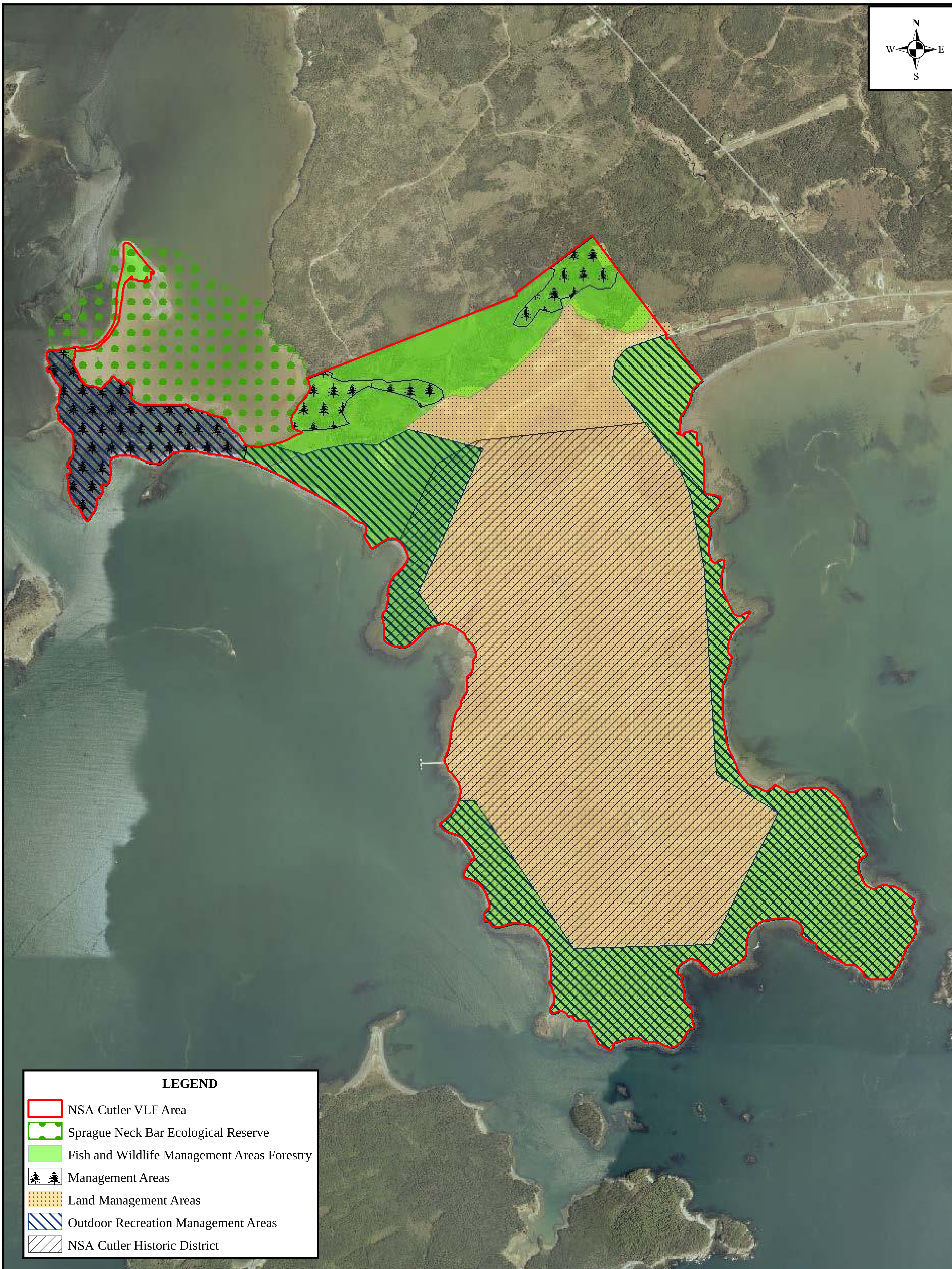

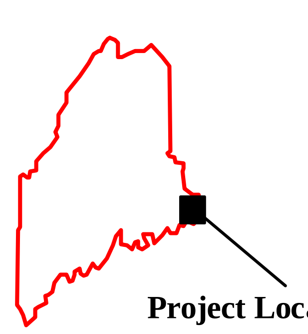

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; N. Famous, 2009.

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Figure 4.1. Very Low Frequency Management Areas NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH, INC.

Date: 09/11

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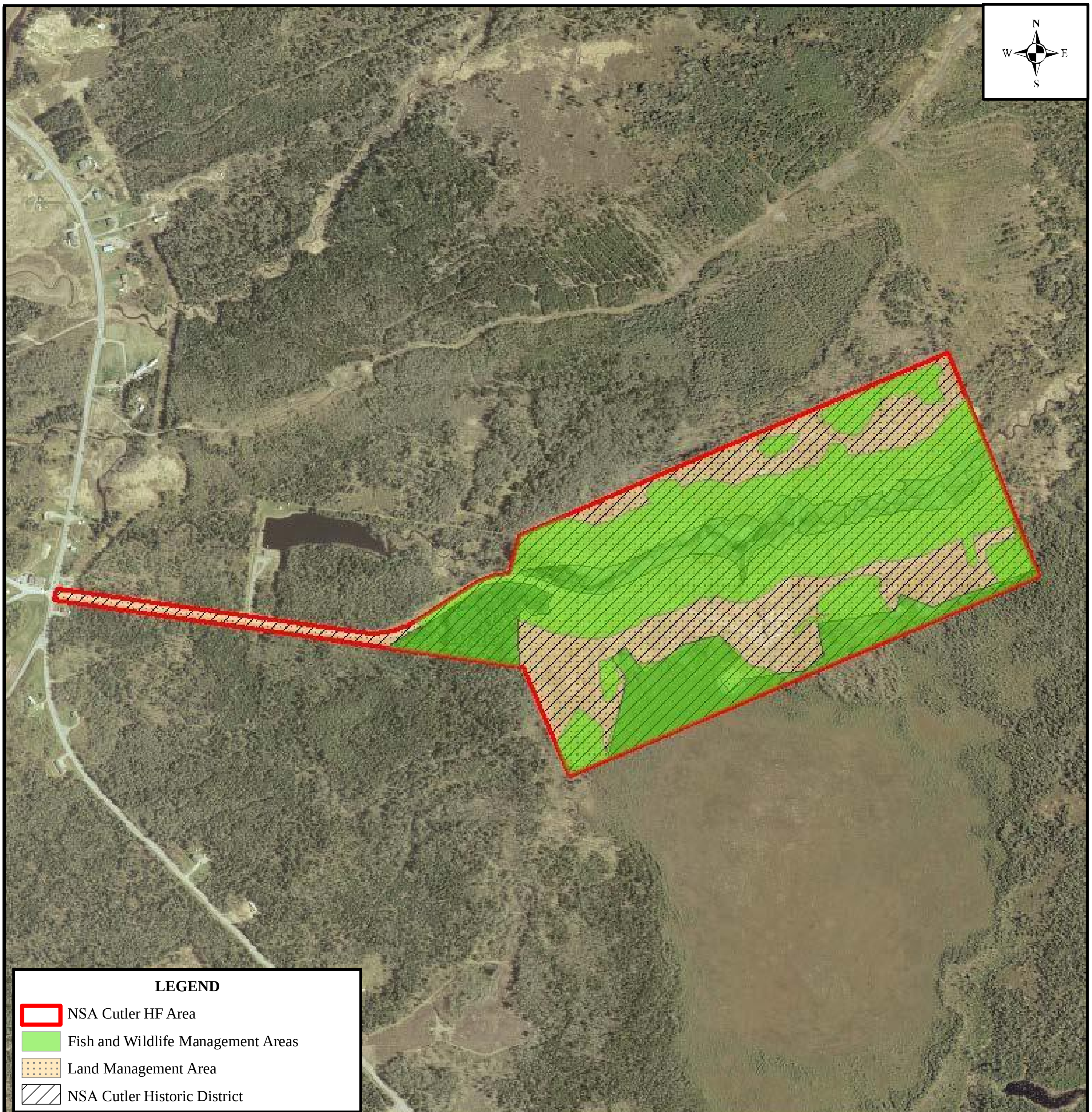

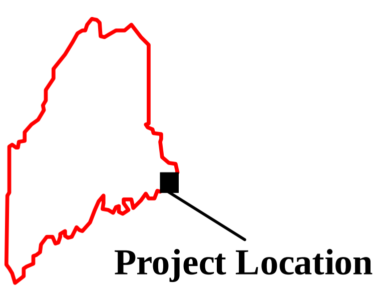

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

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Feet

Figure 4.2. High Frequency Management Areas
NSA Cutler, Cutler, Maine.

Prepared For: NAVFAC Naval Facilities Engineering Command

Prepared By: TETRA TECH, INC.

Date: 09/11

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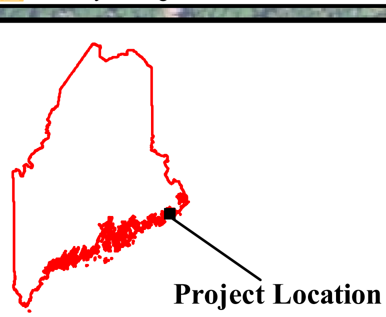

Source: Aerial NAIP, 2015; Navy 2017

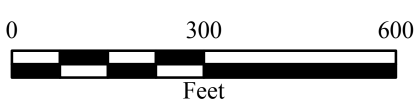

Figure 4.3. Howard Cove Parcel Management Areas NSA Cutler, Cutler, Maine.

Date:
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Land management actions include creating and implementing programs and plans that meet the Land Management Programmatic Objectives outlined in **Section 3.1**. This includes proactively managing land areas with natural resources throughout the Installations to enhance or improve land, water quality, water resources, native vegetation (including control and monitoring of invasive species), and environmental conditions for the protection of threatened and endangered species or significant rare communities and species at risk. Detailed information on the land management recommendations for the Installation are provided below.

4.1.1 Water Resources Management

The numerous wetlands and surface water resources that are located throughout the VLF and HF areas should be protected for the water quality functions they provide. Any proposed ground-disturbing activities that may impact waters of the United States or wetlands will require a formal jurisdictional wetland determination be conducted in the potential impact area. This wetland delineation will be subject to verification and permit approval by USACE. Forested wetlands that are scattered throughout the Sprague Neck peninsula are expected to have a low threat of disturbance. An Installation-wide vernal pool survey is also recommended.

Specific wetland and water quality management recommendations are provided in Section 3.1. Planning level wetland mapping identified approximately 1,793 acres of wetlands located throughout the VLF area, and approximately 69 acres of wetlands located in the HF area. Wetland restoration opportunities are present at both the VLF and HF sites and include creation of PUB wetland habitat. Peatland restoration recommendations are described in **Section 3.1.3**.

Annual erosion surveys should be conducted to identify and evaluate soil erosion at both the VLF and HF areas to address erosion problem areas and to develop any preventive measures needed to protect water quality and ensure shoreline stabilization. All present and future ground-disturbing activities at the Installation should incorporate appropriate erosion and sediment controls to reduce nonpoint source pollution that could result from those activities. In addition, these activities should comply with Maine’s Erosion and Sedimentation Law. An erosion and sedimentation control plan should be developed for all land-disturbing activities using guidance from Maine’s Erosion and Sediment Control BMP handbook (MDEP, Land Resources 2016). Site specific erosion and sediment control measures and stormwater management recommendations are provided in the NSA Cutler SWPPP (NCTAMSLANT DET Cutler 2005). Measures are provided specific to five primary areas of the Installation: VLF Transmission Building, VLF Power Plant, VLF Fuel Storage Area, VLF Facilities Maintenance Complex, and HF Backup Generator Building.

The NSA Cutler 2013 Streambank Assessment identified three streams and five coastline segments as problem areas or potential problem areas. Erosion control measures that should be implemented include the installation of geotextile fabric and/or rip-rap, application of coarse crushed stone, removal of finer crushed stone, application of seed and mulch to exposed soil, and extend road fill (Tetra Tech, Inc. 2013). NSA Cutler will acquire all necessary state and federal permits prior to implementing the suggested maintenance in jurisdictional waters of the United States. NSA Cutler operates under a 2016 MPDES Permit to discharge up to 150,000 GPD of cooling waters associated with the VLF power plant (MDEP 2016). Wastewater, including contact and non-contact cooling water, air compressor waters, boiler blowdown, waste from a reverse osmosis unit, and other miscellaneous non-process waste wasters, as well as stormwater and groundwater, are discharged into Machias Bay via Outfall 001 located in the VLF area (MDEP 2016). Outfall 003 is authorized to discharge non-contact cooling waters associated with an emergency generator into Machias Bay.

Daily water quality sampling during a discharge event at this outfall is a requirement of the MPDES permit (MDEP 2010). The current MPDES Permit expires on June 10, 2021.

No portion of the HF area is within a 100-year or 500-year floodplain zone. All coastal regions of the VLF area are associated with a 100-year floodplain zone (flooding) or within a 100-year floodplain velocity hazard zone (wave action) as shown in **Figure 2.10**. Management measures for the protection of the floodplain zone are described in **Section 3.1.1.1**.

4.1.2 Coastal Zone Management

The entire Installation is located within the federally approved Maine Coastal Zone. Federal consistency review requirements exclude federally owned properties from the coastal zone. However, federal activities on these properties that can be reasonably expected to affect any land or water use or natural resource in Maine's coastal zone outside the federal property are still subject to a federal consistency review. Therefore, any activity that may affect the natural resources down gradient of the Installation boundary along the VLF peninsula should be subject to a federal consistency review.

4.1.3 Vegetation Management

Most vegetation of the Installation would best be left unmanaged, such as Sprague Neck Bar, forested habitat of Sprague Neck, and the reverting habitats bordering the antenna field. Present management practices within the antenna field benefit both birds and mammals.

Impacts to existing stands of mountain ash trees and shrubs located in the VLF area should be minimized, as they provide an important source of food to many species of wildlife. When feasible, allow existing fruit and seed-bearing shrubs (i.e., black crowberry and lowbush blueberry) to expand their footprint along ditch edges and along the outer edge of the tower field to provide additional food sources to migrating bird species and to provide habitat for grassland and shrubland nesting bird species. Maintaining and enhancing feeding habitat in low-bush blueberry fields located north of the VLF tower field along Perimeter Road and creating feeding habitat using mowing to establish lowbush blueberry and black crowberry cover will provide habitat benefits for whimbrels. This and other specific habitat and vegetation management recommendations are provided in **Section 3.1 and Section 3.2**.

The VLF area includes two rare ecosystems, the Maritime Slope Bog and Deer-hair Sedge Bog Lawn. The HF area contains a portion of Kelley Heath, a coastal peatland that is also a rare community type within the Coastal Bog Plateau Ecosystem. These rare ecosystems provide essential habitat (black crowberry) for the crowberry blue butterfly and are adapted to conditions associated with poorly drained and somewhat poorly drained soils, which dominate the HF area. General management recommendations for these rare communities include preventing sedimentation and pollution from impacting these areas, as well as preventing destruction by ground-disturbing activities and degradation from the introduction of invasive species. Habitat restoration will be required following remediation of any of the IRP sites or antenna maintenance or removal activities. Specific habitat management activities are provided in **Section 3.1**.

4.1.4 Invasive Plant Species Management

Small stands of common reed, Himalayan balsam, Japanese knotweed, and the reed canary grass are present within the VLF area and one small stand of reed canary grass is present within the HF area. Stands of these species should be removed—manually or by chemical removal. All aboveground biomass and the underground rhizome by which many invasive plants spread should be removed during mechanical removal. However, this removal method is labor intensive and is feasible only if the stands are small. If manual removal is not appropriate, stands should be treated with an appropriate herbicide. Additional populations of Canada thistle, Japanese knotweed, and bittersweet nighshade occur in the VLF area. Canada thistle is also present in the HF area. See Invasive Terrestrial Plant Species Inventory and Management Plan (Tetra Tech, Inc. 2016b) for recommended treatment and removal methods for each of the highest priority species on the Installation. Annual invasive species surveys should be conducted to proactively identify additional treatment/removal areas, and to monitor restoration sites for regrowth.

4.1.5 Installation Restoration Program

The VLF area tower field has been identified for soil and freshwater sediment restoration due to the presence of lead-based paint particles as part of the Installations IRP. Although oversight of IRP sites is not the direct responsibility of the NRM, remediation of these sites does have the potential to affect natural resources, such as wetlands and grassland habitat. To address this issue, the IRP site project manager will coordinate site remediation actions with the NRM whenever a remedial action has the potential to affect natural resources.

4.1.6 Hazardous Waste Management

The area of the VLF that houses the fuel farm and power plant has the highest potential for a major fuel spill in the VLF area. Personnel will refer to the Installation ICP to implement procedures required for responding to spills and releases, and other emergencies involving hazardous waste and materials (NAVFAC MIDLANT 2007). The Installation HWMP details the likely sources of hazardous materials at the Installation, their respective handling, accumulating, containerizing, inspecting, labeling, recordkeeping, temporary storage, disposal, and training procedures and protocols to be implemented by the Installation environmental coordinator (NCTAMSLANT DET Cutler 2007a). Persons responsible for handling hazardous materials should receive regular training, including rehearsing response to a spill, to ensure impacts from hazardous wastes are minimized. Personnel will immediately contact the Coast Guard National Response Center (1-800-424-8802) and the regional Navy On-scene Coordinator for any spills that have the potential to impact marine resources.

4.1.7 Cultural Resources Management

The CRM is responsible for coordinating all development activities that may impact the NSA Cutler Historic District with the SHPO in accordance with 36 CFR 800 of the National Historic Preservation Act to ensure that no significant cultural resources are affected. The Cultural Resources Survey for NSA Cutler (NCTAMSLANT DET Cutler 2003) provides additional information for the Installation Historic District and provides a map that identifies areas of NSA Cutler that have a low, moderate, or high level of archaeological sensitivity. Due to the broad area of coverage associated with the Installation Cultural Resource Survey, a Phase I archaeological survey may be required prior to any land-disturbing activities being initiated.

If construction is proposed in any of the Installation Historic District, the CRM will apply the cultural resources decision tree to the site to determine if further cultural resource investigations are necessary prior to construction. Although this INRMP takes cultural resources into consideration for any INRMP action that may impact cultural resources, no specific cultural resources management actions are provided as Installation cultural resources will be managed by the CRM in accordance with the Installation ICRMP that is under preparation.

4.2 FISH AND WILDLIFE MANAGEMENT AREAS

4.2.1 General Fish and Wildlife Management

General wildlife surveys that are recommended include baseline or follow-up surveys for an Installation-wide vernal pool survey; a deer wintering habitat survey; a fish survey; a terrestrial invertebrate survey; as well as installation of bird nesting boxes and bat houses. The procedures identified in **Section 3.2.2** will be followed and are required for reporting of any marine mammal strandings that occur at the VLF.

Surveys were conducted to assess the white-tailed deer population and availability of winter habitat, including deer wintering areas and primary winter shelter or secondary winter shelter, on the VLF and HF areas. Appropriate forest stands containing deer wintering areas were identified along the northern VLF area boundary and in the Sprague Neck peninsula. The VLF area surveys demonstrated that the deer use increases within softwood stands on the Sprague Neck peninsula as the snow depth increases. Primary winter shelter and secondary winter shelter may be a limiting factor on the Installation during heavy snow years. The grassland and shrubland habitat in the VLF tower fields provide abundant forage and solar exposure during low to no snow periods. Winter use of the HF area may be limited as very few deer tracks were found during the snow tracking survey. (Tetra Tech, Inc. 2017a)

Based on the current deer survey estimates, the calculated deer density in the VLF area is between 10.6 and 15.3 deer per square mile, which exceeds the target density of 10 deer per square mile. A deer management plan is being developed in coordination with MDIFW and will be incorporated into the INRMP once it has been finalized. (Tetra Tech, Inc. 2017a)

Signage will be installed at the Watchable Wildlife Areas that will encourage viewers to remain within the viewing area to reduce the potential for disturbing the wildlife being viewed. If it is determined that any of these viewing areas will likely disturb migrating shorebirds, or have any other negative impacts to wildlife, these Watchable Wildlife Areas should be removed from consideration.

4.2.2 Threatened and Endangered Species and Special Concern Species Management

Federal and state protected shorebird species and their habitat are protected within the ERA at Sprague Neck. The grassland habitat of the tower fields provides foraging habitat for the state threatened short-eared owl (breeding population) and upland sandpiper, and the state endangered grasshopper sparrow. Several bird species that are state species of special concern utilize the grassland habitat of the tower field. Although not specifically associated with the VLF grassland habitat, the Canada lynx, a federally threatened species and a Maine species of special concern, was observed in proximity to the tower field, and may use this habitat to forage for prey.

The placement of nest boxes in areas that are protected from mowing will encourage grassland bird species, such as the grasshopper sparrow, to nest in areas where they will have limited disturbance from mowing activities, and mowing recommendations described in **Section 4.2.3** will ensure minimal impacts to nesting grasshopper sparrows in the antenna fields. Conservation and restoration of vegetation at the Installation may provide an indirect benefit to Canada lynx, by attracting its prey to these habitats. Forest species such as the peregrine falcon will benefit from development of the forest management plan.

Management recommendations for crowberry blue butterfly, and other special status species that may occur at the Installation, include protection and conservation of rare habitats that support endangered species. Annual surveys for crowberry blue butterfly and other threatened, endangered, rare, and special concern species known to occur at the Installation will provide valuable information to the NRM, and completion of annual surveys for rare plants, wildlife and ecosystems will identify the locations of these species and habitats on the Installation. Completion of surveys of rare ecosystems will have an indirect benefit to the protected species that use these habitats. Mowing of the Coastal Bog Plateau in the HF area should be avoided; however, if mowing is necessary, the mowed footprint should be minimized.

Signage will be installed at the Watchable Wildlife Areas that will encourage viewers to remain within the viewing area to reduce the potential for disturbing the wildlife being viewed. If it is determined that any of these viewing areas will likely disturb migrating shorebirds, or have any other negative impacts to wildlife, including protected species, they should be removed from use by viewers.

4.2.3 Migratory Bird Management

To minimize impacts to nesting birds, it is recommended that mowing of the antenna fields be avoided from May 15 to July 15 to allow time for chicks to fledge. If mowing the antenna fields is necessary during the nesting season, then the minimum necessary footprint should be mowed, and mower height should be set no lower than 10 inches to minimize potential destruction of nests. To minimize disturbances to foraging and roosting shorebirds, it is recommended that signage be placed in the areas of greatest disturbance, particularly in Little Machias Bay and Holmes Bay during clamming season.

The Sprague Neck Bar Navy ERA provides protection of shorebird species and is an important area for shorebird foraging and roosting. Habitat requirements and recommendations that will provide additional benefit to shorebirds, and protection of grassland bird species will be provided in the shorebird and grassland bird management plans.

It is recommended to continually monitor shorebirds populations and submit the data into the ISS through the eBird portal. Other organizations will be able to see the data, and this will allow the collaboration with other organizations to help improve the research efforts.

Mitigation measures that may be included in the bird and bat conservation strategy and the Eagle Protection Plan include potential changes to the artificial lighting scheme at the installation to reduce mortality risks to birds. Current federal regulations require the use of the nighttime lighting for aviation safety on tall structures, over 200 ft. At present, 13 of the 26 towers contain FAA-compliant red strobed and non-strobe lighting to meet federal regulations. Any changes to facility lighting must be consistent with these regulations. In addition, exterior building lights and light that bleeds through windows present hazards to nocturnal migrants. Current lighting at the Installation is compliant with the Navy’s anti-terrorism force protection security standards and any changes would require anti-terrorism force protection review and approval. However, the VLF area lighting should be evaluated to determine if lighting can be modified to pose less risk to migrating birds and still meet anti-terrorism force protection requirements and new FAA obstruction lighting and marking standard for aircraft safety.

- ❖ During routine lighting maintenance, evaluate whether changes to lighting could be made such as replacing steady-burning lights with flashing omnidirectional red lights.

Removal of road-killed animals or other carcasses on or near roads promptly would limit readily available food sources for raptors and owls which would limit attraction.

Evaluate whether installation of day visual markers for bird deterrent devices on guy wires in known raptor or waterbird concentration areas and other areas where these species are known to stop may be effective and implementable.

An additional minimization measure to evaluate would be habitat modification to reduce prey habitat. However, some of the prey habitats may be considered jurisdictional resources and may require federal and state permitting prior to implementation of habitat modification.

In the VLF area, monitoring of osprey usage of alternative nesting platforms and documentation of results should continue. The wooded area of Sprague Neck has been identified as having the best potential to support natural nesting sites, which includes snags with broken tops and live trees that are at least 50 ft (15 m) tall. Use of artificial platforms for osprey nesting at the HF site is not recommended since the required platform monitoring and maintenance could not be guaranteed within this area.

Migratory waterfowl and osprey are two of the primary types of wildlife that utilize the habitat of the HF area. Management recommendations for protection of migratory birds in the HF area include protection and conservation of rare habitats and endangered species and monitoring of the stream corridor in the HF area for erosion and sedimentation to identify issues that could be remedied to protect water quality.

In concert with the avian radar and acoustic survey, it is recommended that additional time be allocated for manual review to provide more accurate results and to be more cost-effective in the long term. The second recommendation for the study is for a sampling plan to apply point counts to the seasonal data set. The last recommendation is to increase the repeated sampling days during seasonal acoustic data sets with the greatest likelihood of detection.

4.2.4 Nuisance Wildlife Management

Beavers have constructed a lodge on the pond located in the southeast corner of the VLF peninsula. While the lodge is not posing a problem to water drainage in the area, if the beaver population or the number or size of constructed dams in this pond were to increase, it could impede water flow through the pond outlet or impact stormwater flows, resulting in flooding or other impacts to water quality. Biannual monitoring (twice per year) of nuisance wildlife, such as beavers and bats that may roost in Installation buildings, are recommended to determine if nuisance wildlife removal or relocation actions are necessary to protect natural resources and human health and safety.

4.2.5 Partnerships and Outreach

The forested habitat of the Sprague Neck peninsula and the habitats of the rare ecosystems that are present at the Installation offers an excellent opportunity to partner with the IBP to establish MAPS stations. Surveys to support a five-year MAPS study are being conducted in approximately 20 acres in the northwestern portion of the VLF area, with surveys initiated in 2015. The establishment of one or more MAPS stations at the Installation will provide valuable information on utilization of these forests by neotropical migrants, and the information will be added to the long-term avian productivity and survivorship database maintained by the IBP. The NRM should contact the DoD PIF Program Manager for the northeast region to obtain more information on partnering with IBP.

The Installation should also re-engage discussions with agencies and organizations including DoD PIF, USFWS, MDIFW, University of Maine–Machias, Ducks Unlimited, and the Conservancy that were involved with the establishment of the ERA at Sprague Neck to evaluate the potential for partnerships or cooperative agreements. Section 3.4.3.1 contains information on the recommendation for re-engaging partnership discussions with these agencies and organizations.

4.3 Forestry Management Areas

Upland Maritime Spruce-Fir Forests are prominent in the VLF area, especially on the Sprague Neck peninsula, and to a lesser extent with the HF area. The Maritime Spruce-Fir Forest habitat should be retained in its natural condition to afford the greatest value to wildlife. The mature coniferous habitat provides shelter to wildlife during severe winter weather, and as mature trees die, snags will become available for wildlife and will create small forest openings that promote regeneration. The resulting mosaic of habitats will help to maintain the diversity of wildlife that is associated with the Maritime Spruce-Fir Forest habitat, including neo-tropical migrant songbirds, and may encourage osprey to establish nest sites in this area of the VLF. The forest habitat will also provide aesthetic value, providing a screen to the prominent antennas and towers of the VLF area antenna fields. A basic forest characterization and forest management plan should be prepared for the Installation. The management plan should include a description and schedule for conducting regular forest health monitoring. Proactive forest management, such as thinning stands to stocking levels to promote health and vigor of existing forest resources, should be considered to minimize pest and disease outbreaks and spread.

Fire prevention measures (including prevention of wildland fires) that are in place include limiting the use of equipment that could spark a fire on days where fire could be easily spread; maintaining working fire extinguishers and fire suppression systems where available; maintaining spill berms and spill kits in all Installation areas that store oil and/or hazardous materials; create and/or maintain permanent and/or temporary firebreaks help to slow fire advancement. Roads should be maintained by removing dead wood and other fuel sources along roadsides to provide firefighters access to the wildland fires and ensure multiple evacuation routes are available. An environmental awareness program focused on educating and training NSA Cutler personnel on protection of natural resources topics is being developed as part of implementation of the Installation INRMP. Wildland fire education will be included as a component of the proposed environmental awareness program (Tetra Tech, Inc. 2016e).

4.4 Outdoor Recreation Management Areas

Recreational opportunities are available only in areas of the VLF located outside of the tower field and include hiking, biking, cross-country skiing, and fishing. Providing recreational opportunities at NSA Cutler will also contribute to the morale, welfare, and recreation opportunities for military personnel stationed at the Installation. The development of interpretive natural trails and signage could provide an educational benefit to military personnel using these areas for wildlife viewing and recreation and provide the Installation an opportunity to showcase its natural resources, promote environmental awareness, and provide environmental education. The primary natural resources management consideration for the Outdoor Recreation Areas is for the provision of outdoor recreation opportunities, and establishment of watchable wildlife viewing areas.

The variety of natural habitats at the VLF area provides a great basis for which to develop the Watchable Wildlife Areas. If feasible, view platforms, and benches are recommended for the Watchable Wildlife Areas to promote usage of these areas, and to encourage viewers to remain in the established areas to avoid disturbance to the wildlife being viewed. The signage installed at the Watchable Wildlife Areas will encourage viewers to remain within the viewing area to reduce the potential for disturbing the wildlife being viewed. If it is determined that any of these viewing areas are disturbing, or are likely to disturb migrating shorebirds, or have any other negative impacts to wildlife, they should be removed from consideration.

Seven Watchable Wildlife Areas have been identified for the VLF area. These are described below and include the primary species of interest that can be expected to be seen from these vantage points.

- Coast Guard Landing: Waterfowl, bald eagles, gulls, and migrating hawks can be easily viewed from the southwest, west, and northwest sides of the landing area.
- Big Holly Cove: Harlequin ducks, purple sandpipers, red-necked grebes (*Podiceps grisegena*), horned grebes, common goldeneyes, Barrow’s goldeneyes (rare), buffleheads, common loons, gulls, seabirds including northern gannets (*Morus bassanus*), black-legged kittiwakes (*Rissa tridactyla*), the occasional Atlantic puffin, razorbill and murre (*Uria* spp.), as well as harbor seals, gray seals, and the occasional whale have been seen here.
- Little Holly Cove: Harlequin ducks, seals, goldeneyes (*Bucephala* spp.), buffleheads, red-necked grebes, and common eiders are present from November to May.
- Beaver Pond: The beaver pond located along the outer perimeter road on the southeast side of the peninsula, adjacent to Little Machias Bay, is an excellent beaver viewing area. In spring and summer green winged teal (*Anas crecca*), wood duck (*Aix sponsa*), American black duck, rails (*Rallus* spp.) and American bitterns can also be seen or heard. Small numbers of shorebirds are usually present in August and September, and bald eagles are frequent throughout the year.
- Great Pond Cove: Great Pond Cove and the adjacent marshes represent one of the Installation’s best wildlife viewing areas for waterfowl, other waterbirds, gulls, shorebirds, and marshbirds. Rail and bitterns, which are primarily nocturnal, can also be heard in this area.
- Aquaculture Area: The salmon pens and areas of shoreline along the west side of the VLF peninsula south of the power plant provide the best gull viewing opportunity at the Installation. Eight gull species have been observed in the aquaculture area, and waterfowl species include red-breasted mergansers (*Mergus serrator*), scoters (*Melanitta* spp.), and common eiders.
- Little Machias Bay: Scoters, eiders, shorebirds can be observed in Little Machias Bay from late April to mid-June, from early July through October, with numbers peaking during late July through late September.

In addition to the designation of Sprague Neck Bar as important shorebird feeding and roosting habitat, of Sprague Neck is home to many different species of wildlife, and the location of an existing recreational cabin and hiking trails located on the Sprague Neck peninsula offers many opportunities for recreation and wildlife viewing. Seabirds that nest on nearby Hog Island can also be viewed from this location. To provide additional recreational opportunities to military personnel, the recreational cabin should be restored. The likely presence of asbestos-containing materials will require special protective measures to ensure demolition personnel and the environment are protected.

Due to the proximity of Installation operation facilities, it is not expected that deer hunting will be allowed in the vicinity of the VLF tower field or at the HF area. If it is determined that deer hunting activities are allowed within designated areas of the VLF, the abundant deer, high interspersion of habitats, and available access by military personnel could provide a high quality recreational experience for deer hunters.

4.4.1 Partnerships and Outreach

Public access and partnerships with natural resource management organizations is limited to allowing National Audubon Society representatives to access the Installation during the month of December to conduct the annual Christmas Bird Count (Fugger and Burns 2009). Access to designated areas of the VLF should also be provided to volunteers participating in the annual National Audubon Christmas Bird Count Survey, and to other private and governmental organizations conducting education or biological surveys upon providing advanced notification and obtaining approval by Installation security.

Establishing future partnerships with the University of Maine–Orono Wildlife Ecology Department Wildlife Summer Camp Program, and Humboldt Field Research Institute in Steuben, Maine should be pursued. Additionally, the Installation should re-engaging discussions for creation of partnerships and cooperative agreements with agencies and organizations that were involved with establishment of the Sprague Neck ERA such as DoD PIF, USFWS, MDIFW, the University of Maine–Machias, Ducks Unlimited, and the Conservancy.

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5.0 INRMP IMPLEMENTATION

Implementation of this INRMP will follow an annual strategy that addresses legal requirements, DoD and Navy directive or policy requirements, funding, implementation responsibilities, technical assistance, labor resources, and technological enhancements. Implementation of this INRMP requires the following actions to be completed.

1. Funding is secured for completion of all Environmental Readiness Level (ERL) 4 projects, as described in **Section 5.5.1**.
2. Installation is staffed with a sufficient number of professionally trained environmental staff needed to perform the tasks required by the INRMP.
3. Annual coordination with all cooperating offices is performed.
4. Specific INRMP action accomplishments that are undertaken are documented each year.

The following sections provide an overview of the role that implementation of this INRMP would play in supporting sustainability of the military mission and the natural environment, meeting natural resources consultation requirements, achieving no net loss, attaining NEPA compliance, understanding project development and classification, identifying funding sources, establishing commitment, and endorsing the use of cooperative agreements. The project table provided in **Appendix C** provides information for the implementation schedule, prime legal driver and initiative, class, Navy assessment level, cost estimate, and funding source for each of the projects proposed in this INRMP. **Section 6.0** summarizes the INRMP projects according to the ERLs described in **Section 5.5.1**.

5.1 SUPPORTING SUSTAINABILITY OF THE MILITARY MISSION AND THE NATURAL ENVIRONMENT

5.1.1 Integration of the Military Mission and Land Use

The Navy has taken a proactive approach towards integrating the military mission with concepts of sustainable land use by recognizing that efficient and effective land use planning supports military readiness and sustainability, while protecting and enhancing the natural resources for multiple use, sustained yield, and biological integrity. Development and human use are inherently limited on military lands that are kept in their natural condition to support the military mission, often resulting in lands that have extremely high ecological value. These areas may include large tracts of undisturbed habitats and diverse flora communities that are often used as retreat areas, migration stopover points, or foraging areas for threatened and endangered, and special concern fauna species. Recognizing that military mission requirements have the highest priority, the Navy understands the role INRMPs play in identifying potential conflicts between a facility's mission and natural resources and identifying actions necessary to maintain the availability of mission-essential properties and acreage. An INRMP balances the management of natural resources unique to the installation with the military mission requirements and other land use activities affecting an installation's natural resources (DOD and USFWS 2002). NSA Cutler understands the importance of integrating the military mission and land use at the Installation to meet the mission of military training and readiness while managing the valuable natural resources to ensure long-term environmental sustainability.

5.1.2 Impacts to the Military Mission

The use and management of lands that support military training and readiness, and the decision-making associated with such land use, directly affect the sustainability of the ecosystem. Specific components of land management include forest management, wetlands management, threatened and endangered species programs, invasive and exotic species control, soil conservation and erosion control, water quality control, and floodplain management. To protect and maintain natural resources while ensuring the continuation of the military mission, NSA Cutler has implemented an ecosystem management approach for environmental stewardship of the installation natural resources. The management strategy maximizes land use that supports military training while minimizing impacts to natural resources.

The major environmental constraints on the military mission and development at NSA Cutler are:

- Limitation on development within floodplain areas of the VLF area
- Management of VLF area grasslands for nesting bird species
- Need for implementation of BMPs to protect surface water and groundwater quality resulting from potential erosion and pollutant discharge
- Selection of the appropriate location of functions using hazardous materials, and the collection and disposal of hazardous wastes
- Limitation on development due to the presence of special concern species and natural communities

Development within floodplains and protection of sensitive species and habitats represents the greatest limitations to expansion of the military mission at the Installation. Long-range planning by conducting annual erosion surveys and implementing erosion remedial and preventive measures to protect water quality, development of a forest management plan, and restoring sensitive bog habitat that has been disturbed will address floodplain, water quality, and sensitive habitat issues without requiring any dramatic changes in natural resources management.

5.1.3 Relationship of Range Complex Management Plan or Other Operation Area Plan

NSA Cutler does not have any range management or other operational plans in place that would need to be coordinated with natural resources management of the Installation.

5.2 Natural Resources Consultation Requirements

Section 7 of the ESA requires federal agencies to consult with USFWS (wildlife) or NOAA NMFS (fish or fisheries) when any proposed activity authorized, carried out, or conducted by that agency may affect a listed species or designated critical habitat. As a result of consultation, USFWS or NOAA NMFS will issue a biological opinion, which includes actions that the federal agency must complete in order to conduct the proposed activity. If critical habitat is located on federal property and adequate protection and management of the critical habitat has been included in the Installation INRMP, the ESA allows USFWS to preclude this habitat from the biological opinion. However, if critical habitat is to be excluded, the qualifying INRMP must address the maintenance and improvement of the primary constituent elements important to the species and must manage for the long-term conservation of the species.

Although critical habitat for Atlantic salmon has been designated for the Installation area, the

Installation does not provide suitable habitat for the support of this species (see **Section 2.7.2**). Other federal and state species are known to occur at the Installation; however, critical habitat has not been designated for these species, or critical habitat is not associated with the Installation. Section 7 consultation is not expected to be an issue for any of the natural resources management measures recommended in this document.

5.3 Achieving No Net Loss

Section 101(b)(1)(I) of the Sikes Act states that each INRMP shall, to the extent appropriate and applicable, and consistent with the use of the installation to ensure the preparedness of the Armed Forces, provide for “no net loss in the capability of military installation lands to support the military mission of the installation.” It is DoD policy that appropriate management objectives to protect mission capabilities of installation lands (from which annual projects are developed) be clearly articulated and receive high priority in the INRMP planning process (Navy 2006).

The effectiveness of this INRMP in preventing “net loss” will be evaluated annually. Mission requirements and priorities identified in this INRMP will, where applicable, be integrated into other environmental programs and policies. It is not the intent that natural resources are to be consumed by mission requirements, but rather are sustained for the use of mission requirements. In order to achieve this, the goal of this INRMP is to conserve the environment for the purpose of the military mission. There may be instances in which a “net loss” may be unavoidable in order to fulfill regulatory requirements other than the Sikes Act, such as complying with a biological opinion under the provisions of the ESA, or from the protection of wetlands under the provisions of the Clean Water Act. However, both the USFWS and USACE are required to adhere to the Sikes Act provision of no net loss. Loss of mission capability in these instances will be identified in the annual update of the INRMP and will include a discussion of measures being undertaken to recapture any net loss in mission capability.

5.4 NEPA Compliance

Prior to passage of Sikes Act legislation, the extent of natural resources management on military lands was largely discretionary. Although installations with applicable natural resources were required to prepare natural resources plans, it was not a legal requirement. The only legal natural resources requirements for installations were related to compliance with ESA, CWA, and other statutory requirements, or DoD directives. Passage of the Sikes Act brought into effect the requirement for “the Secretary of each military department to prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary” (Navy 2006). The Council on Environmental Quality (CEQ) defines an INRMP as a major Federal action requiring NEPA analysis, and as a result the Navy Office of General Counsel (Installations and Environment) has established that implementation of an INRMP per Sikes Act requirements, necessitates the preparation of NEPA documentation prior to approval of the INRMP. The preparation of an EA is usually sufficient to satisfy the NEPA review requirement for most installation INRMPs; however, in cases where implementation of the INRMP will have significant impact on the environment, the preparation of an Environmental Impact Statement (EIS) is required. Annual updates and revisions are covered by the original NEPA documentation unless a major change in installation mission or programmatic objectives occurs.

Decisions that affect future land or resource use that are associated with an INRMP require NEPA analysis. The NRM should refer to Secretary of the Navy Instruction (SECNAVINST) 5090.6A and Chapter 5 of OPNAVINST 5090.1D for basic guidance on the preparation of NEPA documents. CEQ's "Regulations for Implementing NEPA" (https://energy.gov/sites/prod/files/NEPA-40CFR1500_1508.pdf) and "NEPA's 40 Most Asked Questions" (https://www.energy.gov/sites/prod/files/G-CEQ-40Questions.pdf) provide further information. The INRMP and associated NEPA documentation should be prepared as individual documents to ensure that the viability, integrity, and intent of each are maintained. The intent of the INRMP is to outline projects that would fulfill Navy compliance and stewardship obligations, while the intent of the NEPA documentation is to analyze the impacts of the programmatic objectives outlined within the INRMP. While each of these are prepared as separate documents, they should be prepared simultaneously, as it is important for installation NRMs to coordinate the two documents at the earliest possible stage to ensure that decisions reflect current environmental values and to avoid potential conflicts.

Preparation of the NEPA documentation should be completed early to accommodate Navy decision-makers. If a comment period or public notice is required for NEPA process, public notice and comment periods should be coordinated and integrated with the INRMP. A finding of no significant impact (FONSI) must be achieved before an INRMP may be approved. If a FONSI is not achievable, the NEPA process must proceed to an EIS. One of the first steps in the NEPA process is to define the proposed action and explain its purpose and need. The proposed action is to develop and implement an INRMP that integrates natural resources management with the installation's military use in a manner that ensures military readiness and provides for sustainable multipurpose uses and conservation of natural resources (Navy 2006). The purpose and need for the INRMP is to meet statutory requirements imposed by the Sikes Act as well as the requirements of various DoD, Navy, and Navy Instructions. The Purpose and Need section can be further clarified with a brief discussion of the required plan elements (as outlined in the Sikes Act) applicable to the installation.

The majority of the NEPA document should focus on the discussion of relevant environmental issues and reasonable alternatives. Alternatives that are not feasible because they are inconsistent with the installation mission, unreasonably expensive, too technically or logistically complex should not be included in the analysis. Additionally, any alternative that is associated with significant environmental impacts would require preparation of an EIS. The CEQ defines reasonable alternatives as those that are economically and technically feasible and utilize common sense. Feasibility is a measure of whether the alternative makes sense and is achievable. The analysis should focus on the alternatives and methodologies proposed for implementing the programmatic objectives that have been established for natural resources management. Appendix E of the 2006 Navy INRMP Guidance document recommends that the NEPA analysis for INRMP documents adopt a "programmatic" approach that provides opportunities for the installation to accommodate unforeseen projects that meet pre-established criteria for significance evaluation, as well as changes to the projects, as long as impacts are covered within the overall scope and analysis for the selected alternative (Navy 2006). Analysis in the NEPA document will focus on evaluation and comparison of alternative plans in association with the four programmatic objectives established for the Installation: land management, fish and wildlife management, forestry management, and outdoor recreation management. Analysis should not focus on the individual projects or practices except in the cases of controversial projects, or projects considered outside the scope of, or a major deviation from a previously existing INRMP (Navy 2006). The projects and recommendations outlined in an INRMP should provide a framework for reviewing ongoing activities and assist in reviewing changes for unforeseen projects or modifications in the future. It is important to distinguish that the NEPA analysis for evaluating the programmatic objectives is different from the project level of analysis used for project specific actions.

The No Action/Status Quo alternative should always be included as an alternative to implementation of the INRMP. The No Action/Status Quo alternative describes impacts that would occur if the installation did not implement the INRMP, and the installation continued to operate without a plan, or the existing plan if one is in place. The No Action/Status Quo alternative serves as a baseline to which all other alternatives are compared. Each alternative should describe the general geographical extent applicable to each of the programmatic objectives. Each of the reasonable alternatives may only represent variable intensities of one or more of the programmatic objectives; however, differences in funding levels for each alternative would not constitute a valid range of alternatives. For example, it is not acceptable for all required compliance projects to represent an alternative. A summary of alternatives considered for the INRMP should be included to provide the review agencies and the local community the range of management scenarios that were analyzed.

Although specific projects are not required to be analyzed in the NEPA document, a complete list of projects, including description, cost estimate, funding priority designations, and implementation schedule must be included to provide the basis of the Proposed Action. If agency stakeholders and the Navy determine that potential projects are controversial, sufficient project details must be provided in the INRMP so that a decision can be made regarding significance as part of the NEPA analysis. Additionally, controversial projects, or projects outside the scope or , may require a tiered or amended NEPA document for that specific project. All projects must be consistent with the methodologies analyzed in the NEPA document, and the installation should ensure that the NEPA documentation for the INRMP is prepared such that it will accommodate for unforeseen projects, and changes to original projects. Reference Appendix F of the Navy INRMP Guidance document (Navy 2006) for more information on preparing NEPA documents for INRMPs.

The final EA prepared for this INRMP, which was prepared upon completion of the environmental review and public comment process, is included in **Appendix A** of this INRMP.

5.5 Project Development and Classification

This INRMP is a public document that requires the mutual agreement of the Installation, USFWS, and state fish and wildlife agencies. It is crucial therefore, that these entities reach a common understanding as to which projects are most likely to be funded through the sources identified in **Section 5.6**. An annual strategy must be adopted for INRMP funding that addresses the Installation's legal requirements. The Navy programming hierarchy is described in **Section 5.5.1** and project classification is described in **Section 5.5.2.**

5.5.1 Navy Programming Hierarchy

The Navy programming hierarchy is based on the following DoD funding level classifications.

- **Class 0: Recurring natural and cultural resources conservation management requirements.** Includes activities needed to cover the recurring administrative, personnel, and other costs associated with managing DoD's conservation program that are necessary to meet applicable compliance requirements (federal and state laws, regulations, presidential EOs, and DoD policies) or which are in direct support of the military mission.

- **Class I: Current compliance**. Includes projects and activities needed because an installation is out of compliance (has received an enforcement action from a duly authorized federal or state agency, or local authority); has a signed compliance agreement or has received a consent order, or has not met requirements based on applicable federal or state laws, regulations, standards, presidential EOs, or DoD policies, and/or are immediate and essential to maintain operational integrity or sustain readiness of the military mission. "Class I" also includes projects and activities needed that are not out of compliance (deadlines or requirements have been established by applicable laws, regulations, standards, DoD policies, or presidential EOs, but deadlines have not passed or requirements are not in force) but shall be if projects or activities are not implemented in the current program year.
- **Class II: Maintenance requirements.** Includes those projects and activities needed that are not out of compliance (deadlines or requirements have been established by applicable laws, regulations, standards, presidential EOs, or DoD policies) but deadlines have not passed or requirements are not in force), but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year.
- **Class III: Enhancement or actions beyond compliance.** Includes those projects and activities that enhance conservation resources or the integrity of the Installation mission, or are needed to address overall environmental goals and objectives but are not specifically required under regulation or EO and are not of an immediate nature.

The Navy funding classification of recurring and non-recurring projects consists of the following four ERLs. The following descriptions of each ERL are presented in decreasing order of priority with ERL 4 having the highest priority as “must fund” compliance projects, through ERL 1 representing environmental stewardship projects.

Environmental Readiness Level 4 (ERL 4) – Environmental Compliance:

- Supports all actions specifically required by law, regulation or EO (DoD Class I and II requirements) just in time
- Supports all DoD Class 0 requirements as they relate to a specific statute such as hazardous waste disposal, permits, fees, monitoring, sampling and analysis, and reporting and record keeping
- Supports recurring administrative, personnel and other costs associated with managing environmental programs that are necessary to meet applicable compliance requirements (DoD Class 0)
- Supports DoD policy requirement to comply with overseas Final Governing Standards (FGS) and Overseas Environmental Baseline Guidance Document (OEBGD)
- Supports minimum feasible Navy executive agent responsibilities, participation in Office of the Secretary of Defense (OSD)-sponsored interdepartmental and interagency efforts, and OSD-mandated regional coordination efforts

Environmental Readiness Level 3 (ERL 3) – Navy Proactive Involvement:

- Supports all capabilities provided by ERL 4

- Supports existing level of Navy executive agent responsibilities, participation in OSD sponsored inter-department and inter-agency efforts, and OSD mandated regional coordination efforts
- Supports proactive involvement in the legislative and regulatory process to identity and mitigate requirements that will impose excessive costs or restrictions on operations and training
- Supports proactive initiatives critical to the protection of Navy operational readiness

Environmental Readiness Level 2 (ERL 2) – Navy or DoD Policy Requirement:

- Supports all capabilities provided under ERL 3
- Supports enhanced proactive initiatives critical to the protection of Navy operational readiness
- Supports all Navy and DoD policy requirements
- Supports investments in pollution reduction, compliance enhancement, energy conservation and cost reduction

Environmental Readiness Level 1 (ERL 1) – Navy Environmental Stewardship:

- Supports all capabilities provided under ERL 2
- Supports proactive actions required to ensure compliance with pending/strongly anticipated laws and regulations in a timely manner and/or to prevent adverse impacts to the Navy mission
- Supports investments that demonstrate Navy environmental leadership and proactive environmental stewardship

5.5.2 Project Classification

The list of projects described in this INRMP consists of both "must fund" compliance-type projects, and stewardship-type projects. "Must fund" compliance project requirements are for those projects and activities that are required to meet recurring natural and cultural resources conservation management requirements or current legal compliance needs, including EOs. These projects are designated ERL 4 or 3 in the Navy funding classification system, described in **Section 5.5.1**.

"Must fund" or ERL 4 or 3 projects could include:

- Developing, updating, and revising INRMPs
- Salaries and annual training of professional personnel, in accordance with Individual Development Plans, involved in the development and implementation of INRMPs
- Terms and conditions of Biological Opinions issued by USFWS or NMFS
- Baseline surveys to keep INRMPs current
- Biological surveys to determine population status of endangered, threatened and sensitive species
- Survey and monitoring programs to support the MBTA and related permits

- Wetland surveys for planning, monitoring and/or permit applications
- Erosion control measures required in order to remain in compliance with natural resources protection regulations and to maintain land condition for realistic training operations
- Support of leadership roles or executive agent responsibilities for the Coastal America, Coral Reef Protection, Chesapeake Bay, and Mojave Desert Ecosystem Management Initiative
- Memorandums of Agreement/Understanding (MOA/MOU) commitments

This list is not meant to be all-inclusive, but provides an overview of the types of projects that could be classified as compliance or “must fund” projects.

INRMP projects are developed based on the unique circumstances facing an installation, and INRMPs also should include valid projects and programs that enhance an installation’s natural resources, promote proactive conservation measures, and support investments that demonstrate Navy environmental leadership and proactive environmental stewardship. These projects are considered “stewardship” projects and fall under ERL 2 or 1 in the Navy classification system.

Examples of stewardship, or ERL 2 or 1 projects include, but are not limited to:

- Community outreach activities, such as Earth Day and Migratory Bird Day activities
- Education and public awareness projects such as interpretive displays, oral histories, Watchable Wildlife Areas, nature trails, wildlife checklists, and conservation teaching materials
- Biological surveys or habitat protection for nonlisted species
- Management and execution of volunteer and partnership programs
- Demonstration plantings of native plant materials
- Experimental conservation techniques
- Agriculture outlease improvements
- Forest stand improvements and other management efforts
- Wildlife management efforts

All INRMP Projects must be entered into the EPR-web system and receive approval up the chain of command prior to soliciting any signatures on the INRMP. CNO Environmental Readiness Division is the final authority for designating the appropriate ERL for a given INRMP Project.

5.6 Funding Sources

Once INRMP projects have been validated, and entered into EPR-web, ERL Level 4 and 3 projects are typically programmed in for funding. ERL 2 and 1 projects are not usually funded through the EPR-web system, and alternate sources of funding should be sought for these projects. EPR-web project entries should include clear justification of funds being requested so that: (1) natural resource funds are distributed wisely, and (2) funding levels are not threatened by the use of funds in ways that are inconsistent with funding program rules (Navy 2006). The primary sources for funding Navy NRPs are:

- Operations and Maintenance, Navy (O&MN) Environmental Funds
- Legacy Program Funds
- Forestry Revenues
- Agricultural Outleasing
- Fish and Wildlife Fees
- Recycling Funds
- Strategic Environmental Research and Development Program (SERDP) Funds
- Other Non-DoD Funds

5.6.1 O&MN Environmental Funds

Most natural resource projects are funded with O&MN environmental funds and are primarily restricted to support must-fund environmental compliance projects (i.e., Navy ERL 4 projects). O&MN funds are generally not allocated for ERL 1–3 projects. Other limitations for the use of O&MN funds include the following.

- Only the initial procurement, construction, and modification of a facility or project are considered valid environmental funding requirements. The subsequent operation, modification due to mission requirements, maintenance, repair, and eventual replacement is considered a Real Property Maintenance (RPM) funding requirement.
- When natural resource requirements are tied to a specific construction project or other action, funds for the natural resource requirements should be included in the overall project costs.

O&MN Environmental Funds are expected to be the primary source of funding for NSA Cutler INRMP Environmental Compliance Projects.

5.6.2 The Legacy Resource Management Program

The Legacy Program was part of a special Congressional mandated initiative for funding military conservation projects. Although the Legacy Program was originally funded from 1991 to 1996 only, funds for new projects have continued to be available through this program (Navy 2006). Legacy Program funds can be used for a variety of conservation projects, such as regional ecosystem management initiatives, habitat preservation efforts, archaeological investigations, invasive species control, monitoring and predicting migratory patterns of birds and animals, and National partnerships and initiatives, such as National Public Lands Day. Requests for Legacy funds should consider the following:

- The availability of Legacy funds is generally uncertain early in the year.
- Pre-proposals for Legacy projects are due in March and submitted using the Legacy Tracker Website: http://www.dodlegacy.org/
- Project proposals are reviewed by the Navy chain of command before being submitted to the DOD Legacy Resources Management Office for final project selection.
- The Legacy website provides further guidance on the proposal process and types of projects requested.

Legacy Program funds should be a potential funding source for NSA Cutler INRMP Projects.

5.6.3 Forestry Revenues

Forestry Revenues originate from the sale of forest products on Navy lands and can be used to fund forestry and potentially other natural resources management programs. Forestry revenues are given preference for funding the Annual Navy Forestry Funds and the DoD Forestry Reserve Account. Annual Navy Forestry Funds are used to support commercial forestry operations at installations. Forestry revenues are first used to reimburse commercial forestry expenses, then, as directed by DoD Financial Management Regulation 7000.14-R Volume 11A, 40 percent of net proceeds for the fiscal year for the installation are distributed to the state in which the installation resides. The state usually uses these funds to support road systems and schools. Once the commercial forestry expenses are reimbursed, and proceeds are distributed among the state counties, any remaining amount is transferred to a holding account known as the DoD Forestry Reserve Account.

Forestry Revenues can also be used to fund the improvement of forested lands; fund unanticipated contingencies associated with administration of forested lands and production of forest products, for which other sources of funds are not available; and natural resources management for implementation of approved plans and agreements. In order for a natural resources project to be eligible for funding from Forestry Revenues it must:

1. Be specifically included in an approved management plan, such as an INRMP
2. Provide for:
   a. Fish and wildlife habitat improvements or modifications;
   b. Range rehabilitation where necessary for support of wildlife;
   c. Control of off-road vehicle traffic;
   d. Specific habitat improvement projects and related activities; and
   e. Adequate protection for species of fish, wildlife, and plants considered threatened or endangered.

The amount of funds available through Forestry Revenues varies from year to year. It is important to note that the amount of funds remaining for natural resources management is relatively small, and although installations are not required to have a timber harvesting plan to be eligible for funds from the DoD Forestry Reserve Account, Reserve Account funds cannot be used for “must fund” environmental compliance projects. DoD Forestry Reserve Account funds are a potential source of funding for NSA Cutler INRMP Projects that are not classified as environmental compliance projects.

5.6.4 Agricultural Outleasing

Agricultural Outleasing funds are collected through the leasing of Navy-owned property for agricultural use. This money is directed back into the NRP and reallocated throughout the Navy by NAVFAC Headquarters. Agricultural Outleasing funds are primarily allocated for agricultural outlease improvements, but also may be used for natural resources management and stewardship projects once the primary objective is met. In addition to projects related to agricultural outleasing, these funds can be used for implementation of INRMP Stewardship Projects. Although funds available through Agricultural Outleasing varies from year to year, this funding source is one of the more consistent sources for implementing INRMP projects that do not have Level 1 requirements. Agricultural Outleasing funds should be considered as a potential funding source for NSA Cutler

INRMP Projects that are not classified as environmental compliance projects.

5.6.5 Fish and Wildlife Fees

Fish and Wildlife fees are primarily collected as part of installation hunting, fishing or trapping program. These fees are deposited and used in accordance with the Sikes Act and DoD financial management regulations. The Sikes Act specifies that user fees collected for hunting, fishing or trapping shall be used only on the installation where they are collected and be used exclusively for fish and wildlife conservation and management at the installation where collected. Unless NSA Cutler implements a hunting or fishing program for the Installation, the Installation is not expected to receive funds from Fish and Wildlife Fees that can be used to support natural resource management projects.

5.6.6 Recycling Funds

Installations that have a Qualified Recycling Program (QRP) may use their proceeds for some types of natural resource projects. Any proceeds collected as part of the installation QRP must first be used to cover QRP costs, and then up to 50 percent of the net proceeds can be for pollution abatement, pollution prevention, composting, alternative fueled vehicle infrastructure support, vehicle conversion, energy conversion, or occupational safety and health projects, with first consideration given to projects included in the installation's pollution-prevention plans. Remaining funds may be transferred to the non-appropriated MWR account for approved programs or retained to cover anticipated future program costs. NSA Cutler does not include a QRP so Recycling Funds are not expected to be used to support any of the natural resource project recommended in this INRMP.

5.6.7 Strategic Environmental Research and Development Funds

Strategic Environmental Research and Development Program (SERDP) is DoD's corporate environmental research and development (R&D) program, planned and executing in full partnership with the Department of Energy (DoE) and U.S. Environmental Protection Agency (EPA), with participation by numerous other federal and non-federal organizations (Navy 2006). SERDP funds are allocated for environmental and conservation project through a competitive process. The focus of SERDP is on Cleanup, Compliance, Conservation, and Pollution Preventions technologies. Due to the competitive process involved with allocation of SERDP Funds, NSA Cutler is not expected to receive funds through this source.

5.6.8 Non-DoD Funds

Non-DoD Funds, such as those received from grant programs, are available to fund natural resources management projects, such as watershed management and restoration, habitat restoration, and wetland and riparian area restoration. Federally funded grant programs typically require non-Federal matching funds; however, installations can partner with other groups for preparing proposals for eligible projects. NSA Cutler should consider grant funding and partnerships as a potential funding source for INRMP natural resources projects.

5.7 COMMITMENT

This INRMP will require formal adoption by the Regional Commander or Installation Commanding Officer to ensure commitment for pursuing funding, and to execute all ERL Level 4 Projects, subject to the availability of funding. Funding of ERL Level 4 Projects should be pursued within the specific timeframes identified in **Appendix C** of this INRMP.

5.8 USE OF COOPERATIVE AGREEMENTS

A cooperative agreement is used to acquire goods or services, or to stimulate an activity that will be implemented for the public good. Section 103a of the Sikes Act (16 U.S.C. 670c-1) provides the authority to enter into cooperative agreements with state and local governments, nongovernmental organizations, and individuals to provide for the maintenance and improvement of natural resources on, or to benefit natural and historical research on, DoD installations. In addition to a standard cooperative agreement, examples of other agreements include Memorandum of Understanding, and Cooperative Assistance Agreement. Funds appropriated for multiyear agreements during a fiscal year may be obligated to cover the cost of goods and services provided under a cooperative agreement entered into or through an agency agreement under section 1535 of Title 31 during any 18-month period beginning in that fiscal year, without regard to whether the agreement crosses fiscal years. Cooperative agreements entered into are subject to the availability of funds.

EO 13352, Facilitation of Cooperative Conservation (August 26, 2004) directs that the Secretaries of the Interior, Agriculture, Commerce, and Defense and the Administrator of the EPA shall, to the extent permitted by law and subject to the availability of appropriations and in coordination with each other as appropriate: carry out the programs, projects, and activities of the agency that they respectively head that implement laws relating to the environment and natural resources in a manner that facilitates cooperative conservation; take appropriate account of and respects the interests of persons with ownership or other legally recognized interests in land and other natural resources; properly accommodate local participation in Federal decision making; and provides that the programs, projects, and activities are consistent with protecting public health and safety.

The Navy has entered into cooperative agreements as part of implementation of this INRMP with the following federal and state agencies.

- USFWS
- MDIFW
- Cooperative Agreement for the Conservation and Management of Fish and Wildlife Resources at Naval Communication Unit Cutler, East Machias, Maine. Signed by the Commanding Officer, Naval Communication Unit Cutler (18 Mar 1987), Regional Director, Fish and Wildlife Service, United States Department of Interior (12 Feb 1987), and Commissioner, Maine State Department of Inland Fisheries and Wildlife (18 Dec 1986)

Copies of these agreements are included in **Appendix A** of this document.

6.0 MANAGEMENT RECOMMENDATIONS SUMMARY

This section presents a summary of the management recommendations that were described for each the programmatic objective management areas established for the VLF and HF areas of NSA Cutler, as discussed in **Section 3.0** and **Section 4.0**. The recommendations have been organized by the programmatic objectives introduced in **Section 1.6.2** and discussed in **Section 3.0 and Section 4.0**.

For prioritization and budgeting purposes, each action or project recommended in this INRMP are listed in the project table provided in **Appendix C**. The prime legal drivers, Navy assessment level (described in the CNO Navy Environmental Requirements Guidebook), cost estimate, potential funding source, and schedule for each action or project is identified in the **Appendix C** project table. Administration and day-to-day program activities of the NRP are not included in the table. Policy guidance provided in DoDI 4715.03 states that each military service will be responsible for obtaining funding for natural resources projects. The prioritized natural resources projects summarized in this section and **Appendix C** utilizes the Navy program hierarchy described in **Section 5.5.1** and the project classification system described in **Section 5.5.2**.

Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers (Benton et al. 2008) provides background information for natural resource managers, as well as examples and tools to aid in the development of ecosystem-based biodiversity conservation strategies in the context of the military mission and preparations of INRMPs. This guide is a useful source of assistance and guidance and should be consulted for additional information when implementing any of the following management recommendations. Due to the inherent difficulties of improving conservation and management of natural resources, while still meeting the military mission, there will always be opportunities to improve management practices in some way, promote stewardship, and contribute to the military mission through biodiversity conservation.

6.1 NSA Cutler Management Recommendations

Each of the following recommendation or guideline falls within one of four ERLs, as listed below in descending order of priority:

- ERL 4 – Environmental Compliance
- ERL 3 – Navy Proactive Involvement
- ERL 2 – Navy or DoD Policy Requirement
- ERL 1 – Navy Environmental Stewardship

Refer to **Section 5.5.1** for the specific descriptions that are associated with each of the ERLs.

6.1.1 Environmental Readiness Level 4: Environmental Compliance

Land Management

- ☞ LA02 Conduct annual erosion surveys at the VLF and HF to identify soil problem areas. Focus areas will include the area along roadways, and other areas of ground disturbance adjacent to, and along edges of wetlands, surface waters, and the coastline.

- ☞ LA03 Implement erosion remedial and preventive measures to protect water quality and ensure shoreline stabilization, prioritize activities based on erosion survey results.
- ☞ LA08 Conduct removal and restoration of areas infested with invasive species, such as common reed and reed canary grass. For small stands, manual removal of all above ground biomass as well as the underground rhizome by which they spread is preferred. However, this removal method is labor intensive and is feasible only if the stands are small. If manual removal is not appropriate, invasive species should be treated with a glyphosate herbicide.
- ☞ LA09 Conduct annual site surveys to proactively identify and treat new occurrences of invasive species, and to monitor restoration sites for regrowth.
- ☞ LA10 Coordinate with MNAP to conduct a general rare plant survey that focuses on rare ecosystems present at the Installation.
- ☞ LA13 Erosion and sediment control training for Installation natural resources personnel.
- ☞ LA14 Wetlands, plant and tree identification training for natural resources and grounds maintenance personnel.

Fish and Wildlife Management

- ☞ FW10 Conduct follow-up surveys, every three to five years, of terrestrial invertebrates to generate representative data for the diversity and relative abundance of the invertebrates of the Installation. Survey reports should include management recommendations for general invertebrate habitat.
- ☞ FW11 Install bat boxes in appropriate habitats to increase the diversity of bats utilizing the Installation for foraging and to discourage use of interior areas of Installation buildings for roosting and hibernating. Bat house construction methods and installation should follow guidelines provided by Bat Conservation International (BCI).
- ☞ FW12 Conduct a comprehensive fish survey of the Installation within a variety of habitats, including streams and ponds. Surveys should be conducted seasonally in the spring, summer and fall, and should include a combination of beach seining and electrofishing methods. Data on species, size and health information will be collected, and the survey will also identify any barriers to fish passage such as dams or hanging culverts located along streams or pond outlets/inlets.
- ☞ FW14 Implement the NSA Cutler deer management plan, once available.
- ☞ FW15 Surveys for crowberry blue butterflies are recommended during the flight season for this species (early July through mid-August) to verify the unconfirmed sighting of this species during 2009 field activities and to determine the presence and extent of this rare species elsewhere at NSA Cutler. Multiple surveys scheduled throughout the flight season are recommended to ensure that survey efforts do not miss extant populations due to poor weather conditions or inadequate sampling.
- ☞ FW16 Conduct annual surveys for threatened, endangered, rare, and special concern species known to occur at the Installation during the appropriate season.

- ☞ FW17 Install nest boxes at the Installation to encourage birds to nest outside of the areas mowed within the managed grasslands habitat, utilizing the guidance provided by USFWS NCTC for planning the nest box programs.

- ☞ FW18 Prepare and implement migratory bird monitoring plans (e.g., for grassland and shorebird species known to occur at the Installation) in coordination with IBP, MDIFW, and USFWS.

- ☞ FW19 Implement a bird and bat conservation strategy.

- ☞ FW20 Conduct follow-up raptor migration surveys. Surveys should be conducted in accordance with the Eagle Protection Plan.

- ☞ FW21 Continue to conduct eagle use surveys to document nesting and migratory eagle movement in relation to the antenna fields.

- ☞ FW22 Conduct follow-up surveys to monitor and estimate take of migratory birds and bats. Surveys should be conducted in accordance with the Bird and Bat Conservation Strategy.

- ☞ FW23 Conduct avian radar and acoustic surveys every two to three years to collect near continuous radar data on bird and bat activity across the Installation.

- ☞ FW24 For removal of active osprey nests that are identified as having a negative impact on the military mission, or to the osprey's health, the Installation will obtain a MBTA Depredation Permit from USFWS. Removal of active nests will be conducted in cooperation with a certified wildlife biologist, and in accordance with the recommendations outlined in the Installation Osprey Management Plan.

- ☞ FW25 Conduct a feasibility assessment for installation of artificial nesting platforms for osprey.

- ☞ FW26 Continue to coordinate with interested federal or state agencies, NGOs, or private entities (i.e., DoD PIF and IBP) to establish wildlife monitoring programs.

Land Management and Fish and Wildlife Management

- ☞ LA01 and FW01 Conduct annual monitoring of invasive and nuisance wildlife, such as beavers and bats, to determine if habitat modification to discourage beavers or wildlife removal of nuisance bats (excluding federally or state protected bat species) or other remedial actions are necessary to protect natural resources and/or human health and safety. Create a habitat modification plan to address beaver activity.

- ☞ LA04 and FW03 Conduct a natural community survey of the Installation to collect ground-truthed GIS data of the vegetative community types present.

- ☞ LA05 and FW04 Map the general distribution of larger populations of sensitive wildlife habitats (e.g., black crowberry plants and clusters of bog inhabiting plants, such as pitcher plants, ericaceous shrubs, hare's tail sedge).

- ☞ LA06 and FW05 Restore bog habitat affected by ground-disturbing activities. Bog restoration projects will be overseen by an ecologist who is experienced with peatland restoration, and post-restoration monitoring will be conducted for at least 5 years, or until post-restoration success is determined. If post-restoration monitoring determines that the restoration project is unsuccessful, an adaptive management/corrective action plan will be prepared and implemented to ensure success.

☞ LA07 and FW06 Post-construction bog restoration will include presence/absence surveys for crowberry blue butterflies and/or other rare species in the restoration area. Monitoring adjacent larger bogs would provide baseline population numbers for the broader population as well as the portion of the restored bog habitat. In addition, monitoring should include areas where black crowberry has formed larger lawn-like mats. These data will assist in formulating future decommissioning plans designed to insure the continuity of the black crowberry populations and attendant habitat for the rare crowberry blue butterfly. In addition, mapping extant black crowberry populations would help establish a protection/avoidance plan to help circumvent accidental vehicular damage to plant populations.

☞ LA11 and FW07 Conduct a comprehensive, Installation-wide vernal pool survey during the appropriate survey window, and in accordance with MDIFW protocols.

Fish and Wildlife Management and Forestry Management

☞ FW09 and FO01 A forest management plan should be developed using the completed forest characterization assessment. The management plan should include a summary of the field characterization data, including the stand boundaries, a description of each stand including but not limited to dominant and common tree species, sizes, age class, absolute density, soils, topography, key habitat features, and any other distinctive features. In addition, the plan should include a prescription for each stand and a schedule for conducting forest health monitoring. The management plan will focus on opportunities for improving the forest for wildlife habitat. Forest health monitoring should be conducted once every 5 years and the results incorporated into the forest management plan as an update to reflect the findings of the monitoring and management recommendations, if appropriate. The plan should include measures for protection of standing dead trees (snags) and trees with loose bark or cavities, which represent important roosting habitat for bats.

Fish and Wildlife Management and Outdoor Recreation Management

☞ FW13 and OR01 Install benches and interpretive signage at each of the Watchable Wildlife Areas to enhance and promote the use of these areas, and to encourage viewers to remain in the viewing area to avoid disturbing the wildlife being viewed. Access to these areas will be developed in accordance with the Americans with Disabilities Act.

☞ FW27 and OR02 Re-engage partnership and cooperative agreement discussions that were initiated during the establishment process of the Sprague Neck Bar ERA. Agencies and organizations that should be part of this process include, but are not limited to DoD PIF, USFWS, MDIFW, University of Maine–Machias, Ducks Unlimited, and the Conservancy.

Land Management, Fish and Wildlife Management, and Forestry Management

☞ LA12, FW08 and FO02 Conduct additional deer population surveys over multiple years to identify annual and seasonal variation as funding allows. The findings of these surveys should be incorporated into the deer management plan.

Land Management, Fish and Wildlife Management, Forestry Management, and Outdoor Recreation Management

☞ LA15, FW28, FO03, and OR03 Develop a GIS system for natural resources data and provide training to staff to maintain the GIS database.

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7.2 INTERNET RESOURCES

Natural Resource Laws and Regulations

Maine Department of Environmental Protection (MDEP) Bureau of Land and Water Quality. Natural Resource Protections Act (NRPA). http://www.maine.gov/dep/blwq/docstand/nrpapage.htm

Maine.Gov Environmental Regulations Homepage. http://www.maine.gov/portal/business/environment.html

Maine Natural Areas Program (MNAP). http://www.maine.gov/doc/nrimc/mnap/

U.S. Department of Agriculture, Natural Resources Conservation Service. Home Page. http://www.nrcs.usda.gov/

U.S. Department of the Interior, Bureau of Land Management – Habitat Restoration of At-Risk Plant and Animal Communities. http://recovery.doi.gov/press/bureaus/bureau-of-land-management/bureau-of-land-management-habitat-restoration/

Water Resources

U.S. Environmental Protection Agency (EPA). National Pollutant Discharge Elimination System (NPDES). http://cfpub.epa.gov/npdes/home.cfm?program_id=6

Habitat Restoration and Management

Global Peatland Restoration Manual. http://www.imcg.net/docum/prm/gprm_03.pdf

Maine Department of Environmental Conservation (MEDEC). Cutler Coast Public Reserved Land.
http://www.maine.gov/cgi-bin/online/doc/parksearch/details.pl?park_id=44

Maine Department of Environmental Protection (MDEP). Maine Invasive Plants-Common Reed (Phragmites). http://www.state.me.us/dep/rwm/landfillclosure/pdf/invasive%20plant%20fact%20sheet%20Common%20Reed.pdf

Maine Natural Areas Program (MNAP) Jonesport Heaths Community Map. http://www.maine.gov/doc/nrimc/mnap/focusarea/jonesport_heaths.pdf

Maine Natural Areas Program (MNAP) Maritime Spruce-Fir Forest Information. http://www.maine.gov/doc/nrimc/mnap/features/communities/maritimesprucefirforest.htm

Maine Natural Areas Program (MNAP) Natural Communities Associated With Maritime Forest Systems. http://www.maine.gov/doc/nrimc/mnap/features/eco_maritimeforest.htm

NAVFAC Environmental Restoration Program Implementation of the Naval Installation Restoration Information Solution (NIRIS). https://portal.navfac.navy.mil/portal/page/portal/4C8DFFD00BCE39F9E04400144F23AD64Peatland Restoration Guide. http://www.peatmoss.com/pdf/Englishbook.pdf

U.S. Department of Agriculture, Natural Resources Conservation Service. Wetland Restoration, Enhancement, Creation, and Construction.
http://www.wli.nrcs.usda.gov/restoration/

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U.S. Fish and Wildlife Service. Maine Coastal Island National Wildlife Refuge. http://www.fws.gov/northeast/mainecoastal/

Wildlife Management

Bolen, E.G. and W. L. Robinson. 1999. Wildlife Ecology and Management, Fourth Ed. Prentice Hall, Upper Saddle River, NJ. 519pp.

Deer Management. http://www.maine.gov/IFW/wildlife/species/deer/index.htm

Maine Bow Hunters Association. http://www.mainebowhunters.org/main.php

Bird Conservation

Maine Audubon – Important Bird Areas (IBA) program.
http://www.maineaudubon.org/conserve/iba/documents/IBAstoryspring08.pdf

Maine Department of Environmental Protection (MDEP) Bureau of Land and Water Quality. Bird Habitat Fact Sheet #1.
http://www.maine.gov/dep/blwq/docstand/nrpa/birdhabitat/bird_habitat.htm

Maine Department of Environmental Protection (MDEP) Bureau of Land and Water Quality. Bird Habitat Fact Sheet #2.
http://www.maine.gov/dep/blwq/docstand/nrpa/birdhabitat/fs_pbr_2006.htm

Maine Department of Environmental Protection (MDEP) Bureau of Land and Water Quality. Lubec – Significant Wildlife Habitat – Seabird Nesting Islands. http://www.maine.gov/dep/blwq/docstand/nrpa/birdhabitat/maps_sbni/files/lubec_sbni.pdf

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Maine Department of Inland Fisheries and Wildlife (MDIFW) Important Shorebird Habitat Map of Cutler. http://megis2.dafs.maine.gov/ifwpdf/Cutler/Map2.pdf

Maine Department of Inland Fisheries and Wildlife (MDIFW) Important Shorebird Habitat Map of Machiasport. http://megis2.dafs.maine.gov/ifwpdf/Machiasport/Map2.pdf

Maine Department of Inland Fisheries and Wildlife (MDIFW). Peregrine Falcon Fact Sheet. http://www.maine.gov/IFW/wildlife/species/endangered_species/peregrine_falcon/index.htm

North American Bird Conservation Initiative (NABCI) United States. Bird Conservation Region #14. http://www.nabci-us.org/bcr14.htm

Partners in Flight. http://www.partnersinflight.org/

U.S. Environmental Protection Agency (EPA). Species Profile – Osprey. http://www.epa.gov/NE/ge/thesite/restofriver/reports/final_era/B%20-%20Focus%20Species%20Profiles/EcoRiskProfile_osprey.pdf

U.S. Fish and Wildlife Service. Birds Protected by the Migratory Bird Treaty Act. http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtintro.html

U.S. Fish and Wildlife Service. Birds of Conservation Concern 2008. http://library.fws.gov/Bird_Publications/BCC2008.pdf

U.S. Fish and Wildlife Service National Conservation Training Center (USFWS NCTC). 2009. Conservation Library, Homes for Birds. (Retrieved February 17, 2010). http://library.fws.gov/Bird_Publications/house.html#2d

Special Status Species

Maine Department of Inland Fisheries and Wildlife (MDIFW). Canada Lynx Fact Sheet. http://www.maine.gov/ifw/wildlife/species/endangered_species/canada_lynx/index.htm

Maine Department of Inland Fisheries and Wildlife (MDIFW). Delisting the Bald Eagle in Maine. http://www.maine.gov/ifw/wildlife/species/endangered_species/baldeagle_delisting.htm

Maine Natural Areas Program (MNAP) Huckleberry – Crowberry Community and its support of the Crowberry Blue Butterfly. http://www.maine.gov/doc/nrimc/mnap/features/communities/huckleberrycrowberry.htm

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8.0 LIST OF ACRONYMS

°F	degrees Fahrenheit
AOC	Area of Concern
ATV	All-terrain Vehicle
BCC	Birds of Conservation Concern
BCI	Bat Conservation International
BCR	Bird Conservation Region
BMP	Best Management Practice
BP	Before Present
CECOS	Civil Engineer Corps Officers School
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Resource Conservation and Liability Act
CFR	Code of Federal Regulation
CINWR	Cross Island National Wildlife Refuge
CLEAN	Comprehensive Long-Term Environmental Action–Navy
CNO	Chief of Naval Operations
CNRMA	Commander, Navy Region Mid-Atlantic
CO	Commanding Officer
Conservancy	The Nature Conservancy
CRM	Cultural Resources Manager
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategy
CZMA	Coastal Zone Management Act
DENIX	Defense Environmental Network and Information Exchange
DoD	Department of Defense
DoDI	Department of Defense Instruction
DoE	Department of Energy
EA	Environmental Assessment
EBS	Environmental Baseline Survey
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPRweb	Environmental Program Requirements web
ERA	Ecological Reserve Area
ERL	Environmental Readiness Level
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FGS	Final Governing Standards

FONSI	Finding of No Significant Impact
ft	Feet
GIS	Geographic Information System
GP	General Permit
GPD	Gallons Per Day
GPS	global positioning system
GSD	Ground Sample Distance
HF	High Frequency
HUC	Hydrologic Unit Code
HWMP	Hazardous Waste Management Plan
IBA	Important Bird Area
IBP	Institute for Bird Populations
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resource Management Plan
IPM	Integrated Pest Management
IRP	Installation Restoration Program
kg	kilogram
Legacy Program	Legacy Resource Management Program
MAPS	Monitoring Avian Productivity and Survivorship
MARAP	Maine Amphibian and Reptile Atlasing Project
MBTA	Migratory Bird Treaty Act
MDACF	Maine Department of Agriculture, Conservation and Forestry
MDIFW	Maine Department of Inland Fisheries and Wildlife
MDEP	Maine Department of Environmental Protection
MDMR	Maine Department of Marine Resources
MPDES	Maine Pollutant Discharge Elimination System
MIDLANT	Mid-Atlantic Division
MNAP	Maine Natural Areas Program
MOU	Memorandum of Understanding
MWR	Morale, Welfare, and Recreation
NCTAMSLANT DET	Naval Computer and Telecommunications Area Master Station Atlantic Detachment located in Cutler, Maine,
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
NRM	Natural Resources Manager

NRP	Natural Resources Program
O&MN	Operations and Maintenance, Navy
OEBGD	Overseas Environmental Baseline Guidance Document
OPNAVINST	Chief of Naval Operations Instructions
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PCB	Polychlorinated Biphenyl
PEM	Palustrine Emergent
PIF	Partners in Flight
PFO	Palustrine Forested
PSS	Palustrine Scrub Shrub
PUB	Palustrine Unconsolidated Bottom
PWD-ME	Public Works Department Maine
QRP	Qualified Recycling Program
R&D	Research and Development
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
RPM	Real Property Maintenance
SAV	Submerged Aquatic Vegetation
SECNAVINST	Secretary of the Navy Instruction
SERDP	Strategic Environmental Research and Development Program
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
Sikes Act	Sikes Act Improvement Act
SPCC	Spill Prevention Control and Countermeasures Plan
SWPPP	Stormwater Pollution Prevention Plan
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA-NRCS	U.S. Department of Agriculture - Natural Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service
VLF	Very Low Frequency

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APPENDIX A

INRMP COOPERATIVE SUMMARY and Environmental Assessment

ENCLOSURES

- **Mutual Agreement – Federal**
- **Environmental Assessment (see CD located inside the front cover of this document for a complete electronic copy of the Environmental Assessment)**

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Maine Fish and Wildlife Service Complex
P.O. Box A
306 Hatchery Road
East Orland, Maine 04431
207/469-7300 Fax: 207/902-1588

February 15, 2019

Ian Trefry, CWS
Natural Resource Manager
NAVFAC PWD-ME
Portsmouth Naval Shipyard
Building 59, Third Floor
Portsmouth, New Hampshire 03804

REF: USFWS Five-year review, INRMP for the Naval Support Activity Cutler (NSA Cutler), Washington County, Maine

Dear Mr. Trefry:

Thank you for your email dated February 04, 2019 requesting that the U.S. Fish and Wildlife (Service) complete a five-year review of the Integrated Natural Resource Management Plan (INRMP) for the Naval Support Activity Cutler (NSA Cutler), located in Washington County, Maine. Our review is done in accordance with the Sikes Act (16 U.S.C. 670a et seq.) as amended, the Department of Defense Instruction 4715.03, and the Chief of Naval Operations Instruction 5090.1D. The Sikes Act requires that this INRMP be prepared in cooperation with, and reflect mutual agreement of, the Service and other Federal and State natural resource agencies. This requirement affords the Service signatory authority as an external stakeholders and approving officials of this INRMP. We concur with the operation and effect of this INRMP plan, and a signed signature page is attached

The primary mission of the NSA Cutler military installation is to provide communication services to ships and submarines operating in the North Atlantic, Arctic Ocean, and the Mediterranean Sea. Multiple large antenna arrays and support towers and associated support and operation facilities are required to achieve this mission. The installation encompasses 3 parcels of land totaling 3,006 acres comprised of the Very Low Frequency (VLF), High Frequency (HF), and Howard Cove areas. The VLF area is a peninsula in Machias Bay. The HF area is a small area near the VLF area that is set back from the nearby Holmes Bay. The Howard Cove area is on the west side of Machias Bay. The Cross Island National Wildlife Refuge, and several smaller islands are south of the VLF area. This plan documents the military mission of NSA Cutler, baseline conditions of existing natural resources, impacts to natural resources resulting from military operations, management approaches to conserve and enhance natural resources, and a list of specific projects to protect and enhance them. This INRMP helps ensure consistency with the Installation's military mission, while protecting and enhancing natural resources, to the extent practicable.

The goals and objectives of land management and fish and wildlife management programmatic objectives of the INRMP (pp. 118, 138) are aligned with those of the Service. The Service agrees that the Department of Defense is achieving land management objectives to:

1. Continue to manage, maintain, and enhance land areas with natural resource value.
2. Provide adequate special management or protection of threatened and endangered species, significant rare communities, and species at risk.

Furthermore, the Department of Defense is achieving fish and wildlife management objectives to:

1. Protect, conserve, and promote native terrestrial and aquatic fauna.
2. Provide adequate special management or protection of threatened, endangered, and rare wildlife species; wildlife species at risk; and their habitats.
3. Prevent and control invasive species and nuisance wildlife.
4. Develop partnerships with Federal, State, and local agencies and non-government agencies to implement
   facility wildlife monitoring and protection programs.

We appreciate the partnership and cooperation of the Department of Defense in addressing priorities shared with the Service.

The Navy policy on natural resources management, as summarized from OPNAVINST 5090.1D, is to manage natural resources to support and be consistent with the installation mission, while protecting and enhancing those resources for multiple use, sustainable yield, and biological integrity. Land use practices and decisions must be based on scientifically sound conservation procedures and techniques, and use scientific methods and an ecosystem management approach. The Service concurs that the INRMP for the NSA Cutler meets these natural resource management goals while achieving the facility military mission.

Based on our review of the INRMP, we provide the following suggestions to address information needs or new management opportunities:

- The plan addresses pollinators in relation to pesticide use (p. 131), but the plan does not address the rusty patched bumble bee (*Bombus affinis*, Federal endangered species listed in 2017) or the yellow banded bumble bee (*Bombus terricola*) and monarch butterfly (*Danaus plexippus*) that are being considered for listing under the Endangered Species Act. It seems there would be many opportunities to conserve or enhance pollinators in the grassland habitats and we recommend that the conservation of these bumble bee species, the monarch butterfly, and pollinator conservation be included in the INRMP.
- We encourage surveying for these rare bumble bees, the monarch butterfly, and documenting milkweed host plants and the Service is willing to assist the Navy with surveys or pollinator plantings. One question is whether or not this would be possible given the required mowing regime and how this might affect pollinator resources at the facility.

- The metrics of bird passage rates (p. 78) are unclear. We believe the passage rates are birds per hour. If the rates are targets per hour, it would be helpful to know what proportion of the targets are birds and what proportion are insects.
- The magnitude of migratory bird mortality at NSA Cutler is not clear (p. 79). It would be helpful to put the metric of 7.7 birds per plot into perspective. If possible, including summary information from the Bird and Bat survey report could provide more prescriptive details to include in the INRMP. This would help place the importance of addressing bird mortality and bird conservation into better perspective.
- It would be helpful to know what proportion of bird mortalities were migratory versus resident birds. It would be useful to document which bird groups were most prevalent (e.g., gulls, waterfowl, neotropical migrants, resident breeding birds) and if there were hot spots for mortality. This information would help focus or prioritize management for possible avoidance and minimization measures.
- It would be helpful to provide information in the INRMP on the number of roseate terns and red knots (*Calidris canutus*) observed and how consistently they are observed at the facility (p. 104). It would be useful to document whether there are key feeding or roosting areas for these species (see pp. 151-152). Consistent use of Sprague Neck (or other locations) by these federally listed species may warrant a conservation measure later in the INRMP.
- There were five bald eagles *(Haliaeetus leucocephalus)* found dead at NSA Cutler. This is mentioned on page 148, but could also be referenced on page 105.
- We believe that the roseate tern (*Sterna dougallii*), red knot, and rusty patched bumble bee should be be added to Table 3.3.
- Given that all eight of Maine's bat species have been documented at NSA Cutler, we look forward to future opportunities to collaborate with you and the Maine Department of Inland Fisheries and Wildlife (MDIFW) on bat conservation. We recommend that section 3.2.5.3 mention the conservation measure to protect bats including creating bat boxes (FW17). Constructing and installing bat boxes could be an easy collaboration among our agencies in the near future.
- We recommend that you consider future bat surveys to include investigations of various structures at the NSA Cutler. There are many older bunkers and concrete buildings where bats may roost (including some underground). It would be helpful to know if bats occupy any of these buildings, which could help inform measures to avoid or minimize impacts to bats from maintenance projects, including timing of such work.
- Telemetry data suggests that bald eagles are at higher risk of collision in the fall and winter (pp. 148-149). The INRMP discusses high populations of deer. Removing deer carcasses that are attracting bald eagles (all forms of deer mortality) would be beneficial (p. 150).
- A possible future project would be to access additional bald eagle telemetry data that were collected after November 2017. This would add to our knowledge of bald eagle use of hazardous areas (FW21).
- We do not believe that bird mortality studies were designed to evaluate mortality from dangerous levels of radioactivity from the helix houses. This is mentioned as a source of bird mortality in the INRMP. This could be an area for future studies (see FW22).
- We look forward to further discussions of the Bird and Bat Conservation Plan and what measures may be feasible to avoid or minimize bird and bat mortality at the facility. We

recommend that the Navy meet with USFWS and MDIFW to discuss alternatives for avoidance and minimization measures and monitoring to evaluate the effectiveness of conservation measures.

The Service completed a five-year review for the INRMP at NSA Cutler and believe that it is current and operational. Some minor revisions and clarifications may be warranted based on the comments above. To our knowledge, all environmental compliance projects have been budgeted for and implemented (or will be) on schedule; required natural resource positions are filled with trained staff or are in the process of being filled; projects and activities identified for the coming year are included in the INRMP; required coordination has been conducted; and significant changes to the installation's mission requirements or its natural resources have been identified.

The Service appreciates the partnership and cooperation of the Navy. We look forward to our continued partnership to conserve the unique natural resources on the NSA Cutler facility.

Thank you for your cooperation and if you have any questions please feel free to contact me via telephone at 207/902-1567 or by email at *anna_harris@fws.gov*.

Sincerely,
ANNA HARRIS
Digitally signed by ANNA HARRIS
Date: 2019.02.15 13:17:15 -05'00'
Anna Harris
Project Leader
Maine Field Office
Maine Fish and Wildlife Service Complex

cc: Brian Benedict, Refuge Manager, Maine Coastal Islands National Wildlife Refuge
John Perry, MEDIFW - Augusta

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR THE ENVIRONMENTAL ASSESSMENT (EA) FOR THE IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE NAVAL COMPUTER AND TELECOMUNICATIONS AREA MASTER STATION ATLANTIC DETACHMENT CUTLER, MAINE

Pursuant to the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508) implementing the National Environmental Policy Act and the Navy regulations (32 CFR Part 775), and Chief of Naval Operations Instruction 5090.1C CH-1, the Department of the Navy (Navy) gives notice that an EA has been prepared and an Environmental Impact Statement (EIS) is not required for implementation of the Integrated Natural Resources Management Plan (INRMP) for the Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler (NCTAMSLANT DET Cutler), Cutler, Maine.

Proposed Action: The proposed action is to implement the INRMP for NCTAMSLANT DET Cutler. The proposed action is needed to comply with the Sikes Act Improvement Act (SAIA) of 1997. The purpose of the INRMP is to implement an ecosystem based conservation and management program that provides for integrated conservation, restoration, and enhancement of natural resources, consistent with the military mission, and provides for sustainable, multipurpose use of natural resources.

Existing Conditions: NCTAMSLANT DET Cutler is located on the east coast of Maine in the Town of Cutler, Maine. The Installation occupies 3,003 acres comprising two parcels: the Very Low Frequency (VLF) area (2,896 acres) and the High Frequency (HF) area (107 acres). Much of the Installation is designated as the Cutler VLF and HF Communications Historic District, which includes 140 contributing architectural resources, including 118 in the VLF area and 22 in the HF area. 1,862 acres of wetlands, 440 acres of mixed maritime spruce-fir forest, and 322 acres of managed grasslands are present at the Installation. Other natural community types present include crowberry-bayberry headlands, green alder shrub/spruce thickets, and beach habitat totaling 300 acres. Developed land totals 49 acres, with 29 acres of the Installation remaining unclassified.

FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR THE ENVIRONMENTAL ASSESSMENT (EA) FOR THE IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE NAVAL COMPUTER AND TELECOMUNICATIONS AREA MASTER STATION ATLANTIC DETACHMENT CUTLER, MAINE

Alternatives Analyzed: The Navy considered three alternatives for the proposed action plus the No Action alternative.

Alternative 1 (the preferred alternative) would fully execute the four management objectives of the INRMP and would provide for integrated management of land, fish and wildlife, forestry, and outdoor recreation resources, as practicable and consistent with the military mission and land uses. Stewardship projects that have been included would be considered reasonable and achievable for the Installation. The preferred alternative also would include training in all management areas for environmental and grounds maintenance staff, outreach, and partnerships.

Alternative 2 is similar to the preferred alternative; however, natural resources management would be focused within developed areas and habitats that support migratory birds. Alternative 2 would include a decreased level of management intensity from the preferred alternative, and "enhanced" measures would be limited to a minimal number of stewardship projects.

Alternative 3 is similar to the preferred alternative; however, under this alternative additional outdoor recreation opportunities would not be evaluated.

The No Action alternative would not implement the INRMP. Implementation of the No Action alternative would not satisfy the purpose and need for the proposed action.

Alternatives considered but eliminated from detailed analysis included those that would disproportionately administer one portion of the natural resources program, such as forest or wildlife management. These alternatives were rejected because they would not constitute an integrated conservation program, and, therefore, would not be compliant with the SAIA, DoD Instruction 4715.3, or OPNAVINST 5090.1C CH-1, and would not adequately address other conservation compliance issues. An alternative that included more intensive natural resources stewardship was also considered, but rejected, because it would involve high-investment actions extending beyond anticipated funding levels.

FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR THE ENVIRONMENTAL ASSESSMENT (EA) FOR THE IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE NAVAL COMPUTER AND TELECOMUNICATIONS AREA MASTER STATION ATLANTIC DETACHMENT CUTLER, MAINE

Environmental Effects: The following is a summary of the environmental consequences of the preferred alternative and other alternatives analyzed in the EA:

Climate and Air Quality: The preferred alternative would not have a significant adverse effect on climate or air quality. A positive effect on climate, through implementation of proactive forestry practices identified by the forestry management programmatic objectives, would occur. Short-term, minor effects on localized air quality would be expected from implementation of land management programmatic objectives that may create mobile source air emissions, such as those associated with grounds maintenance and restoration activities. These impacts would be minimized through implementation of Best Management Practices (BMPs) during land restoration or construction activities to control or minimize effects to air quality during construction activities.

Similar to the preferred alternative, alternative 2 and alternative 3 would not have significant adverse environmental effects on climate or air quality. Implementation of these alternatives would be expected to result in short-term, minor effects on air quality in association with grounds maintenance and restoration actions. Any potential effects to air quality would be minimized through the use of BMPs. Due to the lower level of natural resources management associated with both alternatives, the level of air quality effects would be reduced compared to the preferred alternative.

Geology, Topography, and Soils: The preferred alternative would not have a significant adverse effect on geology, topography, or soils, as it would not include any actions that would result in major ground disturbance that would affect geologic or topographic resources.

The preferred alternative would include proactive land management programmatic objectives that would reduce soil erosion. Erosion and sediment control training for Installation personnel would be provided. Both land management and fish and wildlife management programmatic objectives include restoration and monitoring of disturbed bog habitat. Some effects to soils would be expected from the construction of outdoor recreation facilities; however, BMPs would be used to protect soils by minimizing erosion during ground disturbing activities. The preferred alternative would have an overall positive effect on soils through implementation of management actions that minimize soil loss.

The land management programmatic objectives under alternative 2 and alternative 3 are similar to the preferred alternative and do not include any planned actions that would result in major ground disturbance activities that would affect geologic, topographic, or soil resources. Although minor temporary effects to the topography and soils of the Installation may result from restoration activities and outdoor recreation management actions, these would be reduced in scope compared to the preferred alternative.

Water Resources: Implementation of the preferred alternative would be expected to have beneficial effects on groundwater, surface water, and wetland resources on the Installation. Actions that would improve stormwater management include modification of the existing ditch systems to create small impoundments, increasing the net amount of wetland habitat, and the attenuation of stormwater runoff during heavy rainfall resulting in reduced potential for erosion.

The preferred alternative also would likely have an overall positive indirect effect on the water quality on the Installation by offering a more comprehensive erosion control and stabilization program than currently exists. A proactive approach to identifying and subsequently addressing erosion and sedimentation problems would occur under the preferred alternative.

Implementation of alternative 2 would be expected to have an overall beneficial effect on the groundwater, surface water, and wetland resources on the Installation. However, these benefits would be less in comparison to the preferred alternative since the remedial action necessary to address any erosion or sedimentation control problems would not be required under alternative 2. Additionally, creation of wetland habitat or creation of impoundments to attenuate stormwater runoff, or the requirement to implement remedial actions for protection of water quality and stabilization of infrastructure as identified in annual erosion surveys, would not occur under alternative 2.

Implementation of alternative 3 would provide the same benefit to water resources as described for the preferred alternative.

Vegetation: The preferred alternative would be expected to have some short-term effects on vegetation associated with grounds maintenance and restoration/creation activities. However, positive long-term effects on Installation vegetation would be expected because enhanced management of vegetation resources on an integrated basis would occur. Vegetation management would be based on available scientific information, and would rely on an adaptive ecosystem management strategy that would promote biological diversity of native species and conservation. Monitoring and control of invasive species, as emphasized in Executive Order 13112 (Invasive Species), would also occur.

The preferred alternative would include several management measures that, collectively, would be expected to result in positive effects to the vegetation at the Installation. The preferred alternative would include geographic information system (GIS) mapping of the location and extent of sensitive or important plant communities, and restoration, post-restoration monitoring, and protection of sensitive natural communities. Collection of data for development of a basic forest management plan that focuses on opportunities that improve forest communities for habitat and regular monitoring of forest health would also occur. Annual monitoring, control, and removal of invasive species and planting or seeding with native species would be associated with restoration or habitat creation activities. Plant and tree identification training would also be provided for environmental staff under the preferred alternative.

Alternative 2 would be expected to have short-term effects on vegetation associated with grounds maintenance and restoration/ creation activities. However, this alternative would have some positive long-term effects on vegetation through removal of invasive species, restoration of disturbed habitats, creation of habitat, and post-construction monitoring. Alternative 2 includes a basic forest characterization survey; however, the survey would be reduced in scope compared to the preferred alternative. An integrated ecosystem management strategy would not be applied to vegetation resources under this alternative, since mapping of sensitive habitats, ground-truthing of vegetative communities, annual surveys for invasive species, development of a forest management plan, and training for environmental staff would not occur. The lack of annual surveys to proactively identify invasive species associated with this alternative could potentially result in less effective or more costly restoration of affected areas. Overall, alternative 2 could potentially result in some minor short-term and long-term negative effects to vegetation, which when combined with some minor positive effects, would result in a net minor negative effect to vegetation.

Implementation of alternative 3 would have the same positive effect as described for the preferred alternative.

Fish and Wildlife: Implementation of the preferred alternative would be expected to have overall beneficial effects on the fish and wildlife resources of the Installation. The preferred alternative would include field surveys and management practices that would create baseline data on wildlife communities and habitat that occur at the Installation, including conducting a deer population survey and an assessment of available deer wintering habitat, and performing a terrestrial invertebrate survey. At the request of the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) in an email dated July 27, 2010, a comprehensive fish survey would also be conducted. Additional fish and wildlife habitat would be created from the construction of small impoundments, and wildlife use of the Installation would be encouraged through Installation of bat and bird boxes in appropriate habitats.

Measures to protect nesting ospreys residing on the Installation would continue as recommended in the Installation Osprey Management Plan. Osprey would be discouraged from nesting on Installation antennas, and removal of inactive nests located on antennas would be conducted in consultation with the Installation Natural Resources Manager. If removal of an active osprey nest is required to meet the objectives of the military mission, or to ensure safety of the birds, a Migratory Bird Treaty Act Depredation Permit would be obtained from the U.S. Fish and Wildlife Service. Shorebird and grassland bird species known to occur at the Installation would also benefit from development and implementation of migratory bird monitoring plans.

The preferred alternative provides recommendations for fish and wildlife management strategies based on input from natural resources personnel and cooperating partner agencies. It would include pursuit of new partnerships and cooperative agreements with interested agencies and private groups for continued or improved protection of fish and wildlife and the habitats on which they depend, including establishment of wildlife monitoring programs and re-engaging partnership talks with agencies interested in protection and conservation of the Sprague Neck Bar Ecological Reserve Area (ERA). Based on this integrated approach to fish and wildlife management and application of ecosystem management principals, the preferred alternative would be expected to provide long-term positive effects to fish and wildlife resources of the Installation.

Implementation of alternative 2 would be expected to have some positive effects on Installation fish and wildlife resources; however, management of these resources would primarily be focused on management of osprey and nuisance wildlife. A feasibility assessment for establishing artificial nesting platforms on Sprague Neck would not occur, and no benefit to migratory birds that utilize the Installation would occur as development and implementation of migratory bird management plans would not be included under alternative 2. Biannual monitoring of nuisance wildlife such as bats and beavers would occur, and minor effects to these species could occur if monitoring determines that wildlife removal is necessary to protect water resources or human health and safety. No field surveys would be implemented, no wildlife habitat improvements would occur, and no mapping of natural communities or sensitive wildlife habitat would occur. Development of a forest management plan, which would indirectly benefit forest wildlife, also would not occur under alternative 2. Although Sprague Neck Bar would continue to be recognized as an ERA, discussions for conservation and protection of this area with interested parties would not occur. The data collection and resources management associated with alternative 2 would be focused on some wildlife groups (osprey and nuisance wildlife), while ignoring other wildlife groups that are known to occur at the Installation. Minor long-term effects from lack of implementation of integrated fish and wildlife resource management would be expected under alternative 2. Although an overall net positive benefit would be expected, the benefits would be expected to be lower in comparison to the broad range of fish and wildlife benefits identified for the preferred alternative.

Effects of implementing alternative 3 would have the same overall benefit to fish and wildlife of the Installation as described for the preferred alternative.

<u>Threatened and Endangered Species, Species of Special Concern, and Rare Communities and Significant Habitats</u>: Implementation of the preferred alternative would be expected to have a positive effect on federal and state threatened and endangered species, and species of special concern known or expected to occur at the Installation. Specific recommendations for developing management plans that would provide protection of threatened and endangered species populations and their habitat, including development and implementation of migratory bird management plans, would occur under this alternative. A rare plant and community survey and annual surveys for crowberry blue butterfly (a Maine species of special concern) would be implemented under the preferred alternative. Most of the land management, general fish and wildlife management, and forestry management recommendations proposed will indirectly benefit threatened, endangered, and species concern species that occur at the Installation.

The Installation is located within designated critical habitat for Atlantic salmon; however, the Installation does not contain any suitable habitat to support migrating or spawning salmon. None the less, INRMP activities that protect and improve water quality would contribute to protection of Atlantic salmon habitat within the watershed. Measures to prevent erosion and sedimentation into waterbodies, and wetland protection efforts, would provide an indirect benefit to Atlantic salmon and designated critical habitat located downstream or immediately offshore of the Installation. The water quality protection measures and BMPs (such as erosion and sediment control), wetland protection, monitoring of nonpoint source pollution, protection of watersheds from hazardous materials, use of environmentally beneficial landscaping, and monitoring for and management of forests as shoreline buffers, would indirectly benefit Atlantic salmon critical habitats. Additionally, the management measures that would provide watershed benefits would also provide indirect benefit to marine mammals protected by the Marine Mammal Protection Act that are known to occur immediately offshore of the Installation.

Implementation of the preferred alternative would be expected to have a positive long-term effect on Maine Natural Areas Program (MNAP) rare natural communities and Maine Department of Inland Fisheries and Wildlife (MDIFW) Significant Wildlife Habitat. Mapping of these communities and habitats would identify their location, thereby providing information for avoidance and protection of these areas when planning Installation projects and activities. Completion of formal vernal pool and deer wintering habitat surveys would identify Significant Wildlife Habitat that occurs at the Installation, and would also include surveys for rare plants and rare ecosystems. Reengaging partnerships and cooperative agreements with interested parties would ensure management of the existing Sprague Neck Bar ERA. Implementation of the preferred alternative would be expected to result in positive effects to rare natural communities and Significant Wildlife Habitat of the Installation.

Implementation of alternative 2 would be expected to have an indirect benefit to federal and state threatened and endangered species, and species of special concern of the Installation. However, this alternative would provide benefit to some of the threatened and endangered species, and species of special concern, whereas other sensitive species, such as invertebrates, and migratory bird species, would not receive any special management attention. Long-term minor effects to federal and state protected species and species of special concern would be expected as surveys for these species would not occur. Although some indirect positive benefit to these species would be expected from implementation of alternative 2, the overall positive effect would be expected to be less compared to the preferred alternative, and other long-term negative effects would potentially be expected to occur to those species that would not receive any special management attention.

Implementation of alternative 2 would be expected to have a minor positive effect on MNAP rare natural communities and MDIFW Significant Wildlife Habitat of the Installation. A comprehensive vernal pool survey to identify significant vernal pools would not occur, nor would rare plant or rare natural community surveys be conducted. However, sensitive vegetation that is affected by disturbances such as mowing would be restored and monitored for post-restoration success. The lack of implementation of an integrated ecosystem-based approach to natural resources management under alternative 2 would potentially result in benefit to select communities and habitats, at the potential detriment of other undocumented rare plants or rare natural communities. The reduced level of post-restoration monitoring of restored sensitive habitats may result in a lower success rate of restoration efforts. Pursuit of partnerships and cooperative agreements with agencies and private groups for the continued or improved protection of rare natural communities, Significant Wildlife Habitat, and the Sprague Neck Bar ERA would not occur. Although some positive effects to sensitive communities and Significant Wildlife Habitat would be expected to result from implementation of alternative 2, the lack of rare community surveys and the reduction of post-restoration monitoring would be expected to result in negative effects.

Effects of implementing alternative 3 would have the same overall benefit to threatened, endangered, and special status species, and rare communities and significant habitat of the Installation as described for the preferred alternative.

Cultural Resources: Under each of the alternatives, ground disturbing activities would avoid known archaeological sites. Any ground disturbing activities in areas of high and moderate archaeological sensitivity would be coordinated with the Cultural Resources Manager (CRM) prior to implementation. The CRM would consult with the Maine State Historic Preservation Officer (SHPO) prior to conducting any ground disturbing activities in moderate or high archeological sensitive areas. Consultation with the Maine SHPO would ensure that the Navy avoids, minimizes, or mitigates any adverse effects to historic properties. In the event of an inadvertent archaeological discovery, all work would stop immediately until further directed by the CRM, and the Navy would follow the required procedures for inadvertent discoveries as outlined in 36 CFR 800. Specific standard operating procedures regarding the management of cultural resources will be outlined in the Integrated Cultural Resources Management Plan currently under preparation by the Navy. Compliance with these procedures would ensure any potential effects to cultural resources from implementation of the any of the alternatives would be avoided and minimized, or if necessary mitigated, to a less than significant level.

Infrastructure: Implementation of any of the alternatives would not affect the infrastructure of the Installation.

Socioeconomic Resources: No negative effects to the socioeconomic resources of the area would be expected to result from implementation of any of the alternatives.

Cumulative Impacts: Projects that would be implemented under the preferred alternative would directly support regional ecosystem management initiatives and would enhance and protect the human and natural environment, including federal and state listed threatened and endangered species and species of special concern. No cumulative impacts are associated with management of the Cross Island National Wildlife Refuge, located due south of the VLF Peninsula. Implementation of the preferred alternative is expected to positively benefit natural resources at both the refuge and the Installation.

Monitoring programs, annual reviews, and formal 5-year reviews of the INRMP would allow continuous reassessment of management goals and objectives and would help to avoid undesirable cumulative impacts.

Finding: Based on the analysis presented in the EA and coordination with NOAA NMFS and MDIFW, the Navy finds that implementation of the proposed action would not significantly impact the quality of the human or natural environment or generate significant controversy.

The EA prepared by the Navy addressing this action is on file, and interested parties may obtain a copy from: Naval Facilities Engineering Command Mid-Atlantic, Building Z-144, 2nd Floor, Norfolk, VA 23511 (Attention: Jessica Barker, Natural Resources Specialist).

MAY 15, 2012
Date

T. G. Alexander

T. G. ALEXANDER
Rear Admiral, U.S. Navy
Commander, Navy Region Mid-Atlantic

FINAL ENVIRONMENTAL ASSESSMENT

FOR IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

for the

NAVAL COMPUTER AND TELECOMMUNICATIONS AREA MASTER STATION ATLANTIC DETACHMENT, CUTLER

CUTLER, MAINE

Prepared for:

Atlantic Division

Naval Facilities Engineering Command

Prepared by:

Tetra Tech, Inc.

March 2012

FINAL
ENVIRONMENTAL ASSESSMENT

FOR IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

NAVAL COMPUTER AND TELECOMMUNICATIONS AREA MASTER STATION ATLANTIC DETACHMENT, CUTLER

CUTLER, MAINE

Prepared for:

Atlantic Division

Naval Facilities Engineering Command

Prepared by:

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451 Presumpscot Street
Portland, ME 04103

March 2012

Lead Agency:
DEPARTMENT OF THE NAVY

ENVIRONMENTAL ASSESSMENT FOR THE IMPLEMENTATION OF THE NAVAL COMPUTER AND TELECOMMUNICATIONS AREA MASTER STATION ATLANTIC DETACHMENT CUTLER (NCTAMSLANT DET CUTLER) INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP)

NAVAL COMPUTER AND TELECOMMUNICATIONS AREA MASTER STATION ATLANTIC DETACHMENT CUTLER (NCTAMSLANT DET CUTLER)
CUTLER, MAINE

MARCH 2012

Abstract

This environmental assessment (EA) has been prepared to analyze potential effects of actions associated with the U.S. Department of the Navy's (Navy's) implementation of the Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler (NCTAMSLANT DET Cutler or Installation) Integrated Natural Resources Management Plan (INRMP) for the plan period of 2012–2017. Purpose of the Proposed Action is to implement the Installation natural resources program to conserve land and natural resources, and ensure compliance with environmental laws and regulations. The INRMP would help to maintain quality lands needed to meet the Installation's mission on a sustained basis, and to ensure natural resources conservation activities are integrated and consistent with federal stewardship requirements. The INRMP provides technical guidance for integration of natural resource issues and concerns into facilities and operational planning, in accordance with the National Environmental Policy Act decision-making processes. The EA analyzes the effects of full implementation of the INRMP (Alternative 1, Proposed Action), the Reduced Management Emphasis alternative (Alternative 2), the Reduced Outdoor Recreation Management Emphasis alternative (Alternative 3), and the No-Action Alternative. Alternative 1 is the Preferred Alternative. A thorough analysis of individual resources determined that implementation of the Proposed Action would not result in significant adverse effects to climate and air quality; geology, topography, and soils; water resources; vegetation; fish and wildlife; cultural resources; and infrastructure. Additionally, implementation would have no adverse effects to low income or minority communities or socioeconomic resources, and pose no health or safety risk to children. A positive cumulative impact on environmental resources would occur from implementing the Proposed Action by initially improving on-site resources, providing off-site benefits including greater ecosystem diversity, and supporting regional ecosystem management initiatives over the long-term.

Please contact the following person with comments and questions:

Ms. Jessica Barker, Natural Resources Specialist
Environmental Planning and Conservation
U.S. Department of the Navy
Naval Facilities Engineering Command Mid-Atlantic
Building Z-144, 2nd Floor
Norfolk, VA 23511

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969; 42 United States Code (USC), chapter 55, as implemented by the Council on Environmental Quality (CEQ) regulations; 40 Code of Federal Regulations (CFR) Parts 1500–1508; and, U.S. Department of the Navy (Navy) guidelines, including Integrated Natural Resources Management Plan Guidance for Navy Installations (Navy 2006), Navy Environmental Readiness Program, Chief of Naval Operations Instructions (OPNAVINST) 5090.1C-Change 1 (Ch-1) (Navy 2011), and Navy Environmental Planning for Department of the Navy Actions, Secretary of the Navy Instruction (SECNAVINST) 5090.6A (Navy 2004).

The EA analyzes the environmental effect of the Proposed Action, which is to implement the Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler (NCTAMSLANT DET Cutler or Installation) Integrated Natural Resources Management Plan (INRMP). Implementation of the INRMP would be consistent with the military mission, and goals and objectives of the Sikes Act Improvement Act of 1997, as amended (SAIA). The goal of the INRMP is to implement an ecosystem based conservation and management program that provides for integrated conservation, restoration and enhancement of natural resources, consistent with the military mission, and provides for sustainable, multipurpose use of natural resources. Management objectives include integrated management of land, fish and wildlife, forestry, and outdoor recreation resources, as practicable and consistent with the military mission, operation, and security requirements.

The INRMP covers all land and waters under the jurisdiction of the Navy at NCTAMSLANT DET Cutler. Specific real estate parcels include the Very Low Frequency (VLF) area and the High Frequency (HF) area.

The INRMP provides specific recommendations for management of land, fish and wildlife, forestry, and outdoor recreation resources. The EA is focused on the broad programmatic management strategies associated with each alternative, rather than on specific INRMP recommendations or projects. Four alternatives are analyzed in this EA. In addition to the No Action/Status Quo alternative and the Proposed Action (Alternative 1), alternatives that have been included in the EA include the Reduced Management Emphasis alternative (Alternative 2) and the Reduced Outdoor Recreation Management Emphasis alternative (Alternative 3).

Alternative 2, or the Reduced Management Emphasis alternative, is similar to the Proposed Action (Alternative 1); however, under this alternative "enhanced" measures would not be implemented, thus reflecting a different level of management intensity from Alternative 1. Minimal stewardship projects would be considered under Alternative 2, with natural resources management focused within developed areas and habitats that support migratory birds. Alternative 3, or the Reduced Outdoor Recreation Management Emphasis alternative, also is similar to the Proposed Action (Alternative 1); however, under this alternative only the additional "enhanced" outdoor recreation opportunities would not be evaluated, whereas other natural resources management would be consistent with that described for the Proposed Action. The No Action/Status Quo alternative involves continued implementation of ongoing natural resources management at NCTAMSLANT DET Cutler. NCTAMSLANT DET Cutler does not currently have an INRMP in place, and under the No Action/Status Quo alternative, management actions would be limited to the objectives and practices of the existing natural resources management programs that are necessary to prevent the military mission from being hindered, to maintain human health and safety, and to comply with federal and/or state laws and regulations. The No Action/Status Quo alternative has been carried forward as a baseline for comparison of potential environmental consequences of implementing the various action alternatives as required by CEQ regulations. It is not a truly viable alternative because it would lack development and implementation of a fully integrated natural resources management approach for NCTAMSLANT DET Cutler's natural resources, and does not comply with the guidance set forth in the SAIA, and other Department of Defense (DoD) and Navy guidance documents.

Overall, the Proposed Action would not have a significant environmental effect. The land, fish and wildlife, forestry, and outdoor recreation management strategies proposed for the INRMP would improve the physical and biological conditions present at the Installation. The Proposed Action involves a more proactive (i.e., forward looking and anticipatory) approach to natural resources management in comparison to the No Action/Status Quo. The Installation currently does not have an INRMP in place, and does not fully comply with the SAIA requirements for an integrated plan. Unlike the No Action/Status Quo alternative, the Proposed Action provides for the maintenance, conservation, and enhancement of natural resources at NCTAMSLANT DET Cutler, and therefore fully complies with SAIA requirements for implementation of an INRMP.

The Proposed Action would not adversely affect federal or state listed rare, threatened, or endangered species, species of special concern, or rare communities and Significant Wildlife Habitat. Specifically, the Proposed Action would provide benefits to all federally listed threatened and endangered species known to occur at the Installation through the development of management plans that would provide protection of threatened and endangered species populations, and their habitat. The Proposed Action also would provide benefits to other sensitive species, such as invertebrates, rare ecosystems, and shoreland and grassland bird species. Implementation of the Proposed Action would be expected to result in positive effects to identify, restore, and preserve rare communities and Significant Wildlife Habitat that occur at the Installation.

A federal consistency determination is not required because the Proposed Action is located on federal land, which is excluded from the Maine Coastal Zone (Maine State Planning Office [MSPO] 2006), and would not have reasonably foreseeable direct or indirect effects on coastal use or resources managed by the State of Maine.

The Proposed Action would not have significant adverse environmental effects on low income or minority communities, review of which is required by Executive Order (EO) 12898, Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, directs federal agencies to identify and address disproportionately high and adverse human or environmental effects of their program, policies, and activities on low income or minority populations in the surrounding community. There is no evidence or suggestion that implementation of the Proposed Action would disproportionally affect any low income or minority population in the area. The location of NCTAMSLANT DET

Cutler in relation to populated areas minimizes the potential for disproportionate effects on low income or minority populations, as significant populations do not exist in the immediate vicinity of NCTAMSLANT DET Cutler.

The Proposed Action would not present a disproportionate environmental health or safety risk to children, which was reviewed in accordance with EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (April 21, 1997). EO 13045 directs each federal agency to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. The President also directed each federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks. No children reside at NCTAMSLANT DET Cutler. Therefore, implementation of the Proposed Action poses no disproportionate environmental health risk or safety risk to children.

The Proposed Action would not have adverse cumulative environmental impacts at the Installation, and may result in positive cumulative impacts both on- and off-site. Implementation of the Proposed Action would result in the development of a comprehensive environmental strategy for the Installation that would include compliance, restoration, prevention, and conservation. Initially, implementation would be expected to improve the existing environmental conditions at the Installation, and over time, adoption of the Proposed Action would enable NCTAMSLANT DET Cutler to achieve its goals of maintaining ecosystem diversity. The Proposed Action would also directly support regional ecosystem management initiatives and would enhance and protect the human and natural environment, including state and federally listed threatened and endangered species and species of special concern. Implementation of the Proposed Action is also expected to provide long-term benefit to the natural resources of Cross Island National Wildlife Refuge (located due south of the VLF Peninsula), which is currently being managed by U.S. Fish and Wildlife Service (USFWS).

Monitoring programs, annual reviews, and formal 5-year reviews of the INRMP would allow continuous reassessment of management goals and objectives and would help to avoid undesirable cumulative impacts. Additionally, appropriate NEPA procedures and coordination with stakeholders such as USFWS and Maine Department of Inland Fisheries and Wildlife (MDIFW) would be undertaken for any action that could result in cumulative impacts.

As prescribed by the SAIA, the Navy afforded opportunities for the USFWS, the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), MDIFW, and Navy representatives to provide their formal approval of the INRMP, as well as address any questions or concerns that were identified during agency review of the INRMP. To date the Navy has received INRMP comments from NMFS, and these were incorporated into the INRMP. **Appendix A** contains copies of the agency letters submitted to USFWS, NMFS, and MDIFW, as well as the response received from NMFS. The Navy would continue to collaborate with these agencies in refining, developing, and implementing the projects and recommendations identified in the INRMP. This collaboration would be conducted in accordance with the Memorandum of Understanding (MOU) between the Department of Defense (DoD), USFWS, and the International Association of Fish and Wildlife Agencies, *Cooperative Integrated Natural Resource Management Program on Military Installations* (DoD, USFWS and International

Association of Fish and Wildlife Agencies 2006), as well as other relevant guidance documents and agreements.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

§	Section
AST	Aboveground Storage Tank
BASH	Bird/wildlife Aircraft Strike Hazard
BCI	Bat Conservation International
BMPs	Best Management Practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
CNO	Chief of Naval Operations
CRM	Cultural Resources Manager
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPR	Environmental Program Requirements
ERA	Ecological Reserve Area
ERL	Environmental Readiness Level
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
ft	feet
GIS	Geographic Information System
HF	High Frequency
IBP	Institute of Bird Population Studies
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resource Management Plan
Installation	Naval Computer and Telecommunications Area Master Station Atlantic Detachment, Cutler, Maine
IRP	Installation Restoration Program
MBTA	Migratory Bird Treaty Act
MDIFW	Maine Department of Inland Fisheries and Wildlife

LIST OF ACRONYMS, ABBREVIATIONS, AND DEFINITIONS (CONTINUED)

MDEP	Maine Department of Environmental Protection
MEPDES	Maine Pollutant Discharge Elimination System
MNAP	Maine Natural Areas Program
MSPO	Maine State Planning Office
MIDLANT	Mid Atlantic Division
MOU	Memorandum of Understanding
NAVFAC	Naval Facilities Engineering Command
Navy	U.S. Department of the Navy
NCTAMSLANT DET Cutler	Naval Computer and Telecommunications Area Master Station Atlantic Detachment, Cutler, Maine
NEPA	National Environmental Policy Act
NGOs	Non-governmental organizations
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRM	Natural Resources Manager
NRPA	Natural Resources Protection Act
O&MN	Operations and Maintenance, Navy
OPNAVINST	Chief of Naval Operations Instruction
PIF	Partners in Flight
PWD-ME	Public Works Department Maine
SAIA	Sikes Act Improvement Act
SECNAVINST	Secretary of the Navy Instruction
SWPPP	Storm Water Pollution Prevention Plan
U.S. Department of the Navy	Navy
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
VLF	Very Low Frequency

1 INTRODUCTION

This Environmental Assessment (EA) was prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, 42 United States Code (USC), section 4321 et seq., as implemented by the Council on Environmental Quality (CEQ) regulations; 40 Code of Federal Regulations (CFR), Parts 1500–1508; and U.S. Department of the Navy (Navy) guidelines, including Integrated Natural Resources Management Plan Guidance for Navy Installations (Navy 2006), Navy Environmental Readiness Program, Chief of Naval Operations Instruction (OPNAVINST) 5090.1C-Ch-1 (Navy 2011), and Navy Environmental Planning for Department of the Navy Actions, Secretary of the Navy Instruction (SECNAVINST) 5090.6A (Navy 2004).

1.1 PURPOSE AND NEED FOR PROPOSED ACTION

The Proposed Action is to implement the Integrated Natural Resources Management Plan (INRMP), for the Naval Computer and Telecommunications Area Master Station Atlantic Detachment located in Cutler, Maine, (NCTAMSLANT DET Cutler or Installation) (Navy 2011). The INRMP (Navy 2012) is consistent with the military use and mission of the Installation, and the goals and objectives established by the Sikes Act Improvement Act of 1997, as amended (SAIA). Specifically, the SAIA requires the Secretary of the Department of Defense (DoD) to prepare and implement INRMPs for each military installation in the United States unless the absence of significant natural resources on a particular installation makes preparation of a plan for that installation inappropriate.

The goal of the INRMP is to implement an ecosystem based conservation and management program that provides for integrated conservation, restoration and enhancement of natural resources, consistent with the military mission, and provides for sustainable, multipurpose use of natural resources subject to safety and military security considerations. Management objectives include integrated management of land, fish and wildlife, forestry, and outdoor recreation resources, as practicable and consistent with the military mission, operation, and security requirements. The intent of the INRMP is to outline projects that would fulfill Navy compliance and stewardship obligations.

In preparing the INRMP as required by the SAIA, the Navy has solicited feedback from U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and Maine Department of Inland Fisheries and Wildlife (MDIFW), so that the INRMP reflects the mutual agreement of these parties concerning conservation, protection, and management of fish and wildlife resources on the Installation. Also, as required by the SAIA, the INRMP has been provided for public comment, and the Installation has taken those comments into account in finalizing the INRMP.

1.2 NEED FOR ENVIRONMENTAL ASSESSMENT

Navy policy provides guidance for the preparation and approval of NEPA documents before a new INRMP can be approved (Navy 2004, Navy 2006, and Navy 2011). The NEPA document must be developed to evaluate the Proposed Action identified in the INRMP if it is uncertain whether the Proposed Action could significantly affect the human environment, or if environmental effects could be considered controversial. If the EA analysis determines that the Proposed Action would not significantly affect the environment, a Finding of No Significant Impact (FONSI) would be obtained prior to INRMP implementation. Otherwise, an Environmental Impact Statement (EIS) would be prepared, and a Record of Decision would be issued prior to INRMP implementation.

The intent of this EA is to analyze the effect of the NCTAMSLANT DET Cutler INRMP's "programmatic approach", as well as the alternative management approaches that were considered. The emphasis of this EA is broad, and focuses on the general management approaches or strategies, rather than on specific INRMP recommendations or projects.

1.3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This EA has been prepared to identify and evaluate the potential environmental consequences of implementing the Proposed Action at NCTAMSLANT DET Cutler. The analysis compares and summarizes the environmental consequences of the Proposed Action and Alternatives, including the No Action/Status Quo alternative, rather than individual projects or practices, and is therefore a programmatic EA. Site-specific environmental analyses that are required for future projects may be tiered to this EA provided the anticipated effects of a specific project, project components, the affected resources, or circumstances do not differ substantially from those evaluated in this EA.

Relevant resources evaluated in this EA include climate and air quality; geology, topography, and soils; water resources; vegetation; wildlife; threatened, endangered, and special concern species; rare communities and significant habitat; cultural resources; infrastructure; and socioeconomics. In compliance with NEPA and OPNAVINST 5090.1C-Ch-1 guidelines, the scope of this EA focuses on those resources potentially subject to impact. A number of issues related to implementation of the INRMP were considered for study but eliminated from detailed evaluation because such evaluation was deemed unwarranted for the reasons noted below. Those issues include noise, environmental justice, and protection of children.

Noise effects to humans was considered but eliminated as an issue due to the limited number of people residing in close proximity to the Installation, and the significant distance between the Installation and any major noise-sensitive receptors. Any noise effects on wildlife, such as from implementation of restoration or habitat creation projects, would be temporary or at a level that they would rapidly become accustomed to. None of the noise effects anticipated from any of the alternatives are expected to cause a form of habitat modification that would significantly impair essential behavior patterns, including breeding, feeding, or sheltering requirements of threatened, endangered, or special status wildlife species. As such, noise effects on wildlife were not evaluated in detail.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, directs federal agencies to identify and address disproportionately high and adverse human or environmental effects of their program, policies, and activities on minority or low income populations in the surrounding community. There is no evidence or suggestion that the implementation of any of the alternatives would disproportionally affect any minority or low income population in the area. The location of NCTAMSLANT DET Cutler in relation to populated areas minimizes the potential for disproportionate effects on minority or low income populations, as significant populations do not exist in the immediate vicinity of NCTAMSLANT DET Cutler.

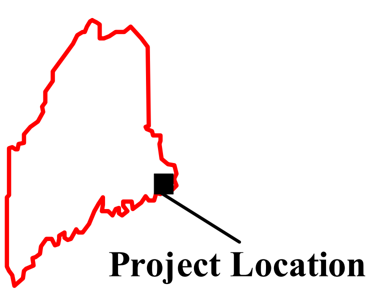
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (April 21, 1997) directs each federal agency to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. The President also directed each federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks. No children reside at NCTAMSLANT DET Cutler. Therefore, implementation of any of the alternatives poses no disproportionate environmental health risk or safety risk to children.

1.4 INRMP STUDY AREA

The INRMP covers all land and waters under the jurisdiction of the Navy at NCTAMSLANT DET Cutler in the Town of Cutler, Maine. The Installation was commissioned in 1961, and occupies approximately 3,003 acres comprising two parcels (**Figure 1.1**), the Very Low Frequency (VLF) area (approximately 2,896 acres), and the High Frequency (HF) area (approximately 107 acres). Natural resources management described in the INRMP is directed towards application of ecosystem management guidance, similar to those recommended by the Navy and DoD guidance documents, including *Integrated Natural Resources Management Plan Guidance for Navy Installations* (Navy 2006) and *Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers* (Benton et al. 2008). The focus of natural resources management in the INRMP is on portions of the study area with natural resources value, including water resources, vegetation, forest habitat, fish and wildlife, threatened and endangered species, species of special concern, areas with invasive species concerns, and areas that could provide natural resources-based recreation opportunities. The INRMP management approach also includes establishment of partnerships, provision of training, and development and management of geographic information system (GIS) data.

1.5 NCTAMSLANT DET CUTLER NATURAL RESOURCES PROGRAM

The natural resource program at NCTAMSLANT DET Cutler is encompassed within a region-wide Navy Natural Resources Program that is overseen by the Navy's Public Works Department Maine (PWD-ME) Natural Resources Manager (NRM). On-site management is handled by environmental staff based at the Installation. Program areas managed by the NRM and environmental staff include traditional resources such as forestry, and fish and wildlife management. In addition, the NRM ensures compliance with applicable local, state, and federal regulations regarding the management and protection of NCTAMSLANT DET Cutler natural resources. The NRM and environmental staff of the Installation also promote environmental awareness to military personnel.



Source: ESRI Data and Maps on CD-ROM, 2007.

0 5,000 10,000 15,000

Feet

LEGEND

- NCTAMSLANT DET Cutler Project Boundary
- NCTAMSLANT DET Cutler Project Boundary, Not Surveyed
- Major Road
- Local Road
- Minor Road
- Town Boundaries
- County Boundaries

Figure 1.1. Regional Location, NCTAMSLANT DET Cutler, Cutler, Maine.

Date:
03/10

z:/projects/cutler/Maps/Figures/figurex.mxd

A natural resources management plan does not currently exist for NCTAMSLANT DET Cutler. However, through the years various tools have been developed to assist in managing the natural resources at NCTAMSLANT DET Cutler. Important management "tools" for NCTAMSLANT DET Cutler include the following plans and permit:

- Stormwater Pollution Prevention Plan (SWPPP) (NCTAMSLANT DET Cutler 2010)
- Hazardous Waste Management Plan (NCTAMSLANT DET Cutler 2007a)
- Integrated Contingency Plan (NCTAMSLANT DET Cutler 2007b)
- Osprey Management Plan (Navy 2007)
- Maine Pollutant Discharge Elimination System Permit (Maine Department of Environmental Protection [MDEP] 2010)
- Integrated Cultural Resources Management Plan (ICRMP) (under development)

In addition, the Navy designated Sprague Neck Bar as an Ecological Reserve Area[1] (ERA) in 1990. The site was selected as an ERA because it provides valuable habitat for a significant number of migratory shorebirds and waterfowl (DoD 1990). The Navy coordinated designation of the ERA with several agencies including USFWS, MDIFW, University of Maine, and The Nature Conservancy. No active management of this site has occurred since the ERA designation.

The documents and agreements listed above provide an indicator that some active management of natural resources at NCTAMSLANT DET Cutler has been ongoing. Current management generally follows multiple-use principles, with an emphasis on good stewardship of the natural resources entrusted to the Installation. However, management practices are generally limited to measures required for compliance with appropriate federal and state laws (i.e., implementation of erosion and sedimentation control best management practices [BMPs]). As such, specific natural resources management goals and objectives have not been established for NCTAMSLANT DET Cutler.

1.6 INRMP IMPLEMENTATION

The INRMP describes and implements an integrated approach to managing natural resources at NCTAMSLANT DET Cutler for the period of 2012–2017. Informal annual updates would provide information that would be incorporated into the formal 5-year review in 2017.

[1] An ERA is "a physical or biological unit in which current natural conditions are maintained insofar as possible. These conditions are ordinarily achieved by allowing natural, physical, and biological processes to prevail without human intervention. However, under unusual circumstances, deliberate manipulation may be utilized to maintain the unique feature which the ecological reserve areas was established to protect" (Navy 1990).

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2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter of the EA describes the activities involved in developing and implementing the NCTAMSLANT DET Cutler INRMP under the Proposed Action, and includes a description of the alternatives to the Proposed Action. The alternatives described in the following sections have been designated to be consistent with the NCTAMSLANT DET Cutler mission and with all laws, guidance, directives, and regulations pertaining to natural resources management.

2.1 INTRODUCTION

The Proposed Action addressed in this EA is to implement the NCTAMSLANT DET Cutler INRMP. The INRMP management objectives are to integrate the land, fish and wildlife, forestry, and outdoor recreation management practices, as practicable and consistent with the military mission and established land uses.

According to Navy's Integrated Natural Resources Management Plan Guidance for Navy Installations (Navy 2006), alternatives considered consist of modifications to the four management objectives described in Section 1.1 (i.e., land management, fish and wildlife management, forestry management, and outdoor recreation management). Analysis in this NEPA document focuses on evaluation and comparison of alternative plans in terms of these management objectives, and is not focused on individual INRMP projects or practices.

2.1.1 Background

The primary mission of NCTAMSLANT DET Cutler is to provide communication services to ships and submarines operating in the North Atlantic, Arctic Ocean, and the Mediterranean Sea. From the time of inception until 1989, NCTAMSLANT DET Cutler was considered pivotal in the Navy's master plan for instantaneous defense against Soviet Union aggression (NCTAMSLANT DET Cutler 2003). As part of the reorganization of NAVFAC MIDLANT, ownership of the NCTAMSLANT DET Cutler facility was recently transferred to PWD-ME, and is currently being managed by the Portsmouth Naval Shipyard Commanding Officer in Kittery, Maine (Joy 2009). The Navy's mission and activities at the Installation are expected to remain stable over the 5-year period of the INRMP.

2.1.2 Operations that Affect Natural Resources

Management of natural resources are an important component of the Navy's mission at NCTAMSLANT DET Cutler. Much of the Installation remains in a natural condition, and undeveloped/open space surrounds the operations areas of the VLF and HF area, providing a natural buffer between the Installation and adjacent rural residential areas.

Several limitations and constraints are imposed on natural resources management by military land use at the Installation. Vegetation maintenance around the communication facilities is required to avoid interference from vegetation. Other effects to natural resources have resulted from operational activities and past waste disposal practices. Habitat loss and degradation of wetlands and water quality may occur as a result of construction and maintenance of roads, parking areas and other infrastructure. Four sites containing debris and contaminated soil have been identified and an additional 11 areas of concern are being investigated. The Navy's Installation Restoration Program (IRP) is conducting restoration and mitigation of contaminated soil and groundwater. The potential for oil and hazardous materials spills also exists. Several aboveground storage tanks (ASTs) are located throughout the Installation.

Security and mission requirements also restrict public access to natural resources at NCTAMSLANT DET Cutler for the purpose of outdoor recreation. The remoteness of the property further limits the accessibility of the property for outdoor recreation; however, public access may be granted on a case-by-case basis with advanced notification, submission and approval of security clearance information, and approval from the Installation commander.

2.1.3 Organization of Chapter

Section 2.2 describes the four natural resource management programmatic objectives. Section 2.3 describes the selection criteria for the alternatives. Section 2.4 describes the alternatives considered but eliminated from consideration. In Sections 2.5–2.8 the programmatic objectives are used to evaluate the INRMP alternatives, including:

- Alternative 1 – Proposed Action
- Alternative 2 – Reduced Management Emphasis
- Alternative 3 – Reduced Outdoor Recreation Management Emphasis
- No Action/Status Quo

Section 2.9 provides a summary of classifications for INRMP project recommendations. Section 2.10 includes a summary table that compares the Proposed Action to the No Action/Status Quo alternative and the other alternatives by environmental area.

2.2 INRMP Management

The NCTAMSLANT DET Cutler INRMP focused on the four natural resources management programmatic objectives identified in the SAIA and described in Section 1.1: land management, fish and wildlife management, forestry management, and outdoor recreation management. Broad programmatic objectives were established for each resource area within each management area that are reflective of the desired effect of the natural resources management program. These programmatic objectives were developed in coordination with the INRMP project team, and reflect the desired outcomes of the proposed Installation natural resource management program. Alternative 1 was selected as the Preferred Alternative based on its ability to meet all of the programmatic objectives identified for each resource area. The four programmatic objective management areas that have been established for NCTAMSLANT DET Cutler are described in the following sections.

2.2.1 Land Management

OPNAVINST 5090.1C-Ch-1 (Navy 2011) defines land management as programs and techniques for management of lands, wetlands, and water quality, including soil conservation, erosion control and nonpoint source pollution, surface and subsurface waters, habitat restoration, control of noxious weed and poisonous plants, agricultural out leasing, range management, identification and protection of wetlands, watersheds, floodplains management, landscaping, and grounds maintenance.

Land management at the Installation would include:

- water resources management, including floodplains, wetlands, surface waters, and riparian areas;
- water quality management (Clean Water Act [CWA] compliance, point and non-point source water pollution, sedimentation and erosion control);
- coastal zone management;
- vegetation management;
- invasive plant species management;
- wildland fire management;
- rare communities and significant habitat;
- IRP and hazardous waste management;
- regional conservation lands;
- leases;
- environmental and natural resources training; and
- GIS management.

Land Management Programmatic Objectives

The following programmatic objectives have been established for land management at NCTAMSLANT DET Cutler.

1. Continue to manage, maintain, and enhance land areas with natural resource value.
2. Improve and enhance water quality by reducing non-point sources of pollution.
3. Continue ongoing Navy efforts to identify and clean up existing contaminated areas.
4. Preserve, protect, and enhance water resources (e.g., wetlands, vernal pools, surface water, and groundwater).
5. Maintain and enhance native vegetation, and control and monitoring of invasive species.
6. Provide adequate special management or protection of threatened and endangered species, significant rare communities, and species at risk.

2.2.2 Fish and Wildlife Management

OPNAVINST 5090.1C-Ch-1 (Navy 2011) defines fish and wildlife management as those actions designed to preserve, enhance and regulate indigenous wildlife and its habitats, including conservation of protected species and non-game species, management and harvest of game species, bird/wildlife aircraft strike hazard (BASH) reduction, and animal damage control.

Fish and wildlife management at NCTAMSLANT DET Cutler would include:

- aquatic species management (marine mammals, birds, herpetofauna, fish, and invertebrates) and habitats (marine and freshwater surface waters, wetlands and vernal pools);
- terrestrial species management (mammals, birds, herpetofauna, and invertebrates);
- threatened, endangered, and special concern species known to occur, including Canada lynx (*Lynx canadensis*), piping plover (*Charadrius melodus*), roseate tern (*Sterna dougallii*), and crowberry blue butterfly (*Plebejus idas* ssp. *empetri*); and other protected or special concern species (i.e., birds protected by the Migratory Bird Treaty Act [MBTA] or the Bald and Golden Eagle Protection Act, such as bald eagles [*Haliaeetus leucocephalus*]), and their habitat (grasslands, peatlands, and forests) management;
- invasive species and nuisance wildlife management;
- partnership development with federal, state and local agencies, and non-governmental organizations (NGOs) to establish Installation wildlife monitoring and protection programs;
- conservation law enforcement;
- environmental and natural resources training; and
- GIS management.

Fish and Wildlife Management Programmatic Objectives

The following programmatic objectives have been established for fish and wildlife management at NCTAMSLANT DET Cutler.

1. Protect, conserve, and promote native terrestrial and aquatic fauna.
2. Provide adequate special management or protection of threatened, endangered, and rare species, species at risk, and their habitats.
3. Prevent and control invasive species and nuisance wildlife.
4. Develop or re-establish partnerships with federal, state, and local agencies and NGOs to implement Installation wildlife monitoring and protection programs.

2.2.3 Forestry Management

OPNAVINST 5090.1C-Ch-1 (Navy 2011) defines forest management as those actions designed for the production and sale of forest products and for maintaining the health and vigor of forest ecosystems. Actions include timber management, forest administration, timber sales, reforestation, afforestation, timber stand improvement, timber access road construction and maintenance, forest protection, and other directly related functions; and for maintaining the health and vigor of forest ecosystems.

Forest management at the Installation would include:

- general forestry management, including mature tree stands protection, impact avoidance to tree species that provide important forage for birds and other wildlife, and forest characterization and management;
- environmental and natural resources training; and
- GIS management.

Forestry Management Programmatic Objectives

The following programmatic objectives have been established for forestry management at NCTAMSLANT DET Cutler.

1. Protect and promote sustainable management of forest resources.
2. Manage forest habitats to promote use by a diverse range of wildlife species, including protection of mature tree stands and snags, and protection of tree species that provide suitable nesting and foraging habitat for wildlife.
3. Manage forest habitats to maintain wildlife travel corridors, streamside protection, and aesthetic buffer zones.
4. Maintain forest habitats to enhance plant community diversity.
5. Maintain forest habitats to ensure consistency with an ecosystem approach to forest management.

2.2.4 Outdoor Recreation Management

OPNAVINST 5090.1C-Ch-1 (Navy 2011) defines outdoor recreation management as those natural resources actions designed to provide recreation opportunities that are sustainable, within the military mission, within established carrying capacities, and consistent with the natural resources upon which they are based.

Outdoor recreation management at the Installation would include:

- outdoor recreation opportunities;
- partnerships and outreach;

- special natural areas management, including Sprague Neck ERA and Watchable Wildlife Areas;
- environmental and natural resources training; and
- GIS management.

Outdoor Recreation Management Programmatic Objectives

The following programmatic objectives have been established for outdoor recreation management at NCTAMSLANT DET Cutler.

1. Evaluate opportunities for natural resource-related outdoor recreation.
2. Provide and promote passive outdoor recreation opportunities (e.g., wildlife observation and photography) to Cutler personnel.
3. Provide and promote passive outdoor recreation opportunities to the public.
4. Promote education awareness of the Installation natural resources and the importance of natural resources stewardship.

2.3 SELECTION CRITERIA FOR ALTERNATIVES

Each alternative presented for analysis must be a reasonable alternative that meets the purpose and need of the Proposed Action to implement the INRMP for the Installation. Each alternative must integrate natural resources management at NCTAMSLANT DET Cutler with the military mission in a manner that ensures military preparedness, meets the requirements of SAIA and other conservation laws that regulate natural resources on federal lands, and meets the programmatic objectives established for NCTAMSLANT DET Cutler described in Sections 2.2.1–2.2.4. In order for an alternative to be viable, it must maintain compliance with and follow guidance set forth by 32 CFR Part 190, Department of Defense Instruction (DoDI) 4715.3, OPNAVINST 5090.1C-Ch-1, and the SAIA. Specifically each alternative must:

- be based on the principles of ecosystem management;
- provide for sustainable multipurpose uses of natural resources;
- maintain compliance with relevant environmental regulations;
- provide for public access for use of natural resources subject to safety and military security considerations;
- establish specific natural resources management objectives and timeframes for proposed action; and
- prevent loss in the capability of military lands to support the military mission of the installation.

2.4 ALTERNATIVES ELIMINATED FROM CONSIDERATION

Alternatives to the Proposed Action that would disproportionately administer one portion of the natural resources program, such as forest or wildlife management, over others, or not take multiple uses and ecosystem management into account, were considered and eliminated from further discussion. Included was an alternative that proposed the preservation of land resources that would preclude multiple uses of forests, fish and wildlife, land resources, and outdoor recreation. These alternatives were considered but rejected because they would not constitute an integrated conservation program and therefore would not be compliant with the SAIA, DoDI 4715.3, or OPNAVINST 5090.1C-Ch-1, and would not adequately address other conservation compliance issues.

An alternative that included a higher degree of intensity of natural resources stewardship was also considered but rejected. This alternative would involve high-investment actions extending well beyond the funding levels that historically have been approved for implementation of natural resources management plans at installations. The Preferred Alternative is expected to yield the intended beneficial effects to natural resources in accordance with the requirements of the SAIA; a proportional return on the higher level of investment proposed under this high intensity alternative may not be realized. Therefore, it would not be reasonable to assume or commit to an approach that would require significantly higher funding levels over the 5-year periods that must be addressed by the INRMP.

2.5 PROPOSED ACTION (ALTERNATIVE 1 – PREFERRED ALTERNATIVE)

Alternative 1 is the Proposed Action and is the Preferred Alternative. The Proposed Action would develop and implement an INRMP consistent with the military use of NCTAMSLANT DET Cutler, and the goals and objectives established by the SAIA, Title 16 USC §670a et seq. The goal of the INRMP is to implement an ecosystem based natural resources program that provides for conservation of natural resources in a manner that is consistent with the military mission, integrates and coordinates natural resources management activities, provides for sustainable multipurpose uses of natural resources, and provides for public access for use of natural resources subject to safety and military security requirements. In addition to meeting the statutory requirements of the SAIA, the purpose of the Proposed Action is to support the Installation's operational mission stewardship and legal requirements, enhance the quality of life on the Installation, and ensure Installation resources are managed through an ecosystem approach.

The Proposed Action was selected as the Preferred Alternative because it meets all of the selection criteria established by 32 CFR Part 190, DoDI 4715.3, OPNAVINST 5090.1C-Ch-1, and the SAIA (described in Section 2.3). Specifically, the Proposed Action would fully execute the four management objectives of the INRMP, and would provide for integrated management of land, fish and wildlife, forestry, and outdoor recreation resources, as practicable and consistent with the military mission and land uses. The stewardship projects that have been included would be considered reasonable and achievable for the Installation. The Proposed Action also would include training, outreach, and partnerships. Training in all management areas would be provided to environmental and grounds maintenance staff. Management areas included in the Proposed Action are provided in **Figure 2.1** and **Figure 2.2**.

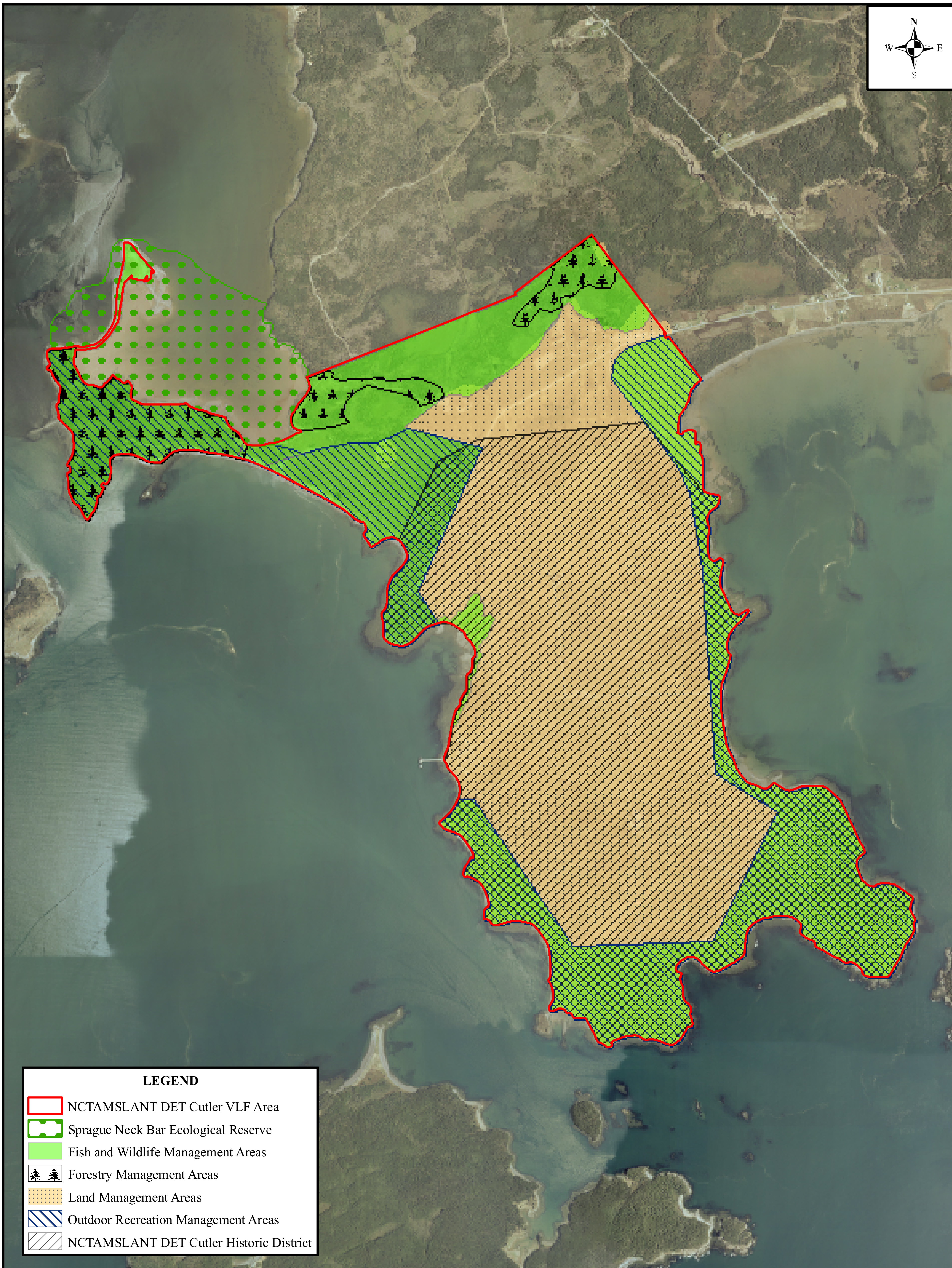
2.5.1 Land Management

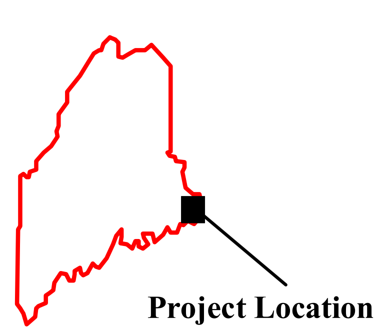
Land management under the Proposed Action would include protection of land and water resources, as described in Section 2.2.1. The Proposed Action would include continuation of ongoing land management practices and programs that have been occurring at the Installation associated with meeting the military mission and federal and state regulatory and permitting requirements, as described for the No Action/Status Quo alternative in Section 2.8.1.

Under the Proposed Action, the Navy would work to proactively identify areas with erosion, sedimentation, and other land management issues that may affect water resources, through implementation of annual erosion control surveys. This work would focus on areas along roadways, and others areas of ground disturbance adjacent to, and along edges of wetlands, surface waters, and the coastline. Additionally, water quality management projects would be implemented under this alternative including creation of surface water and wetland habitat to create wildlife habitat and attenuate storm water runoff and erosion, and implementing recommended erosion control actions identified during annual erosion/sedimentation control surveys to protect water quality. Updated wetlands and water resources information, including new wetland and Federal Emergency Management Agency (FEMA) flood zone maps that were created during preparation of the INRMP would also be made available to Installation personnel to aid in land use planning under the Proposed Action.

The Navy would create and implement programs and plans under the Proposed Action, which would provide environmental conditions for the protection of threatened and endangered species, species at risk, rare communities, or significant habitat. This would include coordinating with agency representatives from MDIFW, Maine Natural Areas Program (MNAP), and USFWS to conduct a general rare plant survey that focuses on rare ecosystem types, and maps the general distribution of sensitive plant communities to facilitate improvement, enhancement, and restoration of natural vegetative communities and sensitive habitats.

The primary goal of vegetation management under the Proposed Action is to maintain and enhance the health and integrity of natural vegetative communities, ensure the safety of personnel, and protect Navy real estate. Under the Proposed Action, natural resources staff would promote the use of beneficial landscaping practices as described in the proposed INRMP. Passive vegetation management techniques would be implemented specifically for three distinct habitats: breeding and migrating landbird habitat, shorebird habitat, and crowberry blue butterfly habitat. Under the Proposed Action, large populations of special status species, such as black crowberry (*Empetrum nigrum*) plants, and other sensitive habitats and natural communities would be mapped and restoration and monitoring of disturbed habitats would occur.





Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; N. Famous, 2009.

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Figure 2.1. Alternative 1 (Preferred Alternative), Very Low Frequency Management Areas, NCTAMSLANT DET Cutler, Cutler, Maine.

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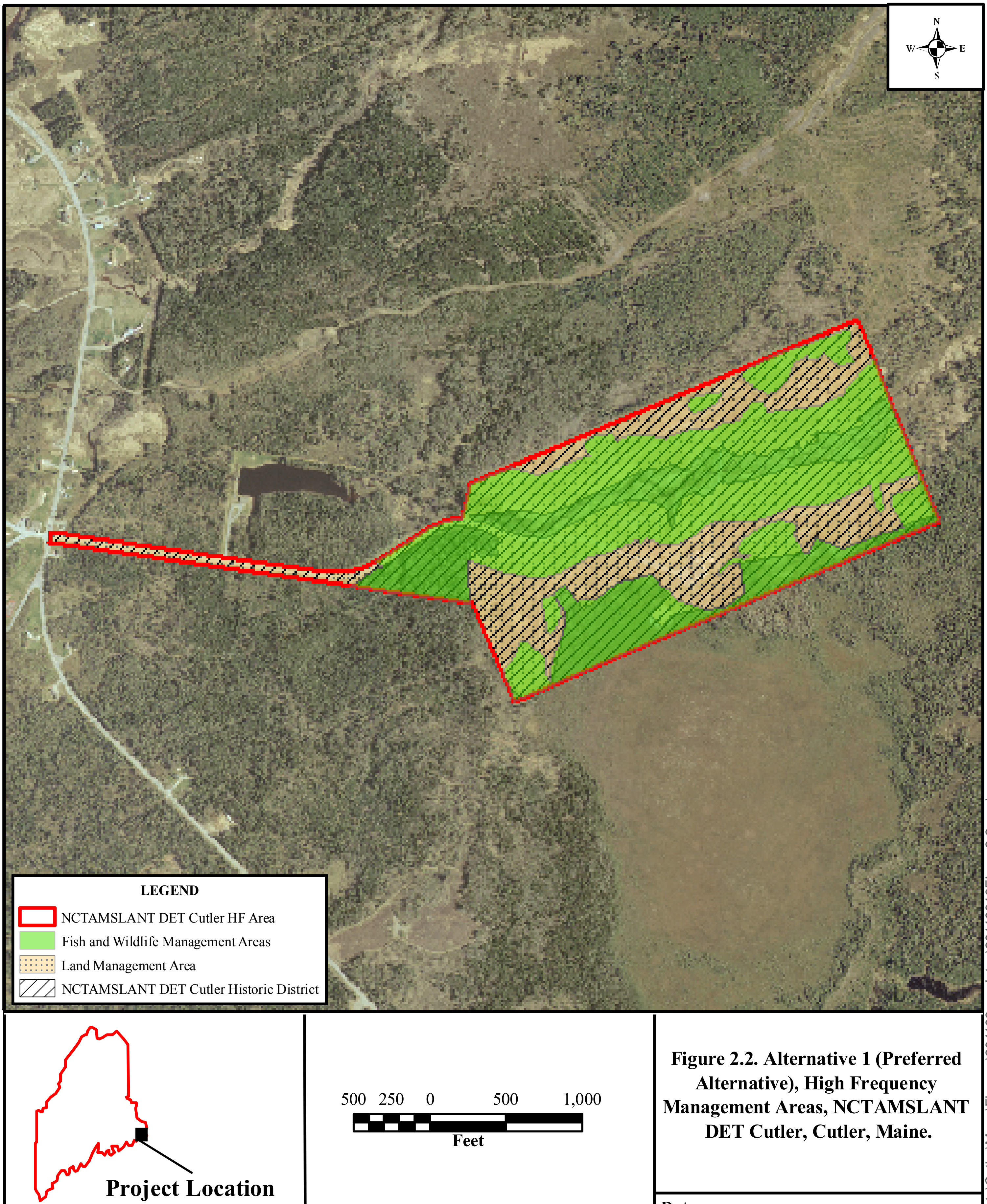

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

Figure 2.2. Alternative 1 (Preferred Alternative), High Frequency Management Areas, NCTAMSLANT DET Cutler, Cutler, Maine.

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Invasive species control and monitoring measures would be implemented under the Proposed Action, to include conducting annual site surveys to proactively identify and treat new occurrences of invasive species, and monitor restored sites for regrowth. Additionally, specific invasive species would be targeted for removal and restoration of infested areas, and manual removal or chemical treatment methods would be used, as appropriate for site conditions.

The IRP and hazardous waste management would be similar to what is described for the No Action/Status Quo alternative, as it would continue to implement procedures for the protection and restoration of natural resources. The Proposed Action would not include provisions for wildland fire management, regional conservation lands, or leases, because these are not currently an issue at the Installation.

Under the Proposed Action, management of cultural resources would be similar to what is described for the No Action/Status Quo alternative, with cultural resources actively managed by the Installation Cultural Resources Manager (CRM) in accordance with the Installation ICRMP that is currently being prepared.

Training opportunities also would be provided to environmental and grounds maintenance staff under the Proposed Action to aid Installation personnel in identifying erosion and sediment issues and implementing remedial action for protection of land and water resources, identifying wetlands and flora, and developing and maintaining a natural resources geographic information system (GIS) database for the Installation.

Overall, land management under the Proposed Action includes creating and implementing programs and plans that fully meet the spirit and intent of all of the Land Management Programmatic Objectives outlined in Section 2.2.1. This includes proactively managing land areas with natural resources to enhance or improve land, water quality, water resources, native vegetation (including control and monitoring of invasive species), and environmental conditions for the protection of threatened and endangered species or significant rare communities and species at risk.

2.5.2 Fish and Wildlife Management

The Proposed Action would include continuation of ongoing fish and wildlife management practices and programs that have been occurring at the Installation associated with meeting the military mission and federal and state regulatory and permitting requirements, as described for the No Action/Status Quo alternative in Section 2.8.2 (e.g., osprey management, reporting of marine mammal strandings). Fish and wildlife management objectives under the Proposed Action would include managing fish and wildlife species and their habitat within the constraints of the military mission, conserving and promoting conservation of wildlife and their habitats, and balancing wildlife population levels.

Fish and wildlife management under the Proposed Action would include proactive management to promote native fauna, such as protecting, enhancing, and creating terrestrial and aquatic wildlife habitats. The Navy would conduct baseline surveys for terrestrial and aquatic fauna and their associated habitat in order to better understand the fish and wildlife resources that occur at the Installation. Nest boxes/platforms would be installed to create habitat for bats and birds and to promote use of the Installation by desirable species. In addition, grounds maintenance practices would be modified in a manner that would not affect the military mission, to improve protection of nesting grassland birds.

Fish and wildlife management under the Proposed Action would also include conservation, protection, and management of federal and state listed species known to occur at the Installation to provide adequate special management or protection to sensitive species and their habitats. Currently three federally listed threatened and endangered species have been documented on NCTAMSLANT DET Cutler: Canada lynx, piping plover, and roseate tern. No critical habitat has been designated on the Installation for any of these species. NCTAMSLANT DET Cutler is located within designated critical habitat for the Gulf of Maine Distinct Population Segment of the Atlantic salmon (*Salmo salar*). Although no suitable spawning habitat occurs on the Installation, the HUC 10 watershed in which the Installation is located is known to support the Gulf of Maine Distinct Population Segment of Atlantic salmon. The management actions described for land management in Section 2.5.1 would indirectly benefit water quality within the watershed, and designated Atlantic salmon critical habitat.

Several state listed rare, threatened, and endangered species occur at NCTAMSLANT DET Cutler. Because it is in the interest of the Navy to protect and preserve these rare species to prevent their decline and eventual listing under the ESA, the Proposed Action also would protect areas of significant habitat known to support rare species, as detailed in the Land Management section above. Management of species protected by federal and state ESAs under the Proposed Action would also include conducting annual surveys for terrestrial and aquatic federal and state threatened, endangered, and rare species, and other special status species and their habitats. Although direct management of offshore areas of the Installation and marine mammals are not required, the Navy is required to report sightings of stranded marine mammals to the NMFS regional stranding coordinator and Chief of Naval Operations (CNO) N45 concurrently. To meet this requirement the Proposed Action would post and distribute educational materials at the Installation that identify procedures to follow in the event of a live or dead marine mammal stranding. This would be expected to be the primary natural resources law enforcement issue for the Installation.

The proposed INRMP presents location maps for the state-rare species and communities known to occur at the Installation. These maps would be revised based on the results of annual surveys and monitoring, and used by all natural resources and land use planning personnel to avoid disturbance to these important natural resource areas.

In addition to the invasive and nuisance wildlife management described for the No Action/Status Quo alternative (see osprey management described in Section 2.8.2), the Proposed Action also would include management of other nuisance wildlife, such as beavers that dam waterways and flood roads, and bats that roost in Installation buildings. Invasive species and nuisance wildlife management would focus on controlling or removing those species or individuals that are effecting operations, facilities, and infrastructure, such as antennae towers, buildings, or roadways.

Under the Proposed Action the Navy would also pursue partnerships with conservation groups, such as the Institute of Bird Population Studies (IBP), to establish monitoring projects at NCTAMSLANT DET Cutler. Additionally, the Navy would re-engage partnership and cooperative agreement discussions with relevant agencies that were initiated during the establishment process of the Sprague Neck Bar ERA. The Navy also would develop and implement bird monitoring plans in coordination with agency partners that focus on maintaining the high diversity of bird species that utilize the Installation for foraging, nesting, and as a migration stop-over site. This would include developing grassland bird and shorebird monitoring plans.

Training opportunities also would be provided, as needed, to environmental and natural resources staff under the Proposed Action to aid Installation personnel in preparing for fish and wildlife management issues that may arise. Management of GIS data would be accomplished through development and maintenance of a natural resources GIS database for the Installation, including mapping of federal and state listed fish and wildlife species and their habitat.

Fish and wildlife management under the Proposed Action includes creating and implementing programs and plans that fully meet the spirit and intent of all the Fish and Wildlife Management Programmatic Objectives outlined in Section 2.2.2.

2.5.3 Forestry Management

Forestry management at NCTAMSLANT DET Cutler would be located primarily outside of mission critical areas. The primary goal of forestry management under the Proposed Action would be to maintain and enhance the health, integrity, and sustainability of the forest, and also would include protecting and promoting sustainable management of forest resources to ensure consistency with an ecosystem-based approach to forest management. Some timber management (i.e., selective tree cutting) may be required to maintain forest health, and would be conducted in a manner that is consistent with the forestry management programmatic objectives that have been established for the Installation.

Forestry management measures included under the Proposed Action would be limited to the VLF area, including Sprague Neck (with the exception of Sprague Neck Bar) and two areas of coniferous and mixed forest habitat located along the northern boundary. Forestry management under the Proposed Action would include characterization and mapping of forest stands and development of a forest management plan. These actions would result in an improved understanding of the forest habitats, wildlife species use and habits, and plant community diversity, and would enable the Navy to properly manage and maintain forest habitats.

Training opportunities also would be provided to environmental and natural resources staff, as needed, to aid Installation personnel in preparing for forestry management issues that may arise. Management of GIS data would include mapping of forestry resources.

During development of the forest management plan the Navy would consider and incorporate the Forestry Management Programmatic Objectives outlined in Section 2.2.3. Therefore, the

Proposed Action would fully meet the spirit and intent of all Forestry Management Programmatic Objectives.

2.5.4 Outdoor Recreation Management

The primary objectives of outdoor recreation management under the Proposed Action would be to improve the quality of life for Installation personnel by providing for outdoor recreational opportunities to the maximum extent possible within the constraints of the military mission and capability of the natural resources. Outdoor recreation activities under the Proposed Action would be limited to the VLF area.

The Proposed Action identifies opportunities for natural resource-related outdoor recreation, and would establish watchable wildlife viewing areas at the VLF. Additionally, recreational facilities at Sprague Neck would be restored under the Proposed Action.

In addition, under the Proposed Action, the Navy would establish or re-engage partnerships with conservation groups, and federal and state agencies, such as The Nature Conservancy, USFWS, and MDIFW for the management of natural resources of the Installation, including the Sprague Neck Bar ERA. Due to the security requirements at NCTAMSLANT DET Cutler, there would be restrictions or severe limitations on access to natural resources by the public. However, establishing and engaging in partnerships would provide feasible and practicable opportunities for external involvement in outdoor recreation activities at the Installation, with the appropriate consideration of the military mission and security requirements.

Environmental awareness initiatives also would be included under the Proposed Action, and would include, but not be limited to, training of NCTAMSLANT DET Cutler staff on natural resource issues such as erosion control, wetland identification, and plant and tree identification. Management of GIS data would include mapping of outdoor recreation opportunities. The outdoor recreation management activities that are part of the Proposed Action would serve to educate and promote outdoor recreational use of the Installation, and would fully meet the spirit and intent of all of the Outdoor Recreation Management Programmatic Objectives.

2.6 Reduced Management Emphasis Alternative (Alternative 2)

Alternative 2 is the Reduced Management Emphasis alternative. This alternative is similar to the Proposed Action (Alternative 1); however, under this alternative "enhanced" measures would not be implemented, thus reflecting a decreased level of management intensity from Alternative 1. Minimal stewardship projects would be considered under Alternative 2, with natural resources management focused within developed areas and habitats that support migratory birds. The focus on developed areas was included because these areas would be the most susceptible to effects from implementation of the military mission, and migratory bird habitat was included because the Installation provides habitat to, and is an important migratory stopover location for, a diverse assemblage of migratory bird species. Alternative 2 would meet the selection criteria for alternatives as described in Section 2.3, but would do so to a lesser degree in comparison with the Proposed Action. Management areas included in Alternative 2 are shown in **Figure 2.3** and **Figure 2.4**.

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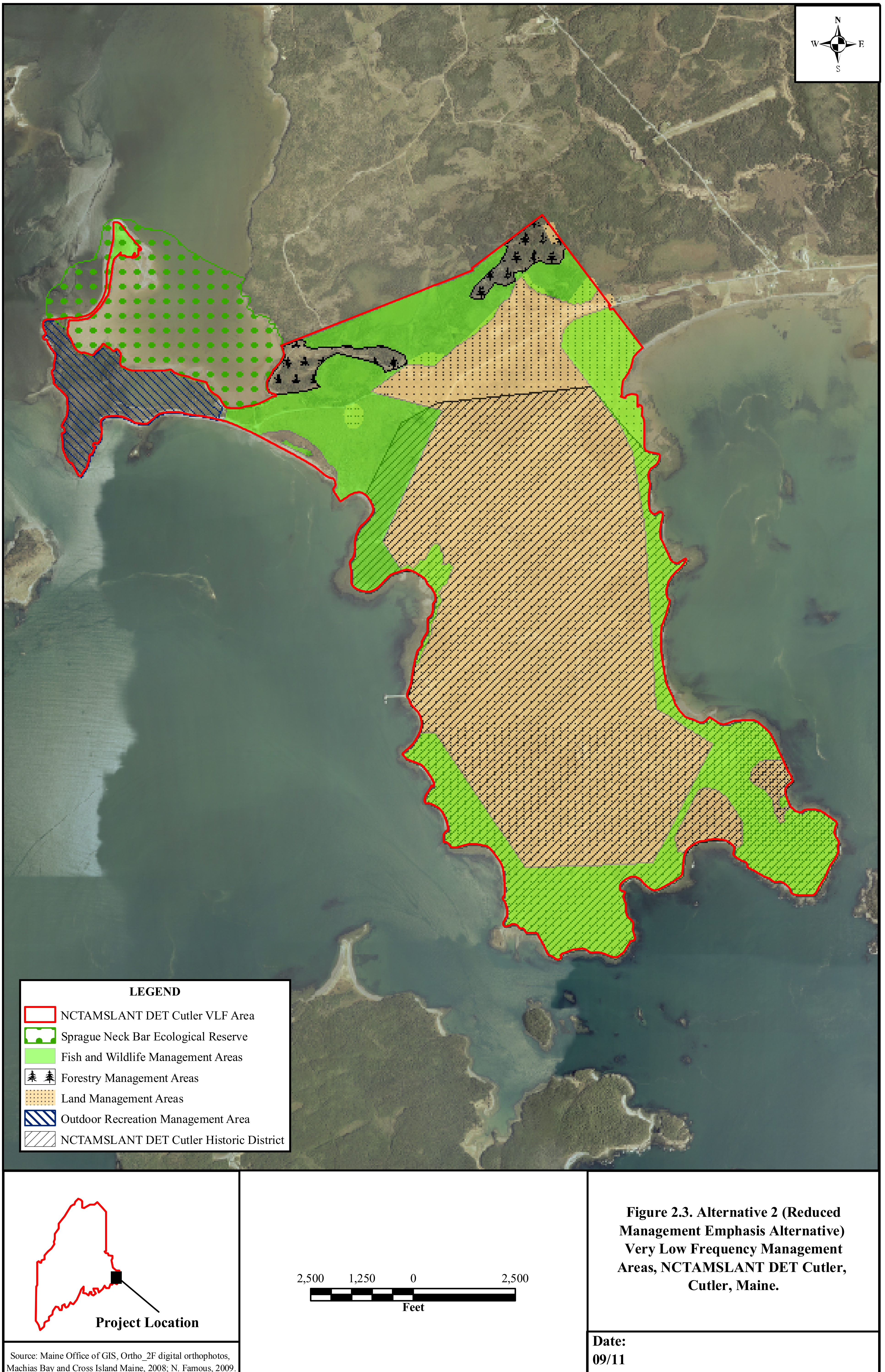

Figure 2.3. Alternative 2 (Reduced Management Emphasis Alternative) Very Low Frequency Management Areas, NCTAMSLANT DET Cutler, Cutler, Maine.

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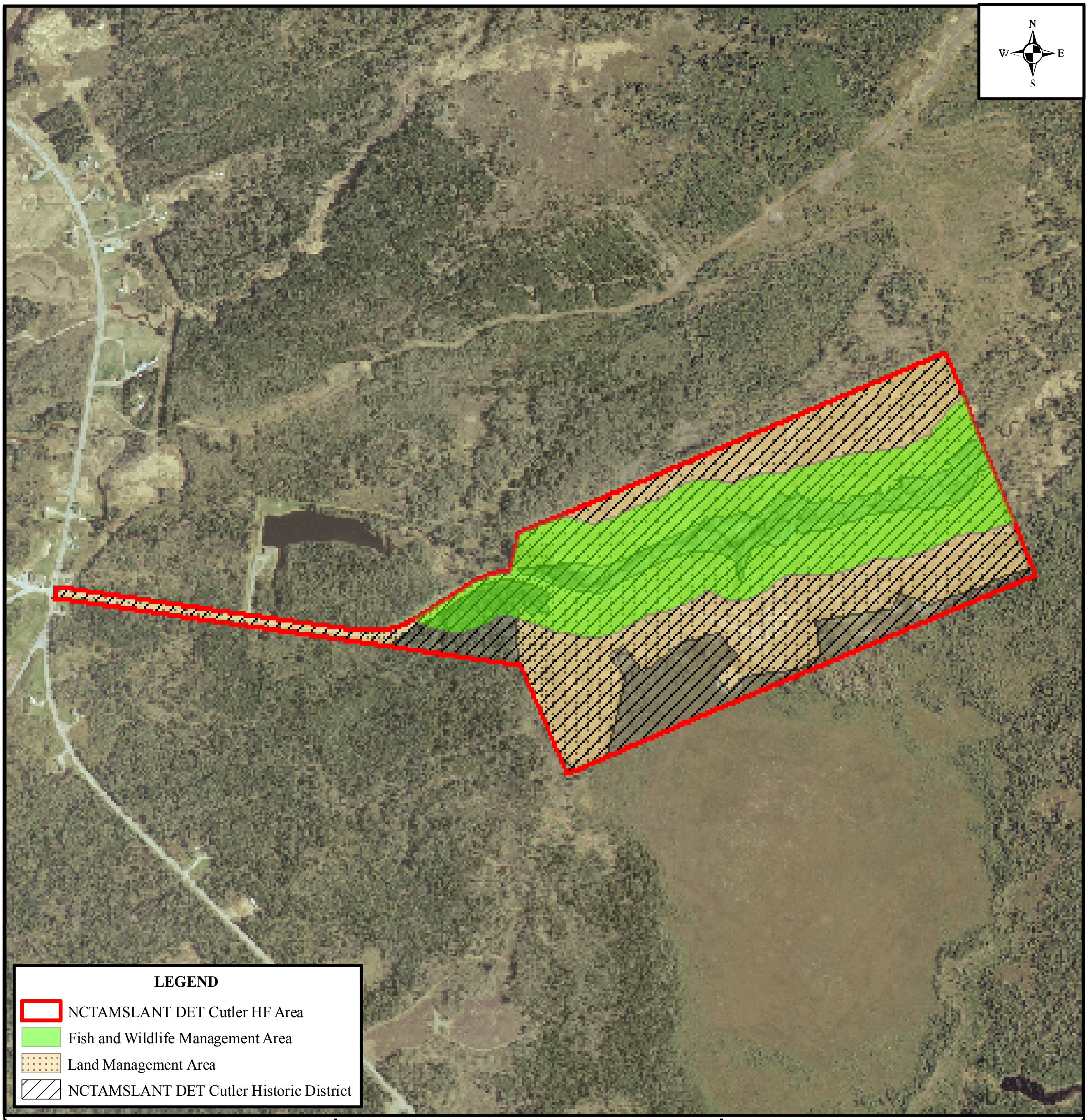

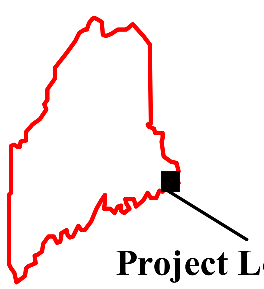

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

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Figure 2.4. Alternative 2 (Reduced Management Emphasis Alternative) High Frequency Management Areas, NCTAMSLANT DET Cutler, Cutler, Maine.

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2.6.1 Land Management

The Reduced Management Emphasis alternative would include continuation of ongoing land management practices and programs that have been occurring at the Installation associated with meeting the military mission and federal and state regulatory and permitting requirements, as described for the No Action/Status Quo alternative in Section 2.8.1. In addition, under Alternative 2, annual erosion/sedimentation control surveys would be conducted; however, implementation of actions to protect water quality would occur in response to identified problems, and would not include pro-active preventative measures that would prevent erosion and sedimentation from occurring. Updated wetlands and water resources geographic information (i.e., GIS), including new wetland and FEMA flood zone maps that were created during preparation of the INRMP also would be made available to Installation personnel to aid in land use planning under Alternative 2. However, enhancement or creation of surface water and wetland habitat to attenuate storm water runoff, reduce erosion, and create wildlife habitat would not occur.

Similar to Alternative 1, Alternative 2 would include Navy coordination with NMFS and USFWS to obtain relevant permits prior to implementing actions that have the potential to effect marine resources.

Under Alternative 2, a reduced level of vegetation management would occur, as compared to the Proposed Action. Natural resources staff would not implement the beneficial landscaping practices described in the INRMP and implemented under the Proposed Action. Passive vegetation management techniques would be implemented; however, these would be broad in nature, and would focus on breeding and migrating landbird habitat, shorebird habitat, or crowberry blue butterfly habitat. Populations of sensitive plants and rare natural communities would not be mapped. Although restoration of disturbed habitats would occur, pre-construction monitoring to establish baseline conditions would not take place. Invasive species control and monitoring measures would be limited to removal and restoration of areas infested with invasive species that are affecting the military mission or human health. Monitoring of restored sites for regrowth would not occur.

Alternative 2 would address elements of the Land Management Programmatic Objectives #1, 2, 4, 5, and 6, including providing additional proactive management of land areas to protect and enhance land, water quality, water resources, native vegetation (including control of invasive species), and threatened and endangered species or significant rare communities and species at risk. However, Alternative 2 would specifically focus on areas that are in the vicinity of developed areas, and therefore are the most susceptible to effects from development, and on areas that would provide benefits to migratory birds. Land management activities would be limited outside of those areas. Therefore, although Alternative 2 would provide some natural resources benefits, it would not fully meet the spirit and intent of the Land Management Programmatic Objectives.

2.6.2 Fish and Wildlife Management

The Reduced Management Emphasis alternative would include continuation of ongoing fish and wildlife management practices and programs that have been occurring at the Installation associated with meeting the military mission and federal and state regulatory and permitting requirements, as described for the No Action/Status Quo alternative in Section 2.8.2. Under Alternative 2, management of fish and wildlife species and their habitat would occur within the constraints of the military mission, and would include reduced conservation and enhancement of wildlife and their habitats in comparison to Alternative 1. The scope of areas targeted for action under Alternative 2 would specifically focus on areas and resources that are in the vicinity of developed areas, and therefore are the most susceptible to effects from development, and on areas that would provide benefits to migratory birds.

Many of the management actions that would occur under the Proposed Action would not occur under Alternative 2, including baseline fish and wildlife population surveys and habitat assessments, monitoring, installing nest boxes/platforms for bats and birds, and modifying grounds maintenance practices to protect nesting grassland birds. In addition, no additional conservation, protection, and management of federal and state listed species known to occur at the Installation would occur beyond what is required by federal and state agencies and ESAs. Additional rare plant and wildlife surveys, developing grassland bird and shorebird monitoring plans, and conducting annual surveys of threatened and endangered species to monitor populations also would not occur.

Under Alternative 2, maps and geographic data (i.e., GIS) for federal and state listed and rare species and communities known to occur at the Installation would be prepared for natural resources and land use planning personnel based on available information on locations, to avoid disturbance to these natural resource areas.

In addition to osprey management, Alternative 2 would provide for management of other invasive species and nuisance wildlife, focusing on controlling or removing those species or individuals that are effecting operations, facilities and infrastructure, such as antennae towers, buildings or roadways.

The Navy would not pursue partnerships with conservation groups, or federal or state agencies to establish monitoring projects. However, the Navy would re-engage partnership and cooperative agreement discussions that were initiated during the establishment process of the Sprague Neck Bar ERA.

Alternative 2 would address elements of Fish and Wildlife Management Programmatic Objectives #1, 2, 3, and 4. However, Alternative 2 would specifically focus on areas or resources that are in the vicinity of developed areas, and therefore are the most susceptible to effects from development, and on areas that would provide benefits to migratory birds, and would not include proactive management activities to protect special status species and their habitats or development of partnerships. Therefore, although Alternative 2 would provide natural resources benefits, it would not fully meet the spirit and intent of the Land Management Programmatic Objectives.

2.6.3 Forestry Management

Under Alternative 2, forestry management would be similar to what is described for the Proposed Action, except that the extent of the forest areas targeted for management would be less than for the Proposed Action. Alternative 2 would focus on forest areas or resources that are in the vicinity of developed areas, and therefore are the most susceptible to effects from development, and would not include management of the forest resources on Sprague Neck Peninsula, which are relatively untouched by human impact in the current condition.

Under Alternative 2, the Navy would work to maintain the health, integrity, and sustainability of forest resources, and would characterize and map forest resources; however, this work would be focused on a smaller footprint area than for the Proposed Action. No forest management plan would be development under this alternative. Therefore, although Alternative 2 would provide natural resources benefits, it would not fully meet the spirit and intent of the Forestry Management Programmatic Objectives.

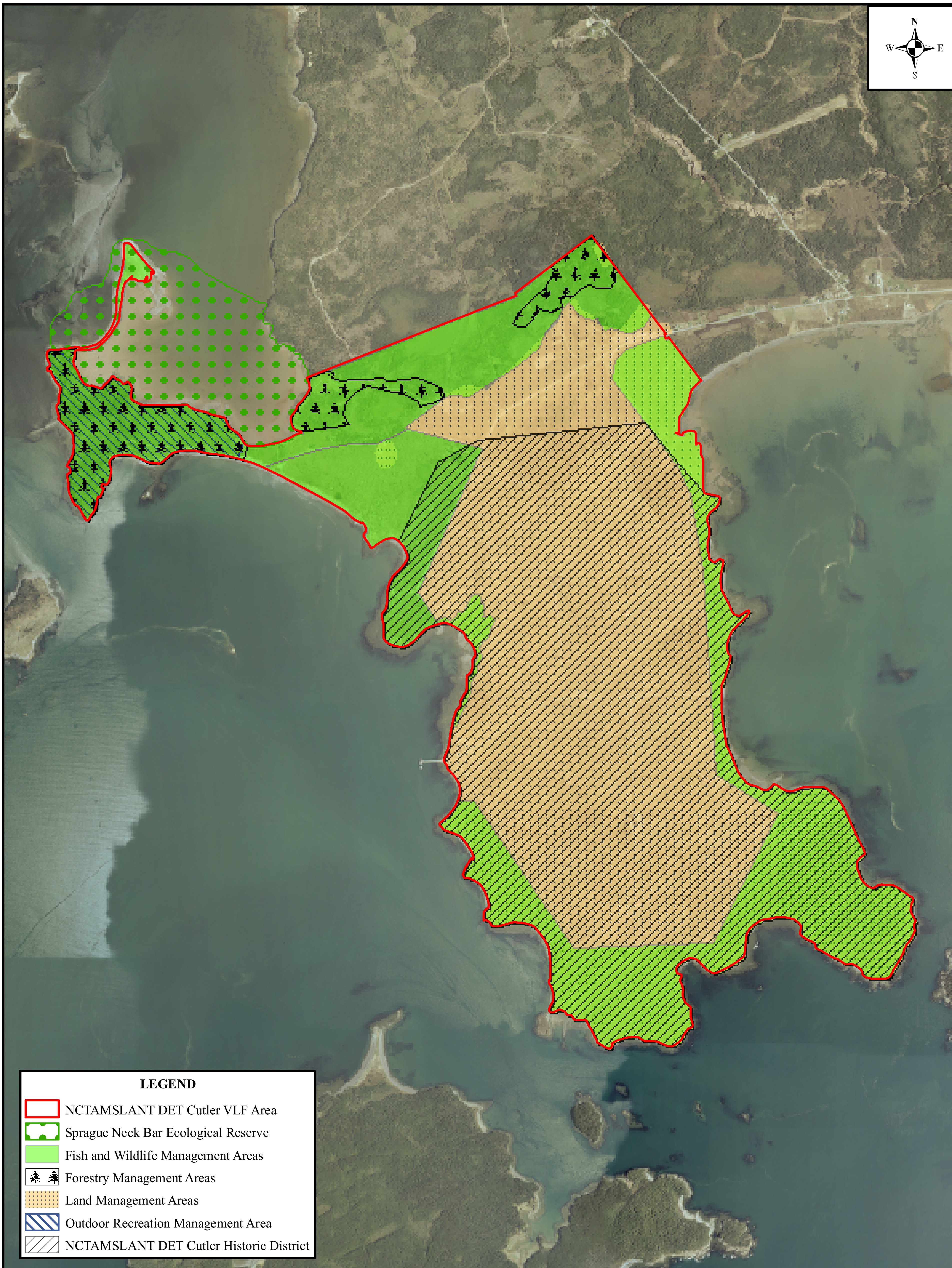
2.6.4 Outdoor Recreation Management

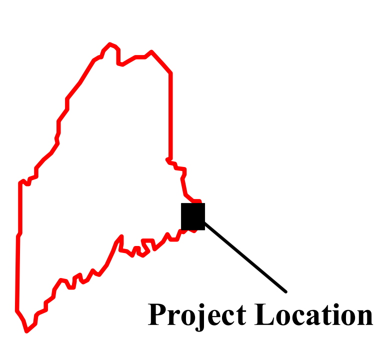
Under Alternative 2, the level of outdoor recreation management and the extent of the area covered would be reduced in comparison to the outdoor recreation management described for the Proposed Action. The extent of the outdoor recreation management areas for Alternative 2 would focus on outdoor recreation management areas that contain existing recreational facilities. Similar to the Proposed Action, outdoor recreation opportunities would occur only within the VLF area, but would be limited to Sprague Neck, and would not include the areas on the remainder of the peninsula identified for outdoor recreation management for the Proposed Action.

Outdoor recreation management under Alternative 2 would include establishing or re-engaging partnerships with conservation groups, and federal and state agencies, for management of natural resources of the Installation, including the Sprague Neck Bar ERA. Watchable wildlife viewing areas would not be established, and environmental awareness and stewardship training would not occur. Therefore, although Alternative 2 would provide natural resources benefit, it would not fully meet the spirit and intent of the Outdoor Recreation Management Programmatic Objectives.

2.7 REDUCED OUTDOOR RECREATION MANAGEMENT EMPHASIS ALTERNATIVE (ALTERNATIVE 3)

Alternative 3 is the Reduced Outdoor Recreation Management Emphasis alternative. This alternative is similar to the Proposed Action (Alternative 1); however, under this alternative additional outdoor recreation opportunities would not be evaluated. Alternative 3 meets the selection criteria for alternatives as described in Section 2.3, but does so to a lesser degree in comparison with the Proposed Action. Management areas included in Alternative 3 for the VLF area are shown in **Figure 2.5**. Management areas for the HF area would be identical to those proposed for the Proposed Action (**Figure 2.2**), and would not include any outdoor recreation opportunities.





Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; N. Famous, 2009.

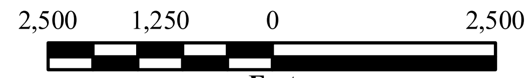


Figure 2.5. Alternative 3 (Reduced Outdoor Recreation Management Emphasis Alternative) Very Low Frequency Management Areas, NCTAMSLANT DET Cutler, Cutler, Maine.

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2.7.1 Land Management

Under Alternative 3, land management would be similar to land management practices described for the Proposed Action (Alternative 1). Therefore, land management under Alternative 3 would include creating and implementing programs and plans that fully meet the spirit and intent of the Land Management Programmatic Objectives.

2.7.2 Fish and Wildlife Management

Under Alternative 3, fish and wildlife management would be similar to the fish and wildlife management practices described for the Proposed Action (Alternative 1). Similar to the Proposed Action, implementation of Alternative 3 would include creating and implementing programs and plans that fully address the spirit and intent of the Fish and Wildlife Management Programmatic Objectives.

2.7.3 Forestry Management

Under Alternative 3, forestry management would be similar to what is described for the Proposed Action (Alternative 1). Similar to the Proposed Action, forestry management under Alternative 3 would include creating and implementing programs and plans that fully address the spirit and intent of the Forestry Management Programmatic Objectives.

2.7.4 Outdoor Recreation Management

Under Alternative 3, the level of outdoor recreation management and the extent of the area covered would be reduced in comparison with the outdoor recreation management described for the Proposed Action, and would be similar to the level of management described for Alternative 2. The extent of the outdoor recreation management areas for Alternative 3 would focus on outdoor recreation management areas that contain existing recreational facilities at the VLF area.

At NCTAMSLANT DET Cutler, this would be limited to Sprague Neck, and would not include the areas on the remainder of the peninsula that were identified for outdoor recreation management under the Proposed Action.

Outdoor recreation management under Alternative 3 would include establishing or re-engaging partnerships with conservation groups, and federal and state agencies, for management of natural resources of the Installation, including the Sprague Neck Bar ERA. Watchable wildlife viewing areas would not be established, and environmental awareness and stewardship training would not occur. Therefore, although Alternative 3 would provide natural resources benefit, it would not fully meet the spirit and intent of the Outdoor Recreation Management Programmatic Objectives.

2.8 NO ACTION/STATUS QUO ALTERNATIVE

The No Action/Status Quo alternative would involve continued implementation of ongoing natural resources management at NCTAMSLANT DET Cutler. NCTAMSLANT DET Cutler does not currently have an INRMP in place, and under the No Action/Status Quo alternative, management actions would be limited to the objectives and practices of the existing natural resources management programs that are necessary to prevent the military mission from being hindered, to maintain human health and safety, and to comply with federal and/or state laws and regulations. For example, the Navy would continue to comply with the regulatory requirements of the CWA, Clean Air Act (CAA), and federal and state ESAs. Management areas included in the No Action/Status Quo alternative are provided in **Figure 2.6** and **Figure 2.7**.

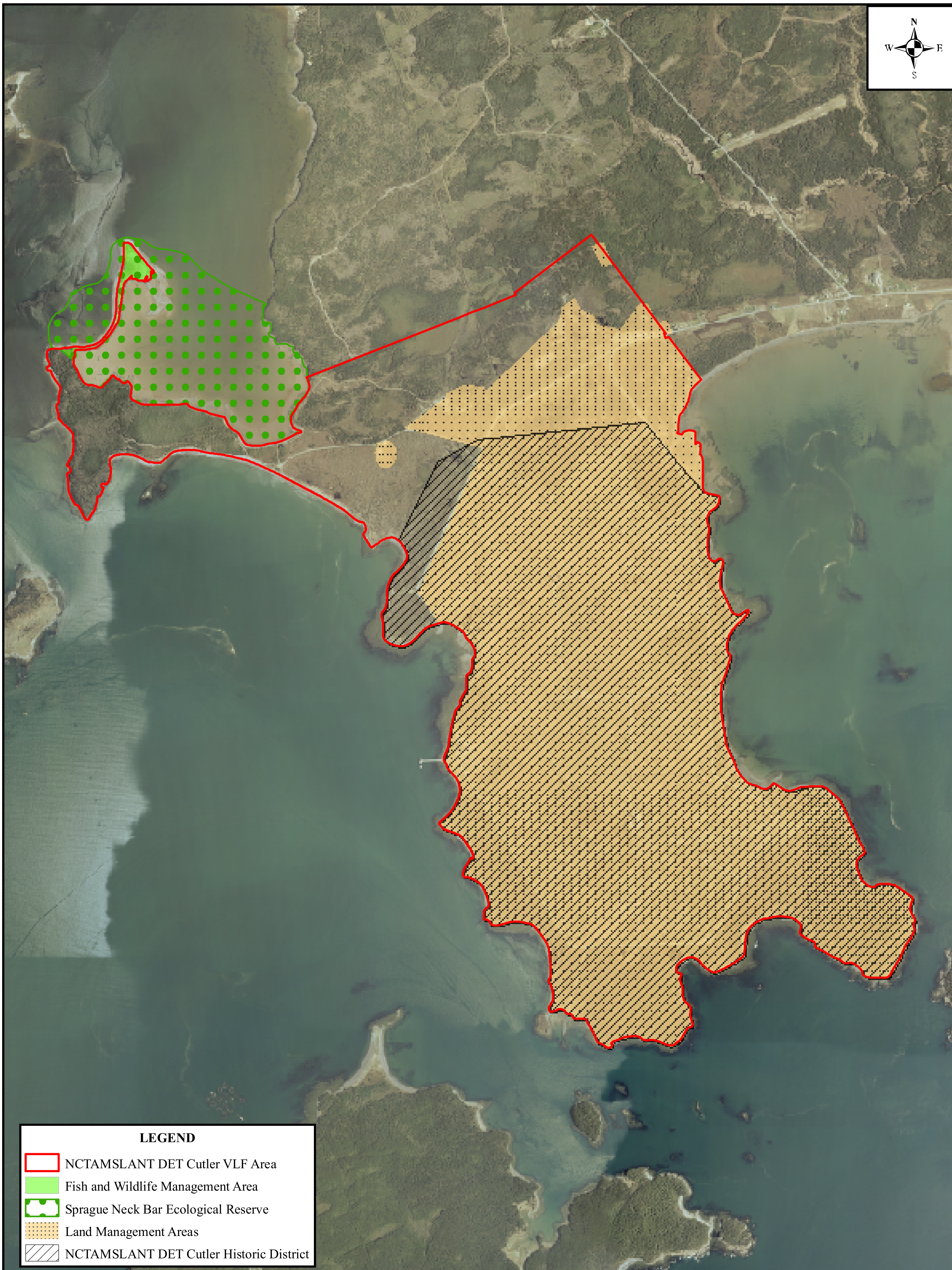
The No Action/Status Quo alternative has been carried forward as a baseline for comparison of potential environmental consequences of implementing the various action alternatives as required by CEQ regulations. It is not a truly viable alternative because it would lack development and implementation of a fully integrated natural resources management approach for NCTAMSLANT DET Cutler's natural resources, and does not comply with the guidance set forth in the SAIA, and other Department of Defense (DoD) and Navy guidance documents. Furthermore, the No Action/Status Quo alternative does not meet the selection criteria described in Section 2.3.

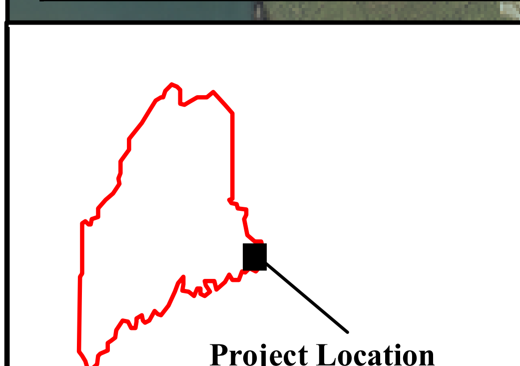
2.8.1 Land Management

Land management practices included under the No Action/Status Quo alternative would be limited to those required to meet the NCTAMSLANT DET Cutler military mission, and would include the periodic mowing of the tower fields and rights-of-way, application of herbicides when necessary to control vegetation, control of pests that are a threat to human health and safety, implementation of the Installation IRP, and other general grounds maintenance activities. The No Action/Status Quo alternative would continue to implement the existing natural resources management plans and programs that have been prepared for, or are occurring at the Installation, and land management practices would generally be limited to measures required for compliance with appropriate federal and state laws. Management of natural resources would be restricted only to instances where it is needed to prevent the military mission from being hindered, or to maintain human health and safety.

Under the No Action/Status Quo alternative, water resources and floodplains would continue to be managed in accordance with relevant federal, state, and local water protection laws and Presidential EOs. The Navy would continue to obtain all appropriate federal, state, and local permits required by point and nonpoint pollution control, groundwater protection, dredge and fill operations, and storm water management programs for any action that may affect water quality. Under the No Action/Status Quo alternative, the Navy would continue to coordinate with the NMFS and USFWS to obtain relevant permits prior to implementing actions that have the potential to effect marine resources.

Specifically, ongoing compliance activities would continue to include CWA and ESA compliance, and compliance with NPDES and MEPDES permit requirements. Other federal and state regulations that may apply to individual actions or projects would include the CAA, Coastal Zone Management Act (CZMA), and National Historic Preservation Act (NHPA). Potential permits, coordination, and environmental protection plans that may apply would include, but would not be limited to:





Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; N. Famous, 2009.

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Figure 2.6. No Action/Status Quo Alternative Very Low Frequency Management Areas, NCTAMSLANT DET Cutler, Cutler, Maine.

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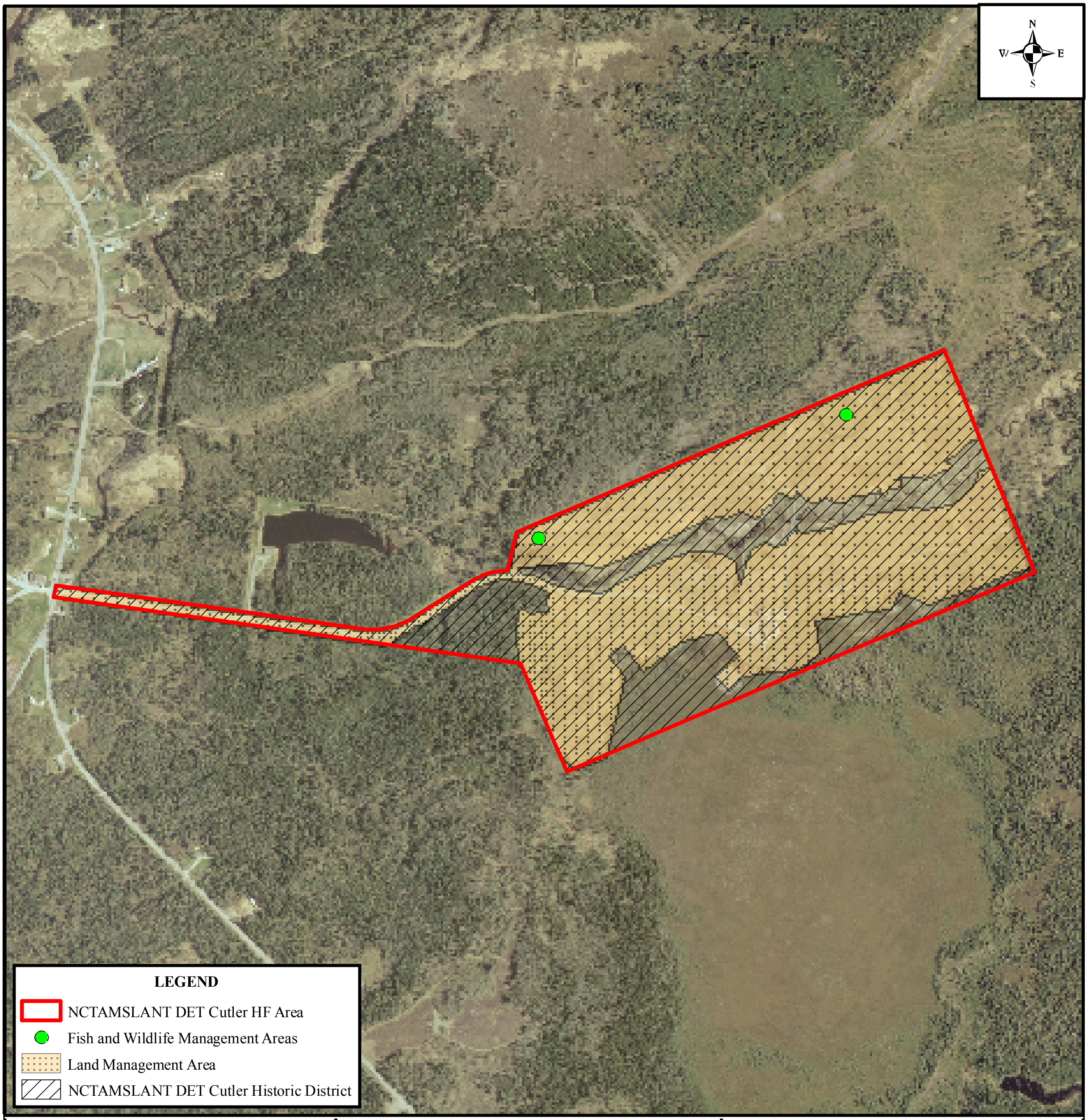

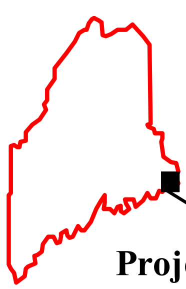

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

Figure 2.7. No Action/Status Quo Alternative High Frequency Management Areas, NCTAMSLANT DET Cutler, Cutler, Maine.

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- CZMA consistency determinations,
- Maine Natural Resources Protection Act (NRPA) permit,
- Maine Storm Water Discharge permit for construction activities, and
- U.S. Army Corps of Engineers (USACE) applicable permits.

Although the Installation currently is meeting the minimum standard to protect natural resources in accordance with permit requirements, efforts under the No Action/Status Quo alternative would continue to be predominantly passive and reactive, and would not include any proactive management to enhance or improve land areas, water quality, water resources, native vegetation, or environmental conditions for the protection of threatened and endangered species or significant rare communities and species at risk. Furthermore, control and monitoring of invasive species would not be conducted.

Under the No Action/Status Quo alternative the Navy also would continue to use BMPs to minimize erosion and sedimentation. Additionally, the Installation has prepared a Storm Water Pollution Prevention Plan (SWPPP) (NCTAMSLANT DET Cutler 2010). Efforts to minimize erosion and sedimentation would continue to be reactive or would be the result of implementation of project specific BMPs, and would not include proactively monitoring soils or identifying erosion problems that would affect water quality. In addition, Installation environmental staff would not receive erosion control training.

The Installation Hazardous Waste Management Plan (NCTAMSLANT DET Cutler 2007a) and the Integrated Contingency Plan (NCTAMSLANT DET Cutler 2007b) also would continue to be applicable to land management, because they provide measures and recommendations for protection of natural resources. Additionally, implementation of the IRP would continue to identify, investigate, and clean up former waste disposal sites in accordance with the Resource Conservation and Recovery Act (RCRA), and/or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The INRMP addresses cultural resources; however, cultural resources will be actively managed by the CRM in accordance with the Installation ICRMP that is currently being prepared. The ICRMP will provide specific directives for management of the Cutler Historic District to ensure compliance with 36 CFR 800 of the NHPA. Consideration is given to the protection of known cultural resources and the potential to uncover new cultural resources for any major land disturbing activity that is undertaken at NCTAMSLANT DET Cutler.

Adherence to the aforementioned regulatory and permit requirements under the No Action/Status Quo alternative would not fully address the spirit and intent of Land Management Programmatic Objectives #1, 2, 4, 5, and 6. Although the No Action/Status Quo alternative would address the goal of protecting water quality, it would not fully address Land Management Programmatic Objective #2, to improve and enhance water quality by reducing non-point sources of pollution. The Hazardous Waste Management Plan, Integrated Contingency Plan, and the IRP would be in line with the spirit and intent of the Land Management Programmatic Objective #3, to continue ongoing efforts to identify and clean up contamination on the Installation. Efforts to protect natural resources would be passive and reactive, as opposed to proactively managing these resources to avoid or minimize potential effects to natural resources from ground disturbing activities. As such the No Action/Status Quo alternative would not fully meet the spirit and intent of the Land Management Programmatic Objectives described in Section 2.2.1.

2.8.2 Fish and Wildlife Management

Under the No Action/Status Quo alternative there would be minimal direct human influence (e.g., management or manipulation of the native flora and fauna) on fish and wildlife resources, and would be restricted only to instances where it is needed to prevent the military mission from being hindered, or to maintain human health and safety. The No Action/Status Quo alternative would continue to implement the limited number of existing natural resources management plans that have been prepared for the Installation, including the Installation Osprey Management Plan. The Navy is also required to report sightings of stranded marine mammals to the NMFS regional stranding coordinator and Chief of Naval Operations (CNO) N45 concurrently.

Generally fish and wildlife management practices would be limited to measures required for compliance with appropriate federal and state laws, such as federal and state ESAs. Therefore, although the Installation currently is meeting the minimum standard to protect natural resources in accordance with federal and state regulatory requirements, continued implementation of these efforts would be predominantly passive and reactive, and would not include proactive management to promote native fauna. Additionally, prevention and control of invasive species and nuisance wildlife management would be limited to osprey management and would not include management of other invasive and nuisance wildlife, such as bats that roost in Installation buildings.

Under the No Action/Status Quo alternative, protection of threatened, endangered, and rare species, species at risk, and their habitats would be limited to osprey management and reporting of any marine mammal strandings, and would not include protection for other special status species and their habitats known to occur at the Installation. Finally, the Installation would not establish any formal partnerships with federal, state, or local agencies, or NGOs for development of wildlife monitoring or protection programs.

Overall, the management actions under the No Action/Status Quo alternative would not fully address the spirit and intent of the Fish and Wildlife Programmatic Objectives, as described in Section 2.2.2.

2.8.3 Forestry Management

Under the No Action/Status Quo alternative there would be minimal direct human influence on the forestry resources. Currently there are no specific forestry management practices in place at the Installation. Forest management practices included under the No Action/Status Quo alternative would be limited to those required to meet the NCTAMSLANT DET Cutler military mission, and would include the periodic removal or trimming of trees and vegetation along rights-of-way to control vegetation and to maintain human health and safety. The Installation does not currently have a timber harvesting plan and there are no plans to harvest timber in the foreseeable future.

The Installation would not implement forestry management measures for the protection and promotion of sustainable management of forest resources. Furthermore, the No Action/Status Quo alternative would not include any forest management measures that would manage forest habitats to promote wildlife diversity; maintain wildlife corridors, streamside protection, and aesthetic buffer zones; enhance plant community diversity; or ensure consistency with an ecosystem approach to forest management. Therefore, implementation of the No Action/Status Quo alternative would not fully address the spirit and intent of the Forestry Management Programmatic Objectives, as described in Section 2.2.3.

2.8.4 Outdoor Recreation Management

Under the No Action/Status Quo alternative there would be no direct human influence on the management of outdoor recreation resources, and there would be no change to implement specific outdoor recreation opportunities at the Installation. Security requirements necessitate restrictions or severe limitations of access to natural resources at the Installation by the public, and the remoteness of the property further limits accessibility of the property for natural resources management activities such as outdoor recreation. Informally, base personnel would be able to utilize designated areas of the Installation for wildlife observation and hiking. Public access to the Installation for the purpose of outdoor recreation would continue to be limited, occurring on a case-by-case basis and with Installation Commander approval. Outdoor recreation for military personnel for recreational use would remain unchanged under the No Action/Status Quo alternative.

Implementation of the No Action/Status Quo alternative would not fully address the spirit and intent of the Outdoor Recreation Management Programmatic Objectives, as described in Section 2.2.4. The Installation would not evaluate opportunities for natural resource-related outdoor recreation, or provide and promote passive outdoor recreation opportunities to Installation personnel or the public. Additionally, the Installation would not develop or implement a program to promote educational awareness of Installation natural resources and the importance of natural resources stewardship. Therefore, implementation of the No Action/Status Quo alternative would not fully address the spirit and intent of the Outdoor Recreation Programmatic Objectives, as described in Section 2.2.4.

2.9 CLASSIFICATION OF INRMP PROJECT RECOMMENDATIONS

Although the focus of this EA is the INRMP's programmatic approach (not the specific recommendations), **Appendix B** includes the INRMP project recommendations for informational purposes. The project recommendations represent the means by which the INRMP would implement the proposed programmatic management approach, which is the subject of this EA. The project recommendations would be implemented by the Installation Commander over the 5-year plan period for the INRMP, provided they do not conflict with the Navy's mission, and operational and security requirements of the Installation.

Information provided in the Compliance Class column of the **Appendix B** table indicates the implementation priority for each project. DoDI 4715.3, Enclosure 4, provides detailed guidance on programming and budgeting natural resources projects. Compliance projects are associated with a legal requirement for protection and management of natural resources. Failure to implement these projects would result in disruption of military mission activities. The priority classifications (Class 0 through Class III) are summarized below.

- **Class 0: Recurring natural and cultural resources conservation management requirements.** Includes activities needed to cover the recurring administrative, personnel, and other costs associated with managing DoD's conservation program that are necessary to meet applicable compliance requirements or that are in direct support of the military mission.
- **Class I: Current compliance.** Includes projects and activities needed because an installation is currently out of compliance; has a signed compliance agreement; has received a consent order; has not met requirements based on applicable federal or state laws, regulations, standards, presidential EOs, or DoD policies; and/or are immediate and essential to maintain operational integrity or sustain readiness of the military mission.
- **Class II: Maintenance requirements.** Includes projects and activities not currently out of compliance, but which will be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year.

Stewardship projects are not driven by environmental requirements. Generally stewardship projects are related to activities that promote community outreach and education, public awareness, and partnerships, or consist of biological surveys or wildlife/habitat management activities for non-listed species.

- **Class III: Enhancement or actions beyond compliance.** Includes those projects and activities that enhance conservation resources or the integrity of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or EO, and are not of an immediate nature.

An additional assessment level is assigned to projects to assist in recognizing appropriate funding sources in the Navy's Environmental Program Requirements (EPR) exhibits. Navy Environmental Readiness Level (ERL) requirements are provided for each INRMP recommendation in the **Appendix B** table. Navy ERL 4 requirements are those prescribed by state or federal laws, regulations, and EOs. Level 4 requirements include DoD Class I and II requirements. Navy ERL 3 requirements are derived from DoD or Navy policy and support critical readiness activities by decreasing encumbrances of statutory compliance (i.e., candidate conservation agreements). Navy ERL 2 requirements are derived from DoD or Navy policy or proactive initiatives that result in speculative return on investments and uncertain benefits to the Navy mission. Navy ERL 1 requirements meet future and stewardship requirements.

Other actions, recommendations, or projects not listed in **Appendix B** may be added or substituted as part of the Installation natural resources program. As long as these actions are consistent with the overall programmatic management approach described in the INRMP and evaluated in this EA, no additional environmental document would be required.

2.10 Comparison of Alternatives by Resource Area and Summary of Alternatives

Table 2.1 provides a comparison of the Proposed Action by environmental area to the No Action/Status Quo alternative and the other alternatives considered. Existing environmental conditions are described in Section 3, and discussion and analysis of environmental effects associated with all alternatives is provided in Section 4.

Table 2.1. Comparison of Alternatives by Environmental Area for the NCTAMSLANT DET Cutler INRMP EA.

Environmental Area	Proposed Action (Alternative 1)	No Action/Status Quo Alternative	Other Alternatives, Including the Reduced Management Emphasis Alternative (Alternative 2) and the Reduced Outdoor Recreation Management Emphasis Alternative (Alternative 3)
Sikes Act Compliance	Complies.	Does not comply with requirement for integrated plan.	Complies.
Physical Conditions	No significant adverse effects. Short-term minor and temporary effects to localized air quality and soil resources minimized through the use of BMPs.	No significant adverse effect, but no active management strategy.	Negative effects to air quality and soil resources less than Proposed Action.
Wetlands and Vernal Pools	No significant adverse effects. Positive effect on wetlands and vernal pools.	No significant adverse effect, but no proactive management strategy.	Same as Proposed Action.
Aquatic Environment	No significant adverse effect. Positive effect on water resources.	No significant adverse effect, but minor negative effects to water quality expected as a result of the lack of a proactive management strategy.	No significant adverse effect. Alternative 2 would have a reduced positive effect on water resources in comparison to the Proposed Action. Alternative 3 effects would be the same as the Proposed Action.

Environmental Area	Proposed Action (Alternative 1)	No Action/Status Quo Alternative	Other Alternatives, Including the Reduced Management Emphasis Alternative (Alternative 2) and the Reduced Outdoor Recreation Management Emphasis Alternative (Alternative 3)
Flora and Fauna	No significant adverse effects. Short-term negative effects to vegetation, but overall positive effects on vegetation. Positive effect on threatened, endangered, and special status species and their habitats.	No significant adverse effect, but no proactive management strategy for identification, protection and conservation of flora and fauna, including sensitive and significant habitat, or protected species.	No significant adverse effect. Alternative 2 positive benefits reduced in comparison to the Proposed Action. Positive effects of Alternative 3 are the same as the Proposed Action.
Cultural Resources	No significant adverse effect.	Same as Proposed Action.	Same as Proposed Action.
Socio-Economic	No significant adverse effect.	Same as Proposed Action.	Same as Proposed Action.
Operationally-Constrained Areas	No significant adverse effect.	Same as Proposed Action.	Same as Proposed Action.
EO 13045, Children's Health and Safety	No significant adverse effect.	Same as Proposed Action.	Same as Proposed Action.
Cumulative Impacts	No adverse cumulative impacts. Positive overall long-term cumulative impacts.	No adverse cumulative impacts, but no positive cumulative impacts.	No adverse cumulative impacts. Positive overall long-term cumulative impacts less in comparison to Proposed Action.
Irretrievable Commitment	No effect.	Same as Proposed Action.	Same as Proposed Action.
Short-term vs. long-term productivity	Short-term commitment of personnel and resources to implement the Proposed Action, but long-term improvement to condition of Installation natural resources.	No short-term effort and commitment of resources, but no long-term improvement of Installation natural resources due to reactive management strategy.	Short-term commitment of personnel and resources to implement alternatives, but long-term improvement to condition of Installation natural resources less than Proposed Action.

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3 EXISTING ENVIRONMENT

3.1 INSTALLATION DESCRIPTION AND HISTORY

Naval Computer and Telecommunications Area Master Station Atlantic Detachment located in Cutler, Maine, (NCTAMSLANT DET Cutler or Installation) is located in the Town of Cutler, Maine, and was commissioned in 1961 (**Figure 1.1**). Construction of the Installation began in 1958, with services coming online on June 23, 1961. The primary mission of the military Installation is to provide communication services to ships and submarines operating in the North Atlantic, Arctic Ocean, and the Mediterranean Sea. From the time of inception until 1989, at the end of the Cold War, NCTAMSLANT DET Cutler was considered pivotal in the Navy's master plan for instantaneous defense against Soviet Union aggression (NCTAMSLANT DET Cutler 2003). The official mission of NCTAMSLANT DET Cutler is to:

> "*Provide secure and reliable, Strategic and Tactical Command and Control (C2) Telecommunications services to U.S. and Coalition Submarine Services.*"

The area of the Installation is approximately 3,003 acres, and comprises two parcels described as the VLF area (approximately 2,896 acres), and the HF area (approximately 107 acres). The Installation historically included an Administrative and Housing Area (51.3 acres), located on the opposite side of Maine Route 191, west of the HF area, as well as the approximately 20-acre water treatment and reservoir site. Both of these parcels were formerly part of the HF area; however, both parcels were transferred in 2003 to the Washington County Development Authority (Moore 2010a). The Fire Station, located in the historic Administrative Area, currently provides fire protection support to both the HF and VLF areas, and was retained under Navy ownership. The Fire Station, and the Sprague Neck peninsula portion of the VLF (approximately 160 acres), are not used to fulfill the Installation's military mission. The Sprague Neck peninsula has been retained in its natural state, with the exception of the recreational cabins that remain. Due to the peninsular location of the VLF area, and the rural character of the surrounding area, encroachment pressure is not an issue for NCTAMSLANT DET Cutler. The Sprague Neck peninsula was designated as an ERA by the Navy in 1990 (DoD 1990).

As part of the reorganization of NAVFAC MIDLANT, ownership of the NCTAMSLANT DET Cutler facility was recently transferred to the Navy's PWD-ME, and is currently being managed by the Portsmouth Naval Shipyard Commanding Officer (Joy 2009).

Very Low Frequency Area

The VLF area is approximately 2,896 acres, and is situated on a peninsula overlooking the Atlantic Ocean (**Figure 3.1**). The VLF area is located south of Route 191, and major access to this parcel is provided by Ridge Road. The VLF peninsula is surrounded on three sides by the following ocean waters: Little Machias Bay to the east; Cross Island, Cross Island Narrows, Little Holly Cove, Big Holly Cove, and the Atlantic Ocean to the south; and, Holmes and Machias bays to the west. The panels in each antenna array are supported by 13 main towers, including a center tower surrounded by an inner circular array of six towers and an outer circular

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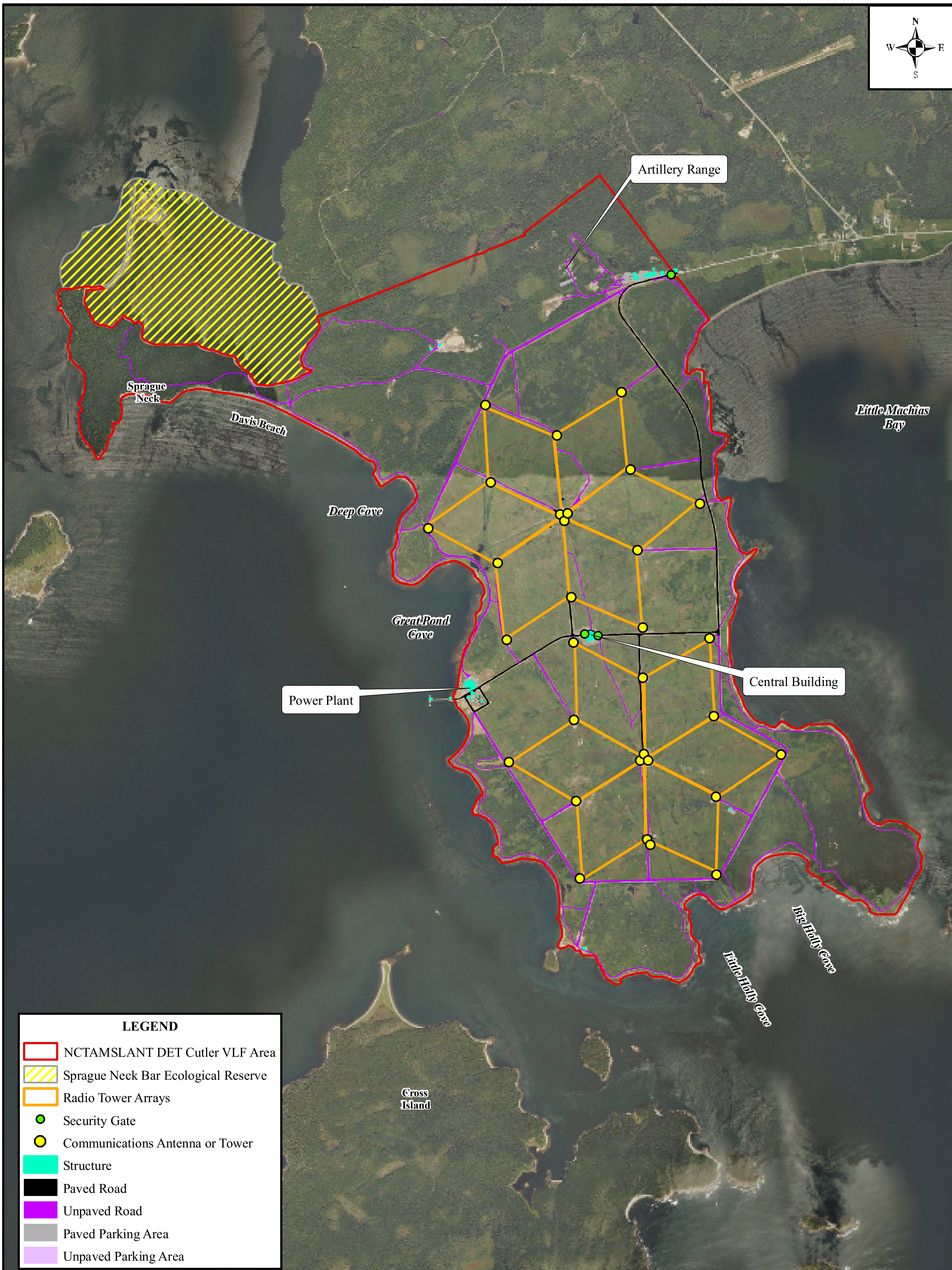

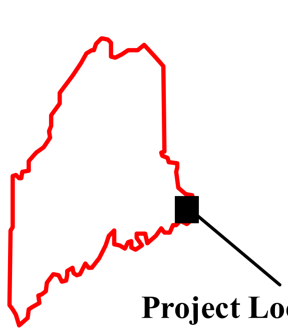

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy, 2009.

2,500 1,250 0 2,500
Feet

Figure 3.1. Very Low Frequency Area Site Details NCTAMSLANT DET Cutler, Cutler, Maine.

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array of six towers. The main towers are approximately 800 to 1,000 ft tall. Each main tower is supported by one or two counterweights, which are supported by towers that are approximately 200 ft tall. Currently, 117 structures are located throughout the VLF area, including winch houses and electrical distribution buildings associated with the antennas and supporting towers, and support and operation facilities. The support and operation facilities include a centrally located transmitter building, two helix houses, a public works shop, a power plant building, and security and administrative buildings, all of which are structures contributing to the Cutler VLF and HF Communications Historic District (Navy 2003 and NCTAMSLANT DET Cutler 2003). The Cutler VLF and HF Communications Historic District are described in Section 3.3.1.

The VLF area of NCTAMSLANT DET Cutler, including Sprague Neck Bar and areas of northeastern coastal Maine, have been designated as a globally important bird area due to their importance to the thousands of nesting and wintering seabirds that are known to concentrate on the Installation and surrounding regions, as well as the thousands of shorebirds that use the Installation and regional coastal locations as a stopover site during migration (DoD PIF Important Bird Areas Program undated).

An ecological reserve is an area that has been zoned to protect all living marine resources by prohibiting fishing activities, and removal or disturbance of any living or nonliving marine resource. Access and recreational activities within designated ecological reserves may be restricted to prevent damage to the resources (NMFS 2010). Because of its importance for providing valuable habitat to migrating shorebirds and waterfowl, Sprague Neck Bar was designated as a Navy ERA in 1990 (DoD 1990); however, no active management of this site has occurred since it's designation.

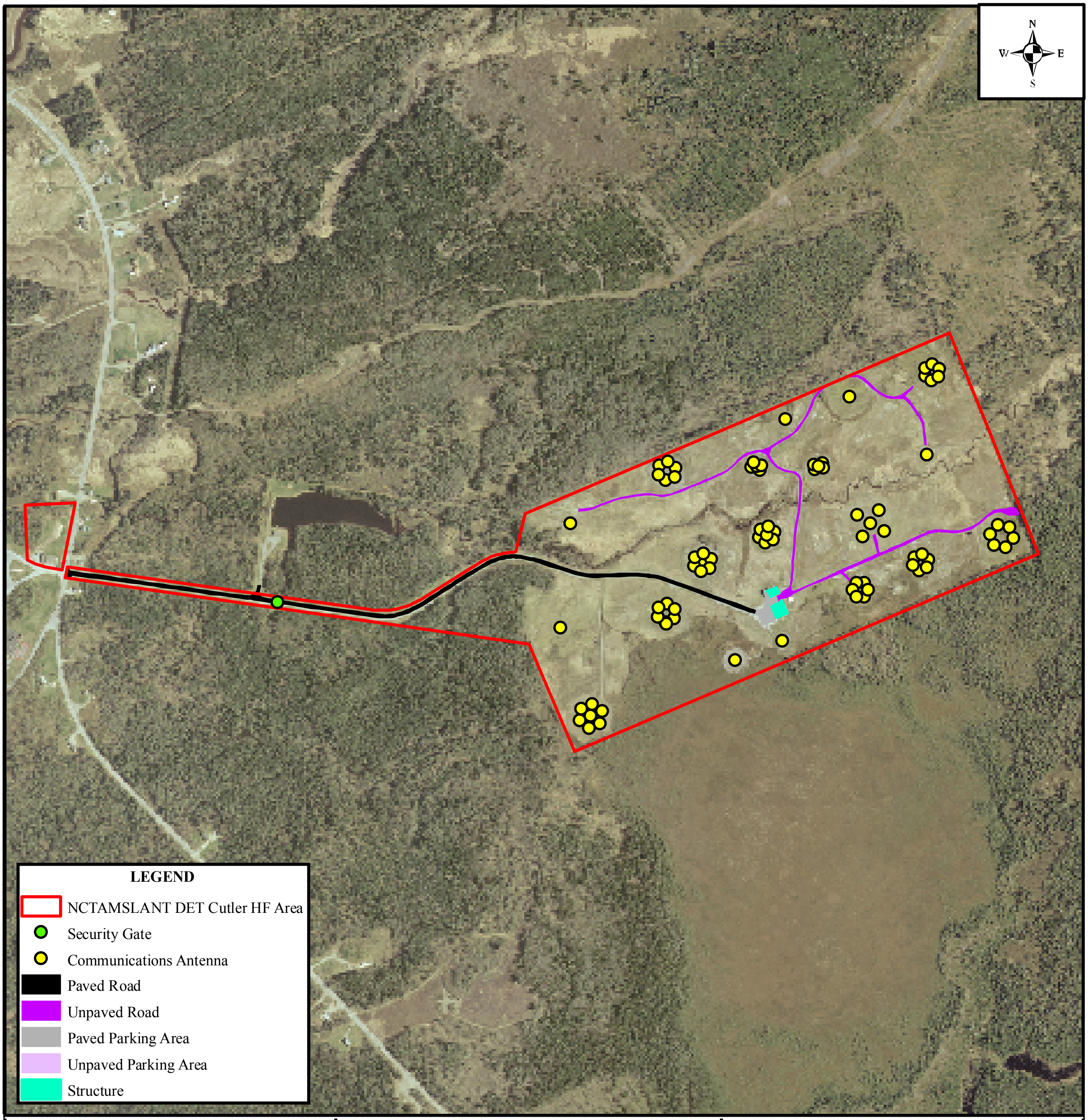
High Frequency Area

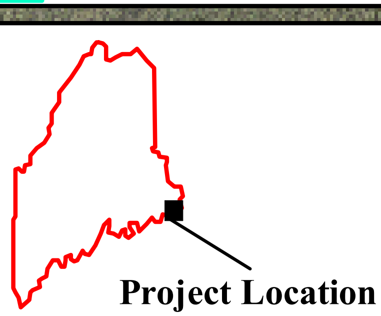
The HF area is approximately 107 acres, and is located approximately 2 miles north of the VLF parcel, off Route 191, and approximately 0.5 mile inland from the eastern edge of Holmes Bay (**Figure 1.1**). Major access to the HF area is provided by the access road that extends east from Route 191 (Cutler Road). The reservoir located adjacent to the western boundary of the HF site is privately owned.

The HF area is equipped with 19 high frequency transmitters and supporting antennas, and functions as a backup for the VLF area in the event of transmitter failure (**Figure 3.2**). In addition to providing backup, the HF area supports other communication activities, including shore-to-ship and ground-to-air transmissions, and includes two buildings: the main operations building and the building that houses the emergency power generator.

3.2 NATURAL ENVIRONMENT

The natural environment consists of all biotic and abiotic non-human habitats and is divided into seven components, including: (1) climate and air quality (2) geology, topography, and soils; (3) water resources and hydrology, including watersheds and floodplains, surface waters, wetlands, and groundwater; (4) vegetation; (5) wildlife resources; (6) threatened and endangered species and species of special concern; and (7) rare plant communities and significant habitat.





Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

500 250 0 500 1,000

Feet

Figure 3.2. High Frequency Area Site Details NCTAMSLANT DET Cutler, Cutler, Maine.

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3.2.1 Climate and Air Quality

3.2.1.1 Climate

The climate condition within the coastal region of NCTAMSLANT DET Cutler is generally humid with temperatures moderated by oceanic influences. Winters at this latitude are somewhat prolonged and last for approximately 5 months (November through March). The prevailing winter winds are out of the north and northwest, which bring snow, and cold, arctic air to the area. The summer season in this region produces prevailing winds out of the south or southwest. Thunderstorms are relatively infrequent due to the cooling influence of the ocean. Hurricanes are an occasional occurrence in late summer.

Temperature information is provided for Jonesboro, Maine, a coastal town located approximately 13 miles west of the Installation, because it is the closest town for which historical temperature data are available (National Oceanic and Atmospheric Administration (NOAA) 2009). July is normally the warmest month of the year with a mean maximum temperature of approximately 75 degrees Fahrenheit (°F). January tends to be the coldest month of the year with a mean minimum temperature of approximately 8°F. The mean annual temperature for the area is approximately 43°F.

The transitional seasons of spring and fall are characterized by frequent precipitation events and dense fog. Historical precipitation data are provided for Machias, located approximately 15 miles northwest of NCTAMSLANT DET Cutler, as it is the closest town for which precipitation data are available (NOAA 2009). Average annual precipitation for the region is 51 inches, with over 60 inches of snowfall reported in 2008. Average annual snowfall in the coastal regions of Maine ranges from 50–70 inches (Maine Tourism Association 2009). Typically this area of the country does not contain a dry season, with precipitation distributed throughout the calendar year. November tends to be the wettest month of the year in this region, with an average mean monthly rainfall of 5 inches.

3.2.1.2 Air Quality

The Clean Air Act of 1970, 42 U.S.C. 7401 et seq., amended in 1977 and 1990, is the primary federal statute governing air pollution. The Clean Air Act designates the following six pollutants as criteria pollutants: nitrogen oxides, sulfur dioxide, carbon monoxide, ozone, particulate matter, and lead. National Ambient Air Quality Standards (NAAQS) have been promulgated for these criteria pollutants top protect human health and welfare.

Federal law requires the states and commonwealths to operate and maintain an air monitoring network to measure criteria pollutants. The MDEP is responsible for this activity. Measurement of criteria pollutant concentrations in ambient air aids in determining whether the NAAQS are being attained in a particular area. If an area has no more than one exceedance per year of a particular criteria pollutant, it is designated as being in attainment for that pollutant.

Areas that have more than one exceedance per year of a particular criteria pollutant are designated as being in nonattainment for the pollutant. The six classifications of ozone nonattainment status are transitional, marginal, moderate, serious, severe, and extreme. Carbon monoxide and particulate matter have classifications of moderate and serious. According to the MDEP, the region that encompasses NCTAMSLANT DET Cutler facility is considered to be in attainment with the current U.S. Environmental Protection Agency (EPA) criteria regarding all of the criteria pollutants.

Emission sources associated with the Installation are primarily associated with the burning diesel fuel that power engines and other process equipment associated with the Installation. The Installation operates under an Air Emission License issued by MDEP (#A-210-70 A-I) that was issued on January 14, 2002.

3.2.2 Geology, Topography, and Soils

NCTAMSLANT DET Cutler is located within the Seaboard Lowland section of the New England physiographic province (U.S. Geological Survey (USGS) 1995). A majority of the site and surrounding area is situated at or near mean sea level (MSL) due to its location along the Atlantic seaboard. The geology, topography, and soils of the NCTAMSLANT DET Cutler area were largely shaped by past glacial activity, which created a landscape primarily of rolling to flat topography, punctuated by glacial debris. Geology, topography, and soils for the VLF and HF areas are described in the following sections.

3.2.2.1 Geology

The surficial geology of Maine was determined by repeated glaciations that eroded bedrock, shaped topography, and deposited glacial sediments (NCTAMSLANT DET Cutler 2003). The recession of the Wisconsin glacial ice sheet at Cutler occurred 14,000 years before present (BP), and accounts for most of the topography of the VLF and HF sites. Effects of past glacial events are evident along the northern portion of the VLF area where a large terminal moraine is located that stretches from Sprague Neck east to the intersection of Route 191 and the VLF area access road (NCTAMSLANT DET Cutler 2003).

The bedrock of the area and surrounding Washington County consists primarily of volcanic and granitic deposits associated with the Silurian and Ordovician periods (USGS 1995). Intrusions of granite and gabbro are locally common, with the majority of the bedrock consisting of poorly metamorphosed flow breccias, tuff breccias, and tuffs (NCTAMSLANT DET Cutler 2003). Breccias rocks are composed of multiple types of mineral fragments or rocks held together by a matrix that may or may not be similar to the fragments. Tuff is composed of consolidated volcanic ash. The bedrock is volcanic in origin, and has been partially metamorphosed through the physical and chemical alteration subsequent to deposition caused by the heat and pressure, usually by being buried and folded in mountain-building processes. Other types of rock associated with the local bedrock include sandstone, siltstone, and basalt flows (NCTAMSLANT DET Cutler 2003).

3.2.2.2 Topography

The overall topography of NCTAMSLANT DET Cutler is relatively flat, and is described for the VLF and HF areas, below.

Very Low Frequency Area

The topography of the VLF area is typically flat, with elevations ranging from sea level along the coastline to approximately 140 ft above sea level in the northeast corner of the site where past glacial events left a large terminal moraine at the north end of the VLF area (**Figure 3.3**). At sea level along the coast, the topography rises to between 20–80 ft above sea level in the inland areas of the tower fields, with the highest elevations (70–146 ft above sea level) occurring north of the tower fields in the northern section of the site. Elevations on the Sprague Neck peninsula range from sea level to 70 ft above sea level.

High Frequency Area

Elevations of the HF area range from 20–68 ft above sea level, with the higher elevations occurring along the northern, eastern, and southern site boundaries (**Figure 3.4**).

3.2.2.3 Soils

Very Low Frequency Area

A large terminal moraine runs east-west across the north end of the VLF site, and is composed of well-drained sand, gravel, and boulders and is mostly overlain by excessively drained soil types. However, soils on the north side of the moraine are very wet and covered by extensive bogs and fens. Soils downslope on the south side of the moraine support a mosaic of wetland and upland habitats.

Twenty-one (21) soil types have been identified for the VLF area (**Figure 3.5** and **Table 3.1**). Five of these soils cover at least 10 percent (%) of the VLF area: Brayton fine sandy loam is the primary soil type, comprising 22.9% of the soils within the VLF area; the Scantic silt loam, 0–3% slopes comprises approximately 18.3% of the soils in the VLF area; the Bucksport and Wonsqueak soils comprise approximately 10.8% of soils in the VLF area; the Rawsonville-Hogback-Abram complex with 3–15% slopes and very stony texture comprises approximately10.2% of the soils in the VLF area; and, the Rawsonville-Hogback complex with 3–8% slopes comprises approximately 10.0% of the VLF area. The remaining 16 soil types and surface water or wetlands comprise the final 27.8% of the soils in the VLF area, ranging from 0.1% to 4.1% coverage of the VLF area.

Erosion is a significant issue within portions of the VLF area, especially in areas along the perimeter roads, and antenna field access roads, and many of the roads leading to individual towers. The locations that are most prone to erosion are areas associated with heavy vehicle use, or areas susceptible to coastal erosion from wave and storm action especially at the southwest end of the peninsula. The primary areas of concern in regards to soil erosion and sedimentation are associated with areas of ground disturbance, or sections of roadways located within 75 ft of existing wetlands, waterbodies, and coastal areas.

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Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy, 2009.

Figure 3.3. Very Low Frequency Area Topography NCTAMSLANT DET Cutler, Cutler, Maine.

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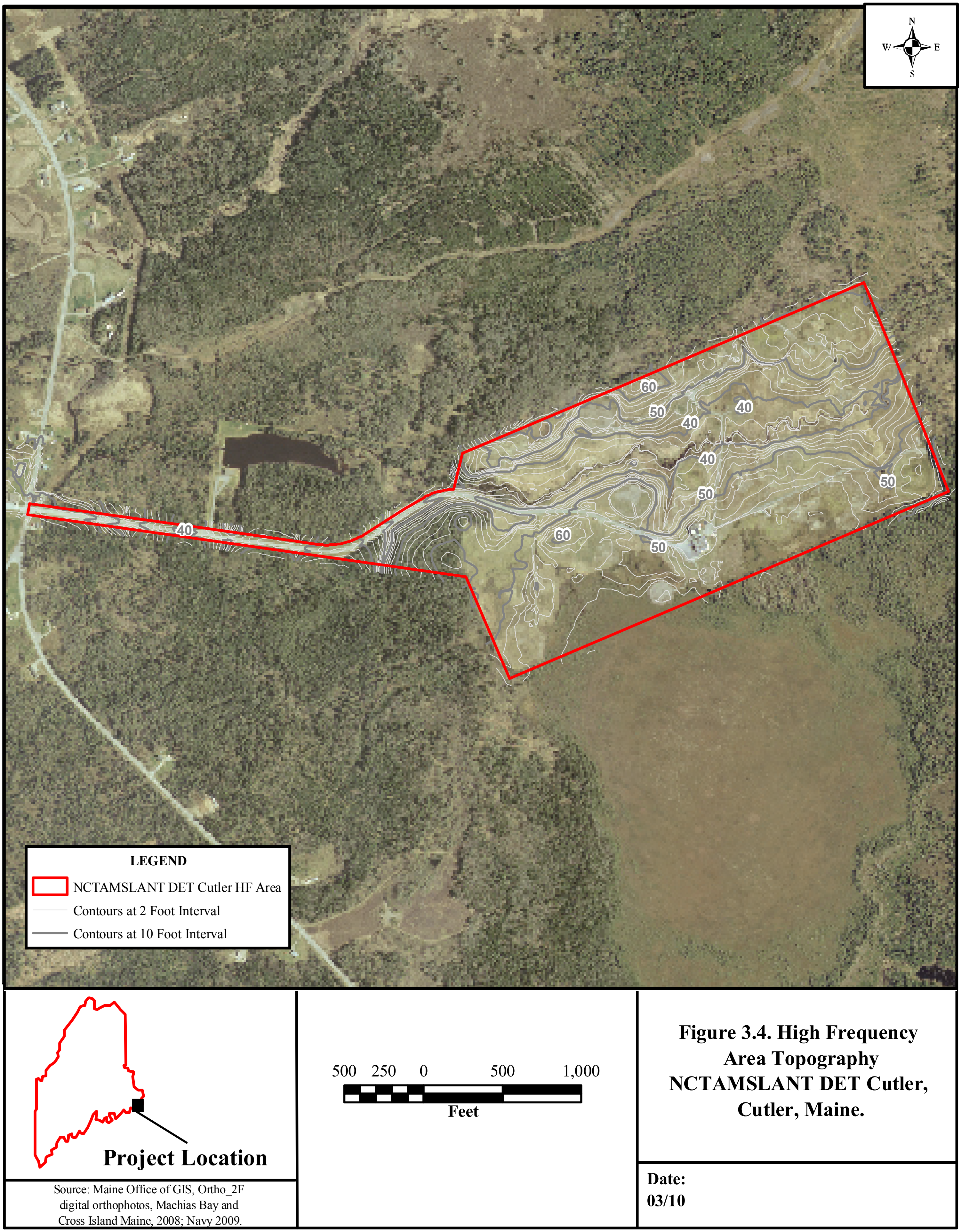

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

Figure 3.4. High Frequency Area Topography NCTAMSLANT DET Cutler, Cutler, Maine.

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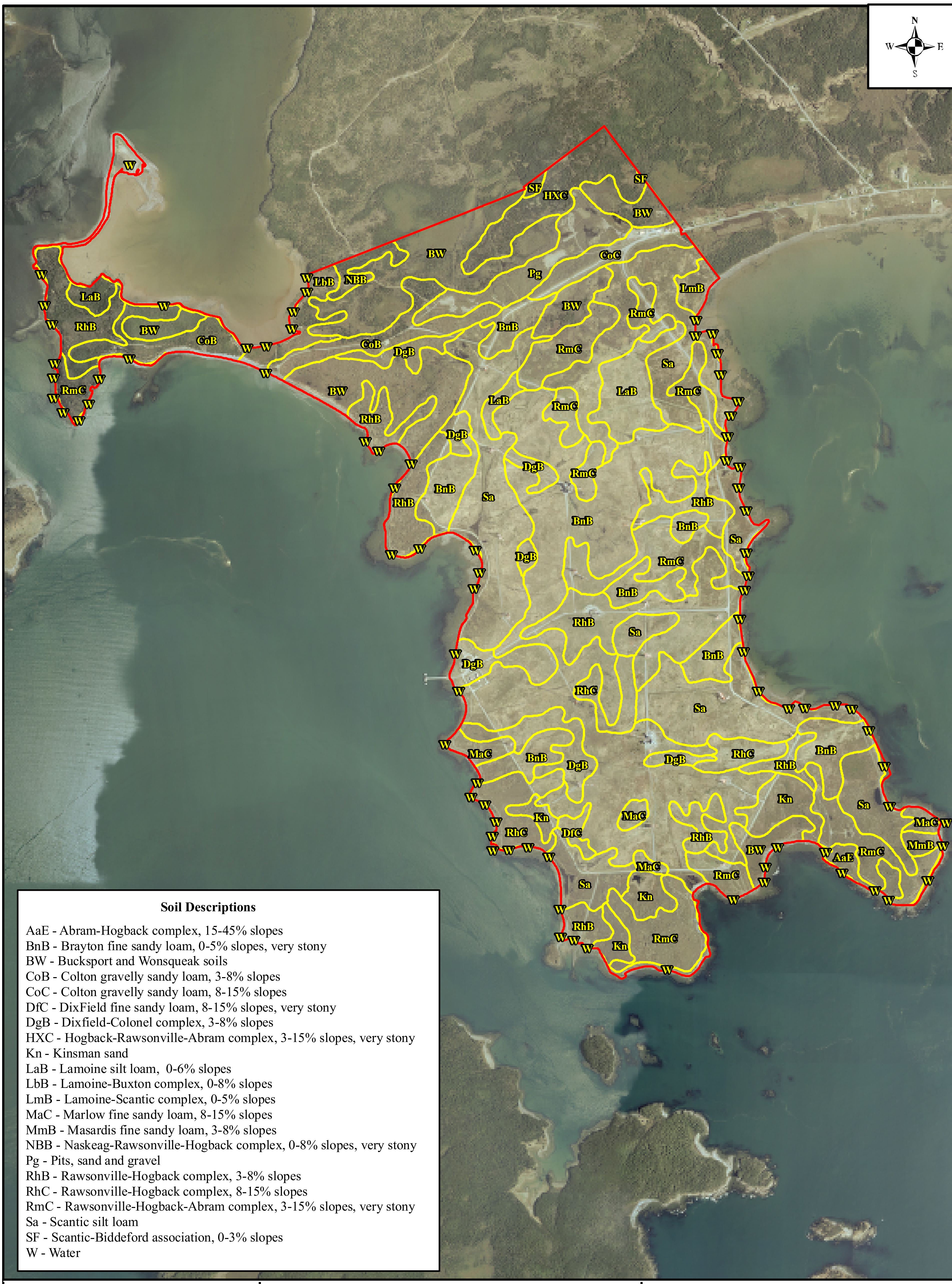

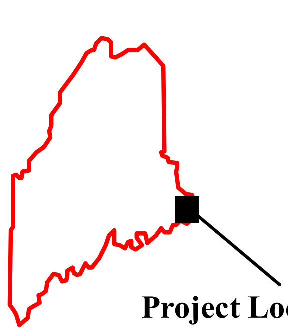

Project Location

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; USDA, NRCS, SSURGO Digital Soils data, Washington County, Maine, 2008.

2,500 1,250 0 2,500
Feet

LEGEND

NCTAMSLANT DET Cutler VLF Area
USDA Soils Boundaries

Figure 3.5. Very Low Frequency Area USDA Soil Types NCTAMSLANT DET Cutler, Cutler, Maine.

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Table 3.1 Very Low Frequency Area USDA Soil Types, NCTAMSLANT DET Cutler, Cutler, Maine.

Map Unit Symbol	Soil Series	Drainage Class	Farmland Classification (P/S)[1]	Area (Acres)	Percent Total
AaE	Abram-Hogback complex, 15 to 45% slopes, very stony	Excessively Drained to Well Drained	–	16.3	0.6
BnB	Brayton fine sandy loam, 0 to 5% slopes, very stony	Poorly Drained	–	662.7	22.9
BW	Bucksport and Wonsqueak soils, 0 to 1% slopes	Very Poorly Drained	–	312.7	10.8
CoB	Colton gravelly sandy loam, 3 to 8% slopes	Excessively Drained	S	102.5	3.5
CoC	Colton gravelly sandy loam, 8 to 15% slopes	Excessively Drained	–	37.9	1.3
DfC	Dixfield fine sandy loam, 8 to 15% slopes, very stony	Moderately Well Drained	–	8.8	0.3
DgB	Dixfield-Colonel complex, 3 to 8% slopes	Moderately Well Drained to Poorly Drained	P	117.8	4.1
HXC	Hogback-Rawsonville-Abram, 3 to 15% slopes, very stony	Excessively Drained to Well Drained	–	74.5	2.6
Kn	Kinsman sand	Poorly Drained	–	73.3	2.5
LaB	Lamoine Silt Loam, 0 to 6% slopes	Somewhat Poorly Drained	S	75.2	2.6
LbB	Lamoine-Buxton complex, 0 to 8% slopes	Somewhat Poorly Drained to Moderately Well Drained	S	32.7	1.1
LmB	Lamoine-Scantic complex, 0 to 15% slopes	Somewhat Poorly Drained to Poorly Drained	S	14.2	0.5

Table 3.1 Very Low Frequency Area USDA Soil Types, NCTAMSLANT DET Cutler, Cutler, Maine (continued).

Map Unit Symbol	Soil Series	Drainage Class	Farmland Classification (P/S)[1]	Area (Acres)	Percent Total
MaC	Marlow fine sandy loam, 8 to 15% slopes	Well Drained	S	33.3	1.2
MmB	Masardis fine sandy loam, 3 to 8% slopes	Excessively Drained	S	8.0	0.3
NBB	Naskeag-Rawsonville-Hogback complex, very stony	Poor Drained to Well Drained	–	15.4	0.5
Pg	Pits, sand and gravel	N/A	–	66.9	2.3
RhB	Rawsonville-Hogback complex, 3 to 8% slopes	Well Drained	P	290.2	10.0
RhC	Rawsonville-Hogback complex, 8 to 15% slopes	Well Drained	S	85.7	3.0
RmC	Rawsonville-Hogback-Abram complex, 3 to 15% slopes, very stony	Well Drained to Excessively Drained	–	295.6	10.2
Sa	Scantic silt loam, 0 to 3% slopes	Poorly Drained	–	530.6	18.3
SF	Scantic-Biddeford association, 0 to 3% slopes	Poorly Drained	–	3.3	0.1
W	Surface Water or Wetland	NA	NA	38.0	1.3
Total				**2,866.2**	**100**

[1] P=Prime Farmland, S=Farmland of Statewide Importance
Source: USDA NRCS 2009.

Prime farmland, as defined by the U.S. Department of Agriculture (USDA), is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses (USDA NRCS 2009). There are two soils types in the VLF area that are considered prime farmland soils, the Dixfield-Colonel complex, 3–8% slopes, and Rawsonville-Hogback complex, 3–8% slopes. These soils comprise approximately 408 acres of the VLF, and are generally located within the area of the tower fields (**Figure 3.5**). In addition, several other soils located throughout the VLF area are considered farmland of statewide importance (approximately 351.6 acres), including: the Colton gravelly sandy loam, 3–8% slopes; Lamoine silt loam, 0–6% slopes; Lamoine-Buxton complex, 0–8% slopes; Lamoine-Scantic complex, 0–5% slopes; Marlow fine sandy loam, 8–15% slopes; Masardis fine sandy loam, 3–8% slopes; and, Rawsonville-Hogback complex, 8–15% slopes. None of the VLF area soils are currently being farmed, and based on their current use as operations areas necessary to meet the military mission for NCTAMSLANT DET Cutler, no portion of the VLF area is available for farming.

High Frequency Area

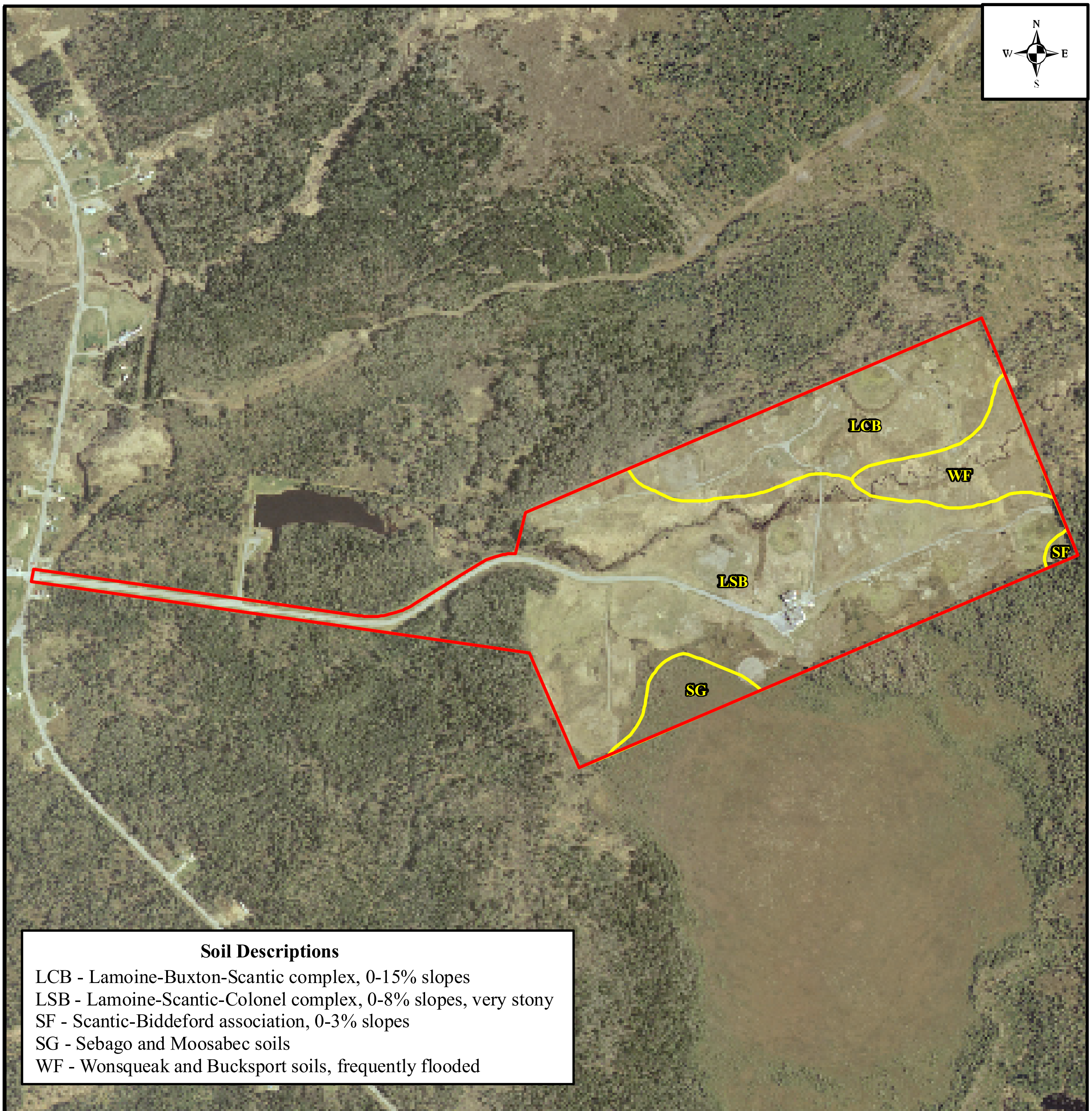
Five (5) soil types have been identified for the HF area (**Figure 3.6** and **Table 3.2**), including the following two types that comprise 10% or more of the HF area: the primary soil type, the Lamoine-Scantic-Colonel complex, 0–8% slopes covering 67.7% of HF area soils; and, the Lamoine-Buxton-Scantic complex, 0–15% slopes, comprises approximately 20.3% of the HF area. The remaining soils, the Wonsqueak and Bucksport soils, the Scantic-Biddeford association, 0–3% slopes, and Sebago and Moosabec, 0–1% slopes, comprise approximately 12% of the soils in the HF area.

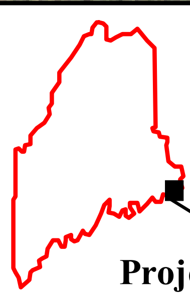
Similar to the VLF area, erosion issues at the HF area are associated with road shoulders. Erosion is especially problematic along access roads in the southeast and northwest corner of the HF area. The topography of this section of NCTAMSLANT DET Cutler is gentle with generally low slopes throughout the area, with the exception of the banks of Huntley Creek, which are steep in some locations. The slopes of the shoulders of the access road where it crosses Huntley Creek are similarly steep and therefore prone to erosion.

None of the soils located within the HF area are considered prime farmland soils, however the Lamoine-Buxton-Scantic complex, 0–15% slopes is considered farmland of statewide importance. There are no plans to farm any portion of the HF area due to its current use in support of the military mission of NCTAMSLANT DET Cutler.

3.2.3 Water Resources

Watersheds and floodplains, surface water, wetlands, groundwater, and water quality for the VLF and HF areas are described in the following sections.





Project Location

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

500 250 0 500 1,000

Feet

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NCTAMSLANT DET Cutler HF Area

USDA Soils Boundaries

Figure 3.6. High Frequency Area USDA Soil Types NCTAMSLANT DET Cutler, Cutler, Maine.

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3.2.3.1 Watersheds and Floodplains

NCTAMSLANT DET Cutler is located in Hydrologic unit codes (HUC) Subregion 0105, Maine Coastal, which totals 7,130 square miles (MDEP, Bureau of Land and Water Quality 2009). The Eastern Maine Coastal basin (HUC 010500) contains the drainage and associated waters extending from Maine's border with New Brunswick, Canada, south to Cape Small, Maine, and includes the St. Croix River Basin within the U.S. (USGS 2009). The Coastal Washington and Hancock Drainage (HUC 01050002) encompasses the area of Maine coast from approximately Rockland north to the Canadian border. Waters associated with NCTAMSLANT DET Cutler (both the VLF and HF parcels) are part of the Maine Coastal Watershed Roque Bluffs Coastal Hydrologic Unit (HUC 010500020602).

Table 3.2 High Frequency Area USDA Soil Types, NCTAMSLANT DET Cutler, Cutler, Maine.

Map Unit Symbol	Soil Series	Drainage Class	Farmland Classification (P/S)[1]	Area (Acres)	Percent Total
LCB	Lamoine-Buxton-Scantic complex, 0 to 15% slopes	Poorly Drained	S	21.7	20.3
LSB	Lamoine-Scantic-Colonel complex, 0 to 8% slopes	Poorly Drained	–	72.3	67.7
SF	Scantic-Biddeford association, 0 to 3% slopes	Poorly Drained	–	0.5	0.5
SG	Sebago and Moosabec soils, 0 to 1% slopes	Very Poorly Drained	–	4.2	4.0
WF	Wonsqueak and Bucksport soils, 0 to 2% slopes	Very Poorly Drained	–	8.0	7.5
Total				**106.8**	**100**

[1] P=Prime Farmland, S=Farmland of Statewide Importance
Source: USDA NRCS 2009.

Very Low Frequency Area

The majority of the VLF area is not within the 100-year floodplain. However, coastal sections are inundated by 100-year flooding with velocity hazard (wave action) (**Figure 3.7**). The VLF area is subject to tidal fluctuations of approximately 14.5 ft during an average tidal cycle (NCTAMSLANT DET Cutler 2003). A minimum height of -1.97 ft and a maximum height of 15.45 ft were recorded for the period of January–December 2009 (Mobile Geographics 2009).

High Frequency Area

The HF area is located within the Huntley Creek watershed, and is outside of the 100-year floodplain. A portion of the HF area is located directly adjacent to Huntley Creek. The low volume of water that typically is associated with this creek does not pose any short-term flood dangers to the HF area.

3.2.3.2 Surface Water

Very Low Frequency Area

The VLF peninsula is surrounded on three sides by the following ocean waters: Little Machias Bay to the east; Cross Island, Cross Island Narrows, Little Holly Cove, Big Holly Cove, and the Atlantic Ocean to the south; and, Holmes and Machias bays to the west. Several natural and man-made ponds, totaling approximately 34 acres are located throughout the VLF area (**Figure 3.7**).

Several of the ponds of the VLF area are located adjacent to, or in proximity to, the VLF perimeter access road, and are naturally occurring or were created as a result of blocking drainage patterns along the constructed roads. The approximately 1.8 acre pond located in the southeastern section of the VLF peninsula is inhabited by beavers, and contains a beaver lodge.

In addition, a large complex of natural ponds is located within the gravel pit area, located at the northern end of the VLF area. A series of fire ponds, which would supply a water source to emergency personnel in the event of a fire in the VLF area, have recently been created in the northern section of the VLF area, southwest of the gravel pit.

Several ephemeral drainages and man-made drainage ditches associated with roadways are located in the VLF area. A surface water drainage is located in the north tower field and several drainages are associated with the beaver pond located in the southeast corner of the VLF peninsula (**Figure 3.7**).

High Frequency Area

The HF area is located inland and east of Holmes Bay, and is located within the Huntley Creek watershed (**Figure 3.8**). Huntley Creek traverses the HF area from east to west, discharging into a dammed impoundment located offsite to the west, and north of the HF area access road. Huntley Creek drains into Holmes Bay after passing under Rt. 191 to the west of the HF area. Within the HF area, Huntley Creek wetted width is approximately 3–6 ft, and water depth observed during field surveys conducted in May 2009 ranged from 0.5–3 ft in depth.

The substrate is composed of cobble and gravel with scattered patches of finer grain material. The velocity of the stream within the HF area during May 2009 was relatively low with mostly runs and glides and a few small riffles. The stream is incised with steep banks that are approximately 2–4 ft high and sparsely vegetated with various species of graminoids. The surrounding community type is mixed shrub/grass. Man-made drainages are located along the roadways of the HF area, and palustrine wetlands are distributed within the HF area as described in Section 3.2.3.3.

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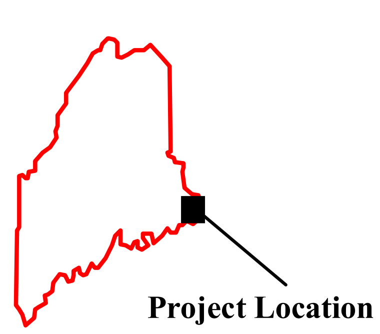
NCTAMSLANT DET Cutler VLF Area

Surface Water (Ponds and Streams)

FEMA FIRM Zone

AE - An area inundated by 100-year flooding, for which Base Flood Elevations (BFES) have been determined; IN Special Flood Hazard Area (SFHA).

VE - An area inundated by 100-year flooding with velocity hazard (wave action); Base Flood Elevations (BFES) have been determined; IN Special Flood Hazard Area (SFHA).



Source: Maine Office of GIS (MEGIS), Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; MEGIS, USDA, NRCS, wbdme6_a, 2004; MEGIS, USGS, hyd24, Machias Bay, 2004, FEMA MEGIS, FEMA Q3 Flood Data, Washington County Maine, 2002.

2,500 1,250 0 2,500

Feet

Project Area is within USDA NRCS
HUC 12 010500020602, Roque Bluffs Coastal.

Figure 3.7. Very Low Frequency Area Water Resources NCTAMSLANT DET Cutler, Cutler, Maine.

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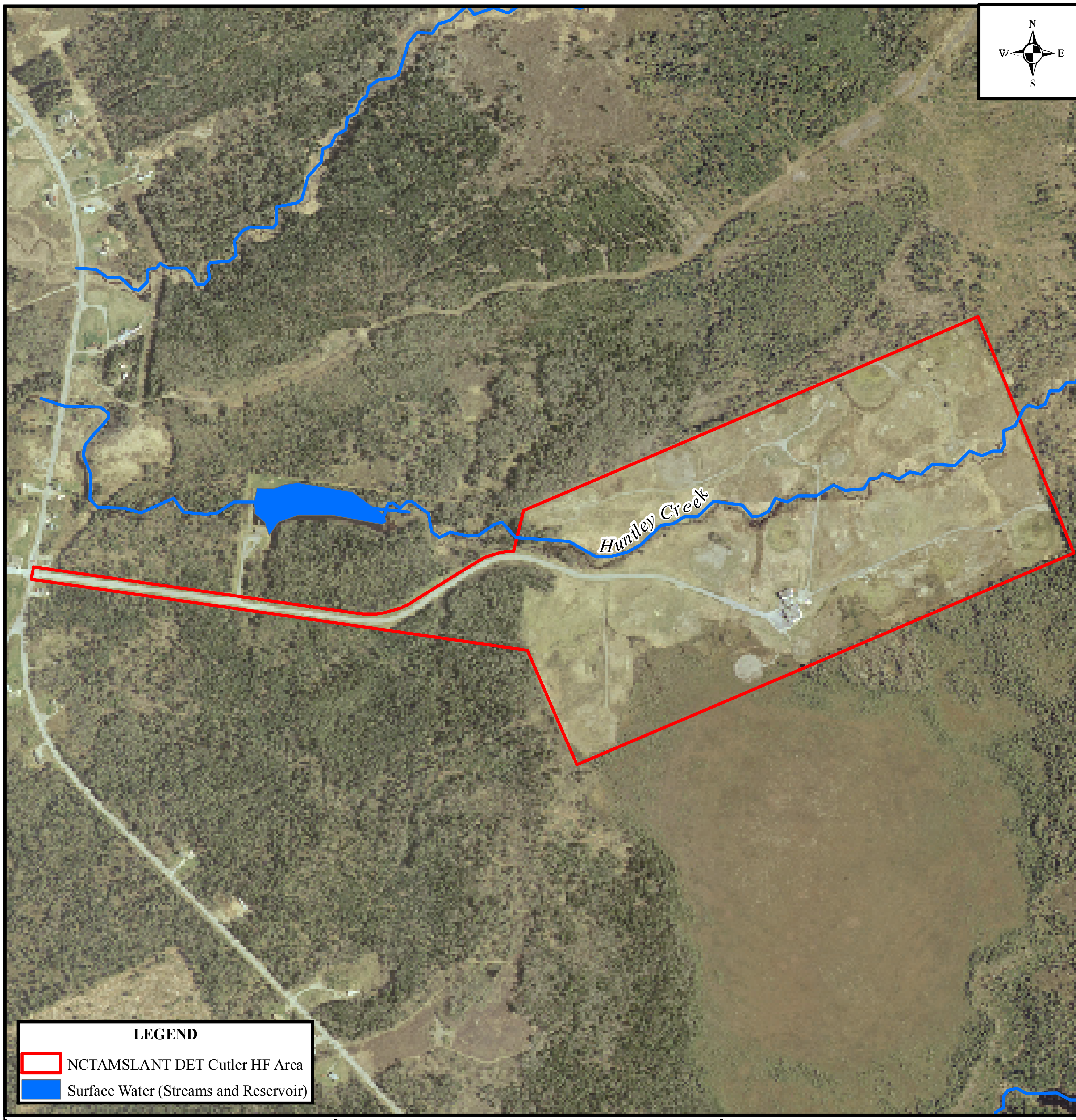

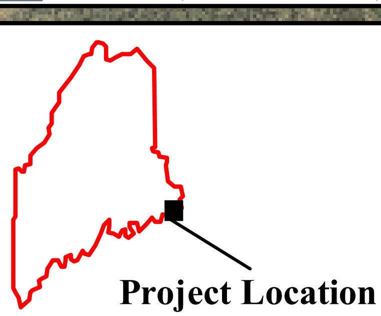

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; Navy 2009.

500 250 0 500 1,000

Feet

Figure 3.8. High Frequency Area Water Resources NCTAMSLANT DET Cutler, Cutler, Maine.

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3.2.3.3 Wetlands

Installation wetlands were classified using the USFWS system for the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et. al 1979). The majority of wetlands identified throughout the VLF and HF by the National Wetland Inventory (NWI) were ground-truthed during field surveys. However, no formal, Installation-wide wetland delineations have been conducted. Maps of the wetland and community types for NCTAMSLANT DET Cutler are provided in **Figure 3.9a**, **Figure 3.9b,** and **Figure 3.10**. Community types are described in Section 3.2.4.1.

The NWI recognizes 20 different palustrine wetland classes within the VLF and HF areas (**Table 3.3**, **Table 3.4**, **Figure 3.9a**, **Figure 3.9b,** and **Figure 3.10**). Palustrine wetlands cover approximately 1,780 acres in the VLF area and 69 acres in the HF area. Estuarine intertidal wetlands occur between the normal high tide and normal low tide levels, and are only associated with the VLF area (13 acres) at NCTAMSLANT DET Cutler.

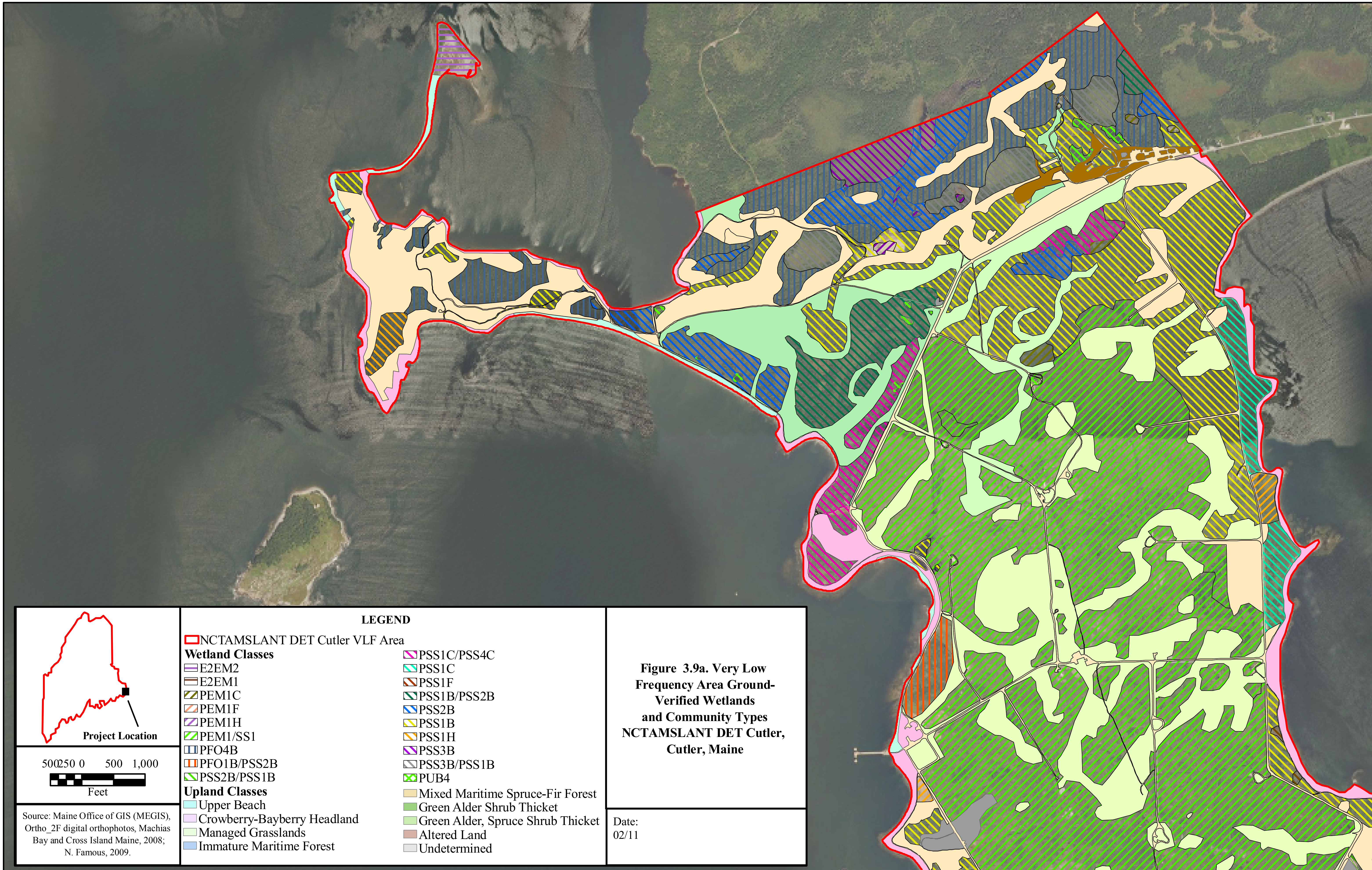

Figure 3.9a. Very Low Frequency Area Ground-Verified Wetlands and Community Types NCTAMSLANT DET Cutler, Cutler, Maine

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Figure 3.9b. Very Low Frequency Area Ground-Verified Wetlands and Community Types NCTAMSLANT DET Cutler, Cutler, Maine

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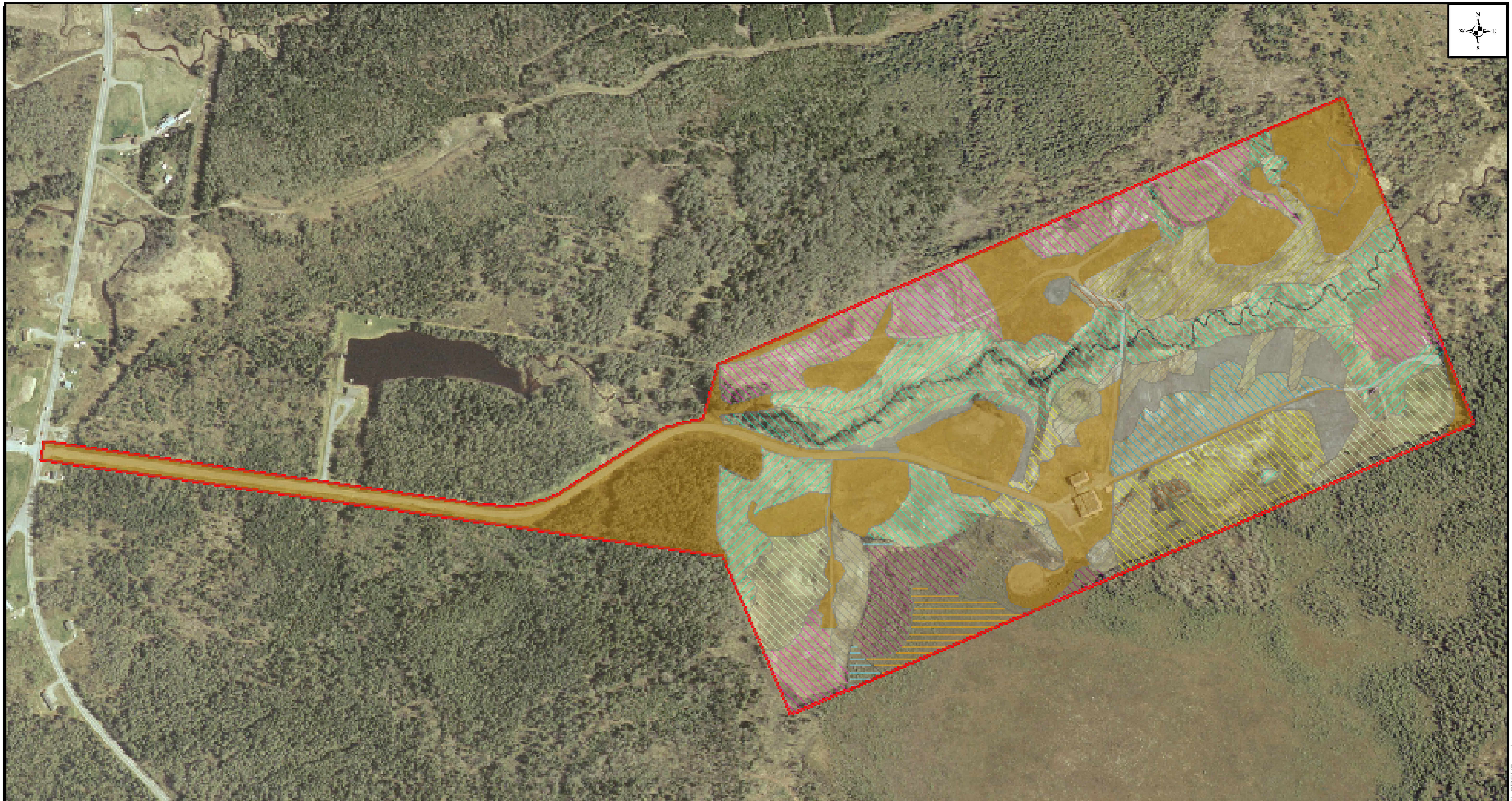

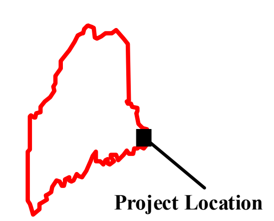

Source: Maine Office of GIS (MEGIS), Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; N. Famous, 2009.

500 250 0 500 1,000

Feet

LEGEND

NCTAMSLANT DET Cutler HF Area

Wetland Classes

- PEM1B
- PEM1C
- PEM1C/PSS1C
- PEM1H
- PSS1A
- PSS1A/PEM1A
- PSS1B
- PSS1C
- PSS1C/PEM1C
- PSS1C/4E
- PSS1F
- PSS4E/2E
- PSS7B
- PSS7F

Upland Classes

- Altered Land
- Undetermined

Figure 3.10. High Frequency Area Ground-Verified Wetlands and Community Types, NCTAMSLANT DET Cutler, Cutler, Maine

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Table 3.3 Very Low Frequency Area Wetlands (Planning Level Ground-verified), NCTAMSLANT DET Cutler, Cutler, Maine.

Wetland Code	Wetland Type	VLF (acres)
Palustrine		
PEM1/PSS1	Palustrine Emergent Meadow, Persistent/Scrub Shrub, Broad-leaved Deciduous	897
PEM1F	Palustrine Emergent Wetland, Persistent, Semi-permanently Flooded	
PEM1C	Palustrine Emergent Wetland, Persistent, Seasonally Flooded	
PEM1H	Palustrine Emergent Wetland, Persistent, Permanently Flooded	
PSS1B	Palustrine Scrub Shrub, Broad-leaved Deciduous, Saturated	724
PSS2B	Palustrine Scrub Shrub, Needle-leaved Evergreen, Saturated	
PSS2B/PSS1B	Palustrine Scrub Shrub, Broad-leaved Deciduous/Palustrine Scrub Shrub, Needle-leaved Evergreen, Saturated	
PSS1B/PSS2B	Palustrine Scrub Shrub, Broad-leaved Deciduous, Saturated/Palustrine Scrub Shrub, Needle-leaved Evergreen, Saturated	
PSS1C	Palustrine Scrub Shrub, Broad-leaved Deciduous, Seasonally Flooded	
PSS1C/PSS4C	Palustrine Scrub Shrub, Broad-leaved Deciduous, Seasonally Flooded/Palustrine Scrub Shrub, Broad-leaved Evergreen, Seasonally Flooded	
PSS3B/PSS1B	Palustrine Scrub Shrub, Broad-leaved Evergreen, Saturated/Palustrine Scrub Shrub, Broad-leaved Deciduous, Saturated	
PSS3B	Palustrine Scrub Shrub, Broad-leaved Evergreen, Saturated	
PSS1H	Palustrine Scrub Shrub, Broad-leaved Evergreen, Permanently Flooded	
PSS1F	Palustrine Scrub Shrub, Broad-leaved Deciduous, Semi-permanently Flooded	
PFO4B	Palustrine Forested Wetland, Needle-leaved Evergreen, Saturated	145
PFO1B/PSS2B	Palustrine Forested Wetland, Broad-leaved Deciduous, Saturated/Palustrine Scrub Shrub, Broad-leaved Deciduous, Saturated	
PUB4	Palustrine Unconsolidated Bottom, Organic	14
Total Palustrine Wetland Area		***1,780***
Estuarine		
E2EM1	Estuarine Intertidal Emergent, Persistent	13
E2EM2	Estuarine Intertidal Emergent, Non-persistent	
Total Estuarine Wetland Area		***13***
Total Wetland Area		**1,793**

Table 3.4 High Frequency Area Palustrine Wetlands (Planning Level Ground-verified), NCTAMSLANT DET, Cutler, Cutler, Maine.

Wetland Code	Wetland Type	HF (acres)
Palustrine		
PSS1C	Scrub Shrub, Broad-leaved Deciduous, Seasonally Flooded	52
PSS1B	Scrub Shrub, Broad-leaved Deciduous, Saturated	
PSS1C/PEM1C	Scrub Shrub, Broad-leaved Deciduous, Temporarily Flooded/Emergent Wetland, Persistent, Temporarily Flooded	
PSS1A	Scrub Shrub, Broad-leaved Deciduous, Temporarily Flooded	
PSS1C/PSS4C	Scrub Shrub, Broad-leaved Deciduous, Seasonally Flooded/Scrub Shrub, Needle-leaved Evergreen, Seasonally Flooded	
PSS1B/PEM1B	Scrub Shrub Broad-leaved Deciduous, Seasonally Flooded/Emergent Wetland, Persistent, Seasonally Flooded	
PSS4B/PSS2B	Scrub Shrub, Needle-leaved Evergreen, Seasonally Flooded/Scrub Shrub, Needle-leaved Deciduous, Seasonally Flooded	
PSS7F	Scrub Shrub, Evergreen, Saturated	
PSS1C	Scrub Shrub, Broad-leaved Deciduous, Semi-permanently Flooded	
PSS7C	Scrub Shrub, Evergreen, Semi-permanently Flooded	
PEM1C/PSS1C	Emergent Wetland, Persistent, Seasonally Flooded/Scrub Shrub, Broad-leaved Deciduous, Seasonally Flooded	17
PEM1C	Emergent Wetland, Persistent, Seasonally Flooded	
PEM1B	Emergent Wetland, Persistent, Saturated	
PEM1H	Emergent Wetland, Persistent Permanently Flooded	
Total Wetland Area (*All Palustrine*)		**69**

Very Low Frequency Area

Based on the NWI maps and field verification, there are four primary wetland types located throughout the VLF area: palustrine scrub shrub (PSS), palustrine emergent (PEM), palustrine forested (PFO), and palustrine unconsolidated bottom (PUB) wetlands (**Figure 3.9a** and **Figure 3.9b**).

The most common wetland type in the VLF is PEM or predominantly emergent wetland containing some scrub-shrub wetland (PEM/PSS) (**Table 3.3**). Common species within these wetlands include bluejoint (*Calamagrostis canadensis*), sedges (*Carex* spp.), woolgrass (*Scirpus cyperinus*), soft rush (*Juncus effusus*), cottongrass (*Eriophorum tenelum*), mannagrass (*Glyceria* spp.), flat-top goldentop (*Euthamia graminifolia*), and willows (*Salix* spp.). These wetlands comprise 897 acres of the VLF, are dominated by persistent emergent vegetation, and are seasonally to permanently flooded. PEM and PEM/PSS wetlands in the VLF area are scattered throughout the tower field.

The second most abundant wetland type within the VLF area is PSS wetland (724 acres). These scrub-shrub wetlands are dominated by either broad-leaved or needle-leaved shrub species–or a combination thereof–that are adapted to a variety of wetland hydroperiods. Common species that occur within PSS wetlands at the Installation include speckled alder (*Alnus incana* ssp. *rugosa*), willows, sweetgale (*Myrica gale*), bluejoint, rough goldenrod (*Solidago rugosa*), and flat-top white aster (*Doellingeria umbellata*). The seasonal pattern of water levels within shrub wetlands in the VLF include saturated, seasonally flooded, and semi-permanently flooded. PSS wetlands are located throughout the northern and southern sections of the VLF area and along the eastern edge of the peninsula.

PFO wetlands and those that are predominantly forested wetlands with some scrub-shrub (PFO/PSS) occupy 145 acres of the VLF area. These include needle-leaved and broad-leaved trees with saturated soils. Common species that occur within forested wetlands on NCTAMSLANT DET Cutler include black spruce (*Picea mariana*), red maple (*Acer rubrum*), eastern larch (*Larix laricina*), balsam fir (*Abies balsamea*), catberry (*Nemopanthus mucronata*), speckled alder, and three-seeded sedge (*Carex trisperma*). PFO wetlands are located in several areas of the VLF, including large sections located in the northern section of the site, north of the administrative and training areas; areas within in the Sprague Neck peninsula; a large section located north of the power plant area, along the coast; and a small section located northeast of the beaver pond in the southeastern section of the VLF peninsula.

The remaining palustrine wetlands in the VLF area are PUB (14 acres). These non-vegetated or sparsely vegetated wetlands are primarily ponds with organic substrates. Many of these wetlands contain submerged aquatic plant species as well as well-developed rooted floating aquatic plant communities dominated by pondweeds. Despite their importance ecologically for birds, aquatic invertebrates, several mammals, amphibians and vascular plant species diversity, total aerial coverage of PUB wetlands in the VLF was very low (< 1%).

Many of the PSS and PEM wetlands are associated with five plateau bogs located in the northern section of the VLF area, and are composed of peatlands or heath vegetation, including forest bog and tall shrub dominated bog habitat. The larger stature vegetation, including trees and tall shrubs, is present within the more lightly managed and unmanaged areas of the VLF area, and mowed herbaceous vegetation and mostly stunted shrubs dominate the heavily managed areas within the VLF tower field. These wetland types include rare vegetation communities including the Heath–Crowberry Maritime Slope Bog, and Deer-hair Sedge Bog Lawn, and are described in more detail in Section 3.2.7. Portions of the northeast corner of the VLF tower field located between the open fields and the paved inner perimeter field were less managed, primarily due to the more rugged topography that occurs in this area.

Estuarine intertidal wetlands characterized by persistent emergent vegetation (E2EM1) include salt marshes that are dominated by saltmeadow cordgrass (*Spartina patens*). Other common species include prairie cordgrass (*Spartina pectinata*), arctic rush (*Juncus arcticus*), and several species of sedges. The intertidal wetlands that are characterized by nonpersistent emergent vegetation (E2EM2) include species such as goosetongue (*Plantago maritima*) and seaside arrow-grass (*Triglochin maritima*). These estuarine habitats are similar to the majority of intertidal wetlands in the region that are associated with the outer areas of the Machias River Estuary and Little Machias Bay. Approximately 13 acres of estuarine wetlands habitat are located along the coast of Sprague Neck and in a small area located along the southwestern edge of the VLF peninsula.

High Frequency Area

Based on the NWI maps and field verification, there are two primary wetland types located throughout the HF area: PSS and PEM wetlands (**Figure 3.10**). No marine or estuarine tidal wetlands are associated with the HF area.

The most common wetland type that occurs within the HF area is PSS or PSS/PEM (52 acres) (**Table 3.4** and **Figure 3.10**). These wetlands are dominated by broad- or needle-leaved deciduous or evergreen shrub species and have hydroperiods ranging from temporarily to semi-permanently flooded. Similar to the VLF area, common species that occur in the PSS wetlands of the HF area include speckled alder, willows, sweetgale, bluejoint, rough goldenrod, and flat-top white aster. A portion (8 acres) of the PSS wetlands located along the southern boundary of the HF area is associated with the 225-acre Kelley Heath, a Coastal Plateau Bog. This rare community type is described in more detail in Section 3.2.7.

Wetlands dominated by persistent emergent (PEM) vegetation occupy approximately 17 acres of the HF area and are located along either side of the Huntley Creek that bisects the parcel in an east-west direction. Common species that occur in the PEM wetlands of the HF area include are similar to those found in the VLF area and include bluejoint, woolgrass, soft rush, cottongrass, mannagrass, and flat-top goldentop.

3.2.3.4 Groundwater

The primary types of groundwater aquifers present within Washington County are consolidated bedrock aquifers, consisting of crystalline rocks (USGS 1995). Although these types of aquifers are not considered major productive aquifers in relation to the major aquifer systems located throughout New England and New York, they are important sources of domestic water supply, especially where other major groundwater aquifers or sources of surface water are not present. Well yields typical of crystalline rock aquifers range from 2–10 gallons per minute, which generally only are adequate for domestic, and small commercial or public, water supplies, although some wells have exceeded 500 gallons per minute (USGS 1995). Groundwater is the source of drinking water for the Installation.

Water quality in the major aquifers of the area is considered suitable for human consumption; however, water quality differs among aquifers due to natural conditions and human activities. Water quality is affected by mineral composition and solubility of rocks that surround the aquifer, and the time the water is in contact with the rock (USGS 1995). Water quality of an aquifer also can be affected by the amount of surface area that is exposed to rock, the chemistry of the water moving into the aquifer from other aquifers, and introduction or induced movement of contaminants. The concentration of dissolved solids in groundwater generally increases with depth, with some aquifers containing saltwater or brine within their deepest sections. Crystalline aquifers consist of almost insoluble igneous and metamorphic rock that is characterized by shallow fracture systems that store and transmit water. This shallow fracture system allows only minimal dissolution of rocks due to the rapid water movement along short flow paths (USGS 1995).

3.2.3.5 Water Quality

Very Low Frequency Area

NCTAMSLANT DET Cutler is currently operating under a Maine Pollutant Discharge Elimination System (MEPDES) Permit (expires September 2, 2015) to discharge up to 1.548 million gallons per day (MGD) of cooling waters associated with the VLF power plant. Wastewater, including contact and non-contact cooling water, boiler blowdown, waste from a reverse osmosis unit, and other miscellaneous non-process wastewaters, as well as stormwater and groundwater, are discharged into Machias Bay via three outfalls located in the VLF area (NCTAMSLANT DET Cutler 2010). A fourth outfall is located in the HF area. As of the 2008 revisions to the MEPDES Permit, routine water quality sampling is conducted at the cooling and non-process wastewater outfall only (Moore 2010b).

High Frequency Area

The NCTAMSLANT DET Cutler MEPDES Permit authorizes discharges from one outfall located in the HF area. This outfall discharges waste and stormwater associated with the building that houses the backup generator into a tributary that drains into Huntley Creek. Routine water quality sampling at this outfall is also a requirement of the 2010 MEPDES Permit. Water quality data for Huntley Creek was not available at the time this INRMP was prepared.

3.2.4 Vegetation

The two parcels associated with NCTAMSLANT DET Cutler are located in the Laurentian Mixed Forest Province of the Warm Continental Division, within the Humid Temperate Domain Ecoregion of the U.S. (Bailey 1995). This transitional province grades between boreal forest and broadleaf deciduous forest, and is a mixture of deciduous and coniferous forest types. The Installation is located within the Fundy Coastal and Interior Section, and the Maine Eastern Coastal Subsection of the Province, which describes the forest vegetation as predominately spruce-fir and maple-beech-birch community types (USDA 2005). Although the Maine Eastern Coastal Subsection predicts the forest composition to include maple-beech-birch, the Installation contains no sugar maple (*Acer saccharum*) or American beech (*Fagus grandifolia*).

The residual natural vegetation cover of the Installation primarily consists of spruce-fir forests, open peatlands, and spruce dominated forested wetlands. Examination of pre-development aerial photographs revealed that the developed sections of the Installation were formerly covered by similar vegetative communities. The Installation is located within a band of boreal forest that extends southwest along the Maine coast into northern Hancock County, after which it extends along outer islands into Knox County. The most abundant birch is mountain paper birch (*Betula papyrifera* var. *cordifolia*), with gray birch (*B. populifolia*) occurring in disturbed soils in both upland and wetland areas. Yellow birch (*B. alleghaniensis*) is present but uncommon in the Sprague Neck area.

3.2.4.1 Upland Natural Communities

Maine Natural Areas Program (MNAP) has developed a classification system for Maine’s natural community types. This classification includes 98 distinct community types that are described in *Natural Landscapes of Maine* (Gawler and Cutko 2010). The descriptions of the natural community types that occur on NCTAMSLANT DET Cutler generally follow the MNAP classification system.

Very Low Frequency Area

The vegetation of NCTAMSLANT DET Cutler VLF area is typical of what is generally associated with this area of Downeast Maine. One exception is the presence of the large, maintained grassland area, which comprises a majority of the VLF area. This area provides suitable habitat for a number of plant and wildlife species, including grassland birds. Several of these species are rare, threatened, or endangered, or species of special concern, and are described in Section 3.2.6.

The predominant community type at NCTAMSLANT DET Cutler is Mixed Maritime Spruce–fir Forest (**Table 3.5**). Other community types that occur on the Installation include Managed Grassland, Crowberry–bayberry Headland, Green Alder Shrub Thicket, Green Alder/spruce Shrub Thicket, Upper Beach, Altered Land, and Maritime Spruce-fir Forest (Immature). These communities as well as approximately 29 acres of undetermined community type are presented in **Figure 3.9a** and **Figure 3.9b**.

Table 3.5 Upland Vegetation Community Types, NCTAMSLANT DET Cutler, Cutler, Maine.

Upland Community Type	Area (acres)
VLF Area	
Mixed Maritime Spruce-Fir Forest	432
Managed Grasslands	322
Crowberry–Bayberry Headland	120
Green Alder Shrub Thicket	77
Green Alder/Spruce Shrub Thicket	70
Upper Beach	33
Altered Land	15
Maritime Spruce-Fir Forest (Immature)	8
Undetermined	29
Total Upland Area	**1,106**
HF Area	
Altered Land	34
Total Upland Area	**34**

High Frequency Area

The only upland community type identified in the HF area is Altered Land (**Table 3.5** and **Figure 3.10**). Altered land is associated with the tower and building locations, as well as paved and unpaved roads that traverse the site of the HF area (34 acres).

3.2.4.2 Wetland Natural Communities

Wetland community types for the VLF and HF areas are described in Section 3.2.3.3 and shown in **Figure 3.9a**, **Figure 3.9b,** and **Figure 3.10**. Both the VLF area and HF area contain examples of Coastal Plateau Bogs. In the VLF area the Coastal Plateau Bogs are all located north of the perimeter road, and in the HF area the Coastal Plateau Bog habitat is associated with the Kelley Heath that partially extends inside the site boundary. Coastal Plateau Bogs are described in more detail in Section 3.2.7.

Very Low Frequency Area

Non-tidal wetland communities that occur within the VLF area include wet meadows dominated by herbaceous plants, speckled alder–dominated thickets, and peatlands. Plant species that that occur in these communities are described in Section 3.2.3.3. The five peatlands within the VLF area include examples of rare natural communities including Heath-Crowberry Maritime Slope Bogs and Deer Hair Sedge Meadow.

High Frequency Area

Non-tidal wetland communities that occur within the VLF area include wet meadows dominated by herbaceous plants, speckled alder–dominated thickets, and peatlands. Plant species that occur in these communities are described in Section 3.2.3.3. The five peatlands within the VLF area include examples of rare natural communities including Heath-Crowberry Maritime Slope Bogs and Deer Hair Sedge Meadow.

3.2.4.3 Invasive Species

Introduced plant species are nonindigenous species that do not naturally occur within the region, and have either accidentally or purposefully become established. While not all introduced species become invasive, many introduced species that become established outside of their native area are not subject to normal predation pressures, and will spread, often times forcing out or replacing native species. Invasive species are those that persist, proliferate, and cause economic or environmental harm (Ecological Society of America 2004).

Very Low Frequency Area

Four introduced plant species have been identified as occurring at the VLF: reed canary grass (*Phalaris arundinacea*), Japanese knotweed (*Polygonum cuspidatum*), ornamental jewelweed (*Impatiens glandulifera*), and common reed (*Phragmites australis*). Reed canary grass was identified within the disturbed areas along the south side of the road leading to Sprague Neck, and within artillery area near the IRP sites, and in areas along the tower field. Japanese knotweed was identified in two small areas, and a larger population along the Sprague Neck Road. This species has not spread since the construction of the facility, and it is not known to spread easily in eastern Maine (Famous 2010). A small area of ornamental jewelweed was also identified on Sprague Neck Road, and is considered a valuable late summer food for migrating hummingbirds. Common reed is located in a few small areas in and around the tower field peninsula.

High Frequency Area

Invasive species observed in the HF area was limited to minor amounts of reed canary grass located along the creek bed of Huntley Creek.

3.2.5 Wildlife

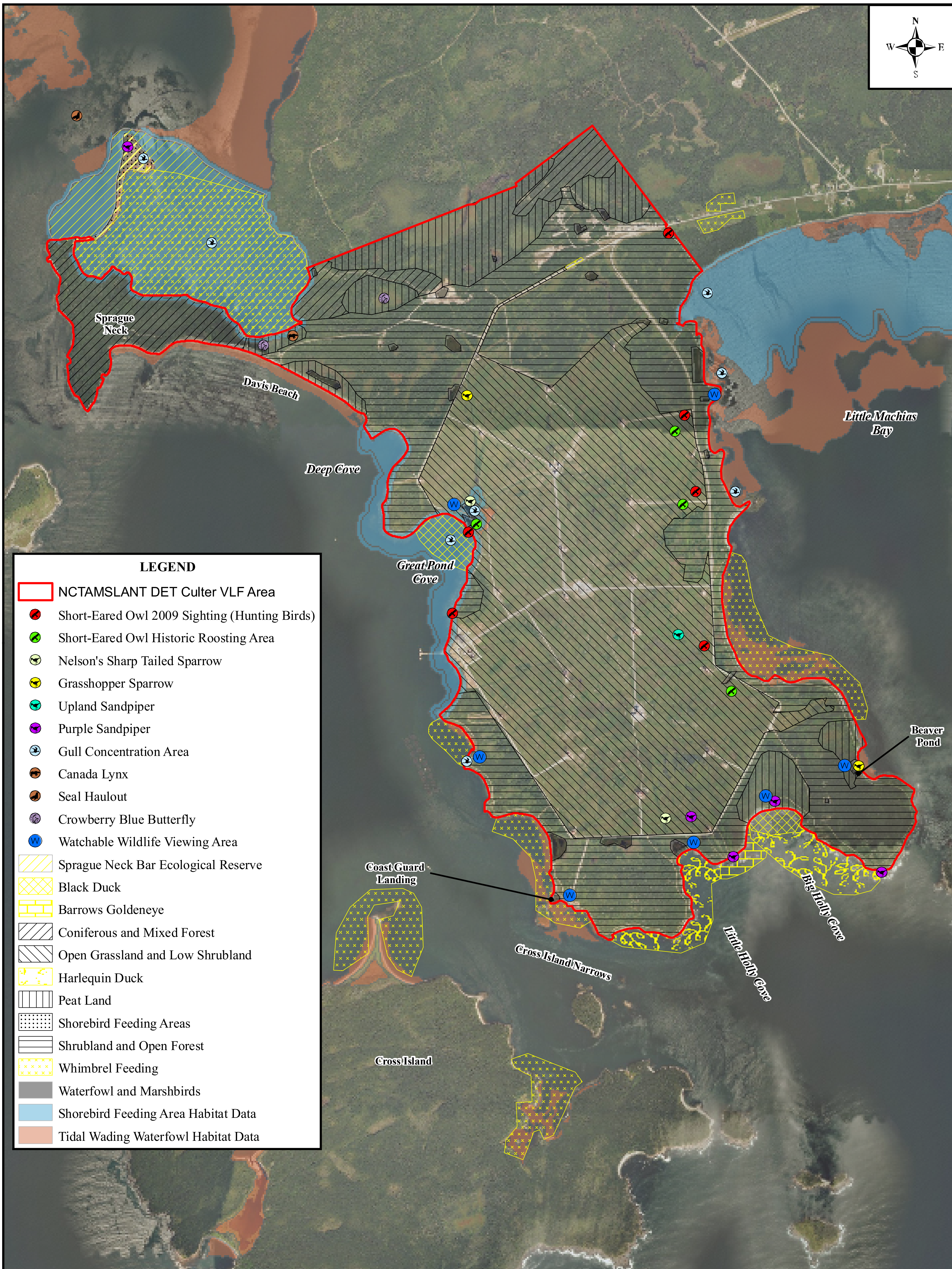
The wildlife of NCTAMSLANT DET Cutler generally are typical of eastern Maine. One unique aspect of the Installation, however, is the habitat provided within the extensive, artificial grassland associated with the VLF tower field, which is the second most abundant upland community type within the VLF area. This area provides suitable habitat for a number of species, some of which are species of federal or State concern. The wildlife species described in this section were determined to occur at NCTAMSLANT DET Cutler using the following methods: field surveys; interviews with local and regional experts, Navy personnel including riggers that maintain the VLF towers and antennas, present and former Installation security guards, and other Navy staff; input from MDIFW regional biologists and USFWS biologists; and, through desktop research. **Figure 3.11** and **Figure 3.12** provide information on wildlife observations and habitats for NCTAMSLANT DET Cutler.

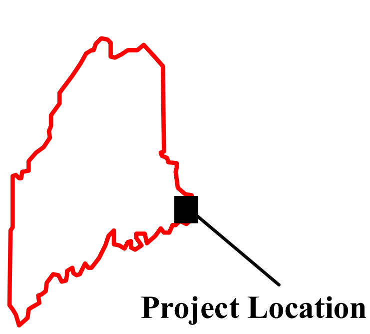
3.2.5.1 Mammals

Very Low Frequency Area

Twenty-four (24) terrestrial species were detected at NCTAMSLANT DET Cutler in 2009 (**Table 3.6**). No marine mammals occur at the Installation; however, four marine mammals have been observed in outer Little Machias Bay from the Installation. Most of the mammal species that occur in the VLF area also are associated with the HF area. Species identified visually or through direct evidence (e.g., scat, winter mammal track counts, small mammal trapping) are presented in **Table 3.6**.

The most abundant mammal species observed at the VLF included white-tailed deer, and common porcupine (*Erethizon dorsatum*). Harbor seals are also commonly observed hauled out on the rocks or beaches adjacent to the Installation. Other common species included snowshoe hare (*Lepus americanus*), meadow vole (*Microtus pennsylvanicus*), redback vole (*Clethrionomys gapperi*), red squirrel (*Tamiasciurus hudsonicus*), American beaver (*Castor canadensis*), eastern coyote (*Canis latrans*), bobcat (*Lynx rufus*), mink (*Mustela vision*), and weasel (*Mustela frenata*). Uncommon and rarely occurring species include moose (*Alces alces*), black bear (*Ursus americanus*), striped skunk (*Mephitis mephitis*), pine martin (*Martes americana*), common muskrat (*Ondatra zibethicus*), and small rodents such as chipmunks (*Tamias* spp.) and deer mice. Other mammals not observed, but expected to occur include bats (order Chiroptera), eastern gray squirrel (*Sciurus carolinensis*), fisher (*Martes pennant*), southern flying squirrel (*Glaucomys volans*), eastern gray squirrel (*Sciurus carolinensis*), harp seal (rare) (*Pagophilus groenlandicus*), small mammal species (i.e., rodents), and a variety of other small mammals.





2,500 1,250 0 2,500
Feet

Figure 3.11. Very Low Frequency Area Wildlife Habitat and Observations NCTAMSLANT DET Cutler, Cutler, Maine.

Source: Maine Office of GIS, Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; N. Famous, 2009c; MDIFW, Shorebirds, 2006.

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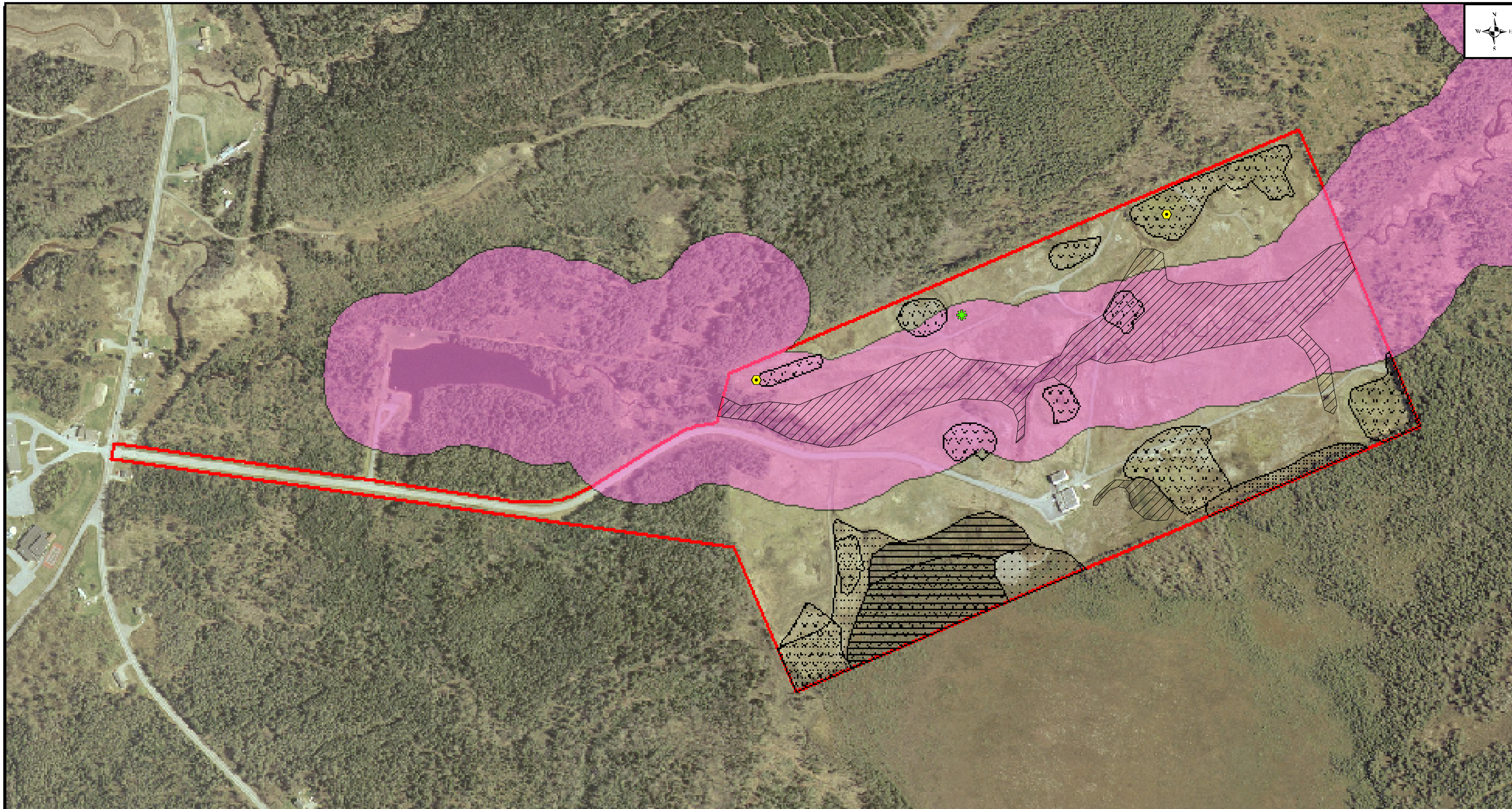

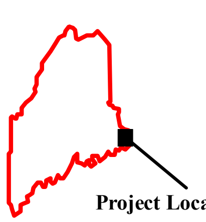

Source: Maine Office of GIS (MEGIS), Ortho_2F digital orthophotos, Machias Bay and Cross Island Maine, 2008; MDIFW, IWWH, Maine, 2008

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Feet

LEGEND

- NCTAMSLANT DET Cutler HF Area
- Water Bird and Marsh Bird Habitat (N. Famous)
- Former Plateau
- Black Crowberry
- Plateau Bog
- Osprey Nest
- *Houstonia longifolia*
- Inland Wading Waterfowl Habitat
- Contours at 2 Foot Interval
- Contours at 10 Foot Interval

Figure 3.12. High Frequency Area Wildlife Habitat and Observations NCTAMSLANT DET Cutler, Cutler, Maine.

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Table 3.6 Mammal Observations, NCTAMSLANT DET Cutler, Cutler, Maine.

Common Name	Scientific Name	VLF[1]	HF[1]	Observation[2]
American beaver	*Castor canadensis*	COM	PRESENT	OB
Black bear	*Ursus americanus*	UNC	UNC	OB
Bobcat	*Lynx rufus*	COM	UNC	OB
Canada lynx	*Lynx canadensis*	RARE	N/A	OB
Chipmunk	*Tamias striatus*	UNC	INDETERMINATE	OB
Common muskrat	*Ondatra zibethicus*	UNC	INDETERMINATE	OB
Common porcupine	*Hystrix cristata*	ABU	PRESENT	OB
Deer mouse	*Peromyscus maniculatus*	PRESENT	INDETERMINATE	TR
Eastern coyote	*Canis latrans*	COM	COM	OB
Finback whale	*Balaenoptera physalus*	RARE	N/A	OB (Offshore and mouth of LMB)
Gray seal	*Halichoerus grypus*	UNC	N/A	OB (Breeding in CIN)
Harbor porpoise	*Phocoena phocoena*	UNC	N/A	OB (CIN)
Harbor seal	*Phoca vitulina*	ABU	N/A	OB
Humpback whale	*Megaptera novaeangliae*	UNC	N/A	OB (Mouth of LMB)
Jumping mouse	*Zapus hudsonius*	PRESENT	INDETERMINATE	OB
Masked shrew	*Sorex cinereus*	PRESENT	INDETERMINATE	OB
Meadow vole	*Microtus pennsylvanicus*	COM	PRESENT	OB
Mink	*Mustela vison*	COM	PRESENT	OB
Minke whale	*Balaenoptera acutorostrata*	UNC	N/A	OB (CIN)
Moose	*Alces alces*	UNC	UNC	TR
Pine martin	*Martes martes*	RARE	INDETERMINATE	WT
Raccoon	*Procyon lotor*	PRESENT	PRESENT	TR
Red fox	*Vulpes vulpes*	COM	UNC	TR
Red squirrel	*Sciurus vulgaris*	COM	UNC	TR
Redback vole	*Clethrionomys gapperi*	COM	INDETERMINATE	TR
Right whale	*Eubalaena glacialis*	RARE	N/A	OB (outside of LMB)
Short-tailed shrew	*Blarina brevicauda*	PRESENT	INDETERMINATE	OB
Snowshoe hare	*Lepus americanus*	COM	PRESENT	HI
Striped skunk	*Mephitis mephitis*	UNC	INDETERMINATE	HI
Weasel	*Mustela frenata*	COM	PRESENT	HI
White-sided dolphin	*Lagenorhynchus obliquidens*	RARE	N/A	HI (outside of LMB)
White-tailed deer	*Odocoileus virginianus*	ABU	COM	OB

[1] Expected Frequency: ABU–Abundant; COM–Common; UNC–Uncommon; RARE–Rare; PRESENT–species was observed but frequency cannot be determined based on field data; INDETERMINATE–species was not observed but is suspected to occur.

[2] Observation Type: OB-Observed; WT-Winter Track Count Only; TR-Small mammal trap; HI-Historically known to occur at Installation; CIN-Cross Island Narrows; LMB-Little Machias Bay.

A Canada lynx, a federally threatened mammal species, was observed in February 2009 during winter mammal track count surveys. More details for this special status species are provided in Section 3.2.6.

High Frequency Area

Although not sampled as intensively as the VLF, the HF area likely supports most of the same species that were detected at the VLF site. **Table 3.6** presents a summary of mammals observed, an estimate of their expected frequency at the HF site, and the type of observation. None of the species observed were unique to the HF area, and the dominant small mammal collected during trapping was the masked shrew (*Sorex cinereus*).

Black bear, moose, and coyote sign appeared to be more abundant in the HF area than in the VLF area. White-tailed deer, red squirrel, chipmunk, and porcupine densities were lower in the HF area based on winter mammal track counts and sign.

3.2.5.2 Amphibians and Reptiles

MDIFW, in cooperation with Maine Audubon and the University of Maine, conducted the Maine Amphibian and Reptile Atlasing Project (MARAP) from 1986–1990 (Hunter et al. 1992), and updated in 1999 (Hunter et al. 1999). The objective of this project was to take advantage of numerous volunteers located throughout the state to document the distribution of amphibians and reptiles in Maine (Hunter et. al 1992). A species identification card was submitted for each MARAP observation that included the location (including township, if applicable) in which the amphibian or reptile was observed. Based on photographic records, field observations and collections, or vocalizations from the data collected, the MARAP identified nine amphibian and reptiles species for the Township of Cutler. These are identified as MARAP in **Table 3.7,** and indicate that the species is likely to occur on the Installation.

In addition to the background document review, site-specific data on amphibians were collected during various field surveys, however a formal, Installation-wide, vernal pool survey was not conducted. Surveys included amphibian vocalization surveys and vernal pool searches. Potential vernal pools were identified based on frog vocalization and data collected primarily was limited to species presence/absence; however, if egg masses were observed they were counted. Amphibian and reptile presence data were also collected during aquatic sampling and vegetation sampling. During these field efforts, eight species were documented to occur within ponds and streams located at NCTAMSLANT DET Cutler. Species that were actually observed on the Installation during field activities are indicated by the area (VLF or HF) within which they were observed in **Table 3.7**.

Very Low Frequency Area

The most frequently documented amphibian in the VLF area, identified from both visual observations and vocalizations, was spring peeper (*Pseudacris crucifer*). A formal vernal pool survey was not conducted; however, several areas of the Installation were noted to have higher densities of frog vocalization. The south side of the road leading from the tower field to Sprague Neck had a high volume of frog vocalization near the shore, especially around dusk. Many spring peepers and wood frogs (*Rana sylvatica*) could be heard calling from the wetland areas located along the northeast side of the tower field, and in the southwestern end of the tower field along the road leading to the Coast Guard landing. Spring peepers vocalizations were heard throughout the field season, until mid-November. Historically, spring peepers have been noted vocalizing in the VLF tower field in early December 1997 (Famous 2009a).

Table 3.7 Amphibian and Reptile Species Known to Occur at or near NCTAMSLANT DET Cutler, Cutler, Maine

Common Name	Scientific Name	NCTAMSLANT DET Cutler (VLF or HF) or Regional (MARAP) Observation
Amphibians		
American toad	*Bufo americanus*	HF,VLF
Eastern newt	*Notophthalmus viridescens*	MARAP
Green frog	*Rana clamitans*	VLF, HF, MARAP
Gray tree frog	*Hyla versicolor*	VLF
Spotted salamander	*Ambystoma maculatum*	VLF, HF, MARAP
Spring peeper	*Pseudacris crucifer*	VLF and HF
Two-lined salamander	*Eurycea bislineata*	MARAP
Wood frog	*Rana sylvatica*	VLF, HF,MARAP
Reptiles		
Common garter snake	*Thamnophis sirtalis*	VLF, HF, MARAP
Painted turtle	*Chrysemys picta*	MARAP
Redbelly snake	*Storeria occipitomaculata*	MARAP
Ringneck snake	*Diadophis punctatus*	MARAP

MARAP Source: Hunter et al. 1992 and Hunter et al. 1999

A yellow spotted salamander (*Ambystoma maculatum*) egg mass and adult red spotted newt (*Notophthalmus viridescens*) were collected during aquatic surveys of the pond located east of the gravel pit and firing range, in the northern section of the VLF area. The egg mass was nearly hatched out at the time it was observed in late May 2009. The most prevalent amphibians encountered during aquatic sampling surveys were tadpoles of an unidentified species. Although identification was not confirmed, they were most likely wood frogs and spring peepers.

High Frequency Area

Three vernal pools were identified at the HF site, and surveys of these areas detected yellow-spotted salamanders and wood frogs. The number of egg masses per pool ranged from 8–23. Due to access constraints and the relatively small acreage of the HF area, this site was sampled less intensively than the VLF.

3.2.5.3 Birds

NCTAMSLANT DET Cutler is an Important Bird Area (IBA) recognized both in Maine and globally (Gallo et al. 2008 and DoD Partners in Flight Important Bird Areas Program undated). Due to the abundance of shorebirds that utilize the area as well as the presence of numerous species of conservation concern, Sprague Neck meets criteria established by the Maine IBA program. Maine Audubon, with assistance from MDIFW staff, identified sites across the state that provided important habitat for one or more species of breeding, wintering, or migrating birds (Gallo et al. 2008). These sites were then organized by areas (i.e., IBAs) based on their proximity to each other or by ecosystem in which they occur (Gallo et al. 2008). Machias Bay IBA includes the Sprague Neck, Machiasport, Old Man Island, and Libby Island sites.

The Installation also represents one of the most species-rich areas, in terms of its size, in the northeastern U.S. for nesting bird species, with 122 species of confirmed breeders plus an additional 13 species classified as probable breeders. A total of 149 bird species have been detected as migrants either at NCTAMSLANT DET Cutler or within offshore areas within 500 ft of the Installation. Six additional species of seabirds have been observed within 1 mile from shore. Since 1978 a total of 286 bird species have been identified at the Installation, with 218 of these species identified during 2009 field surveys (Navy 2012). This list was generated with data collected during bird surveys as well as incidental observations by field biologists, desk-top analysis, and informational interviews. In addition to incidental field observations, bird surveys conducted during 2009 include breeding season point count surveys, grassland bird surveys, shorebird surveys, and focus species surveys. Incidental observations were documented during other biological surveys including but not limited to small mammal trapping, vegetation sampling, and vernal pool searches.

Of the 135 breeding bird species associated with NCTAMSLANT DET Cutler, 123 species were detected at NCTAMSLANT DET Cutler in 2009 (Navy 2010). In addition, appropriate habitat for another six more secretive species occurs on the Installation. The high number of nesting species is likely due to of the structural diversity created by moderate-sized blocks of specialized habitat types that include spruce and mixed deciduous forests, open tall shrub-dominated woodlands, dense tall shrublands, extensive peatlands (bogs and fens), managed open grasslands, and a large array of wetland types. In addition to providing important breeding habitat, NCTAMSLANT DET Cutler is an important stopover area for many regionally rare and accidental species including a variety of gulls, shorebirds, and waterbirds.

As part of the 1988 amendment to the Fish and Wildlife Conservation Act (Public Law 100-653), the USFWS is required to identify species, subspecies, and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973. According to the USFWS *Birds of Conservation Concern 2008* (USFWS 2008), NCTAMSLANT DET Cutler is located within the U.S. portion of the Atlantic Northern Forests region, also known as Bird Conservation Region (BCR) 14. The goal for identification of USFWS Birds of Conservation Concern (BCC) is to stimulate the implementation of coordinated, proactive management and conservation actions among federal, state, tribal, and private partners to prevent these species from being listed under ESA. Additionally, the BCR lists are intended to assist federal land-managing agencies and their partners in their efforts to abide by the bird conservation principles embodied in the MBTA and EO 13186 titled "Responsibilities of federal agencies to protect migratory birds" (USFWS 2008). Of the 29 bird species listed by USFWS for BCR 14, 25 of these species have been documented at the Installation (Navy 2012)**.**

Very Low Frequency Area

Two hundred and eighty-six (286) bird species have been documented in the VLF area since 1975 (Famous 2009d). The following number of species are associated with one or more of the habitat types of the VLF area: 30 species utilize the VLF area grassland habitat, 50 species utilized the shrub habitat, 40 species utilize the Maritime Spruce-fir Forest habitat, 49 species utilize the peatland habitat; 38 species utilize the shoreline and intertidal flat habitat; and 19 species utilize the nearby offshore pelagic habitat (Famous 2009b).

The forests, woodlands, and older shrub-dominated habitats contain fleshy-fruit bearing trees and shrubs that support fruit-eating migratory birds such as whimbrel, a Maine species of special concern, and American robin (*Turdus migratorius*), hermit thrush (*Catharus guttatus*), purple finch (*Carpodacus purpureus*), and waxwings (*Bombycilla* spp.), during the fall migration and in winter. The expansive alder-dominated shrublands surrounding the VLF tower fields support wintering populations of seed eating northern finches (e.g., common redpoll [*Carduelis flammea*], pine siskin [*Spinus pinus*]), especially during winters.

Neotropical migrant species such as black-throated green warbler (*Dendroica virens*) occur in high nesting densities within the forest community of Sprague Neck. The tall shrub dominated habitats that surround the VLF tower field support populations of willow flycatcher (*Empidonax trailii*) and alder flycatcher (*E. alnorum*), chestnut-sided warbler (*Dendroica pensylvanica*), and American redstart (*Setophaga ruticilla*). The forest and sand and gravel bar of the Sprague Neck peninsula also support fall migrants such as horned larks (*Eremophila alpestris*), and, in some years, snow buntings (*Plectrophenax nivalis*), Lapland longspurs (*Calcarius lapponicus*) and water pipits (*Anthus spinoletta*) between October and December (Famous 2009d).

Nesting northern harriers (*Circus cyaneus*) and osprey (*Pandion haliaetus*) are also associated with the VLF tower field. The former campground at Sprague Neck was the site for a nesting long-eared owl (*Asio otus*) documented in the early 1980's, and this same area contained the first confirmed nesting merlin (*Falco columbarius*) in the eastern U.S. in the mid 1980's (Famous 2009c). Grassland songbird species that occur in this community include eastern bluebird (*Sialia sialis*), eastern meadowlark (*Sternalla magna*), field sparrow (*Spizella pusilla*), grasshopper sparrow, bobolink (*Dolichonyx oryzivorus*), and upland sandpiper. These species may also nest in the grassland habitat. Osprey frequently construct nests on the antennas at the VLF.

Shorebird species richness in the VLF area is among the highest in Maine with 35 species detected since 1978. Although shorebirds are present during winter and spring, the VLF area is primarily a fall migration stopover area. The number of shorebirds using intertidal habitats surrounding the VLF has declined significantly since the late 1970s, both locally and regionally. Shorebird counts for Sprague Neck and several other locations have declined from a high of about 10,000 birds to less than 1,500 birds at present (Famous et al. 1980 and Famous 1994).

As evidenced by the 1990 designation of the ERA, the Navy recognizes that Sprague Neck and the surrounding area provide an important staging area for migratory shorebirds, particularly during the southward migration season (July–October). Thirty-five (35) species of shorebirds were observed in the VLF area between 1978 and 2009 (Navy 2010), however many of these are infrequent visitors. The Installation and surrounding area have recorded high numbers of several species of concern during fall migratory bird counts, including whimbrels (Famous 2010). Whimbrels in eastern Maine typically fatten up on fleshy fruits prior to departing on their trans-Atlantic flight to northern South America.

Shorebird feeding and roosting areas at the Installation include the largest and most stable shorebird site in the Machias and Little Machias bays region, providing habitat for 11 of the most abundant shorebird species (**Table 3.8**).

Table 3.8 Shorebird Species that Feed and Roost at NCTAMSLANT DET Cutler, Cutler, Maine.

Common Name	Scientific Name	Conservation Concerns[1]
Black-bellied plover	*Pluvialis squatarola*	IBA
Dunlin	*Calidris alpina*	SHP1
Greater yellowlegs	*Tringa melanoleuca*	IBA
Least sandpiper	*Calidris minutilla*	–
Lesser yellowlegs	*Tringa flavipes*	BCC (non-breeding)
Purple sandpiper	*Calidris maritima*	BCC (non-breeding)/SHP1
Red knot	*Calidris canutus*	FC/BCC (non-breeding)/SHP1
Semipalmated plover	*Charadrius semipalmatus*	IBA
Semipalmated sandpiper	*Calidris pusilla*	SSC/BCC (non-breeding)/IBA
Short-billed dowitcher	*Limnodromus griseus*	SHP1/IBA
Whimbrel	*Numenius phaeopus*	SSC/BCC (non-breeding)/SHP1/IBA
White-rumped sandpiper	*Calidris fuscicollis*	IBA

[1]**Conservation Concerns**

SSC	Maine Species of Special Concern	
BCC	USFWS Birds of Conservation Concern	
Shorebird Conservation Plan	SHPE-Populations Imperiled	SHP1-High Priority
IBA Criteria	Maine Important Bird Areas Program-High populations of statewide significance	

High Frequency Area

One hundred and three (103) bird species have been documented at the HF site historically, of which 95 species were observed at the site during 2009 field activities (Navy 2012). The alder-dominated shrublands surrounding the HF tower fields support large wintering populations of seed eating northern finches, and are valuable for fall migrants and wintering landbirds (Famous 1994). These observations also include birds observed in the woods adjacent to the site that were detected during breeding season point count surveys. The actual list of birds breeding within the site is somewhat less, and the overall list of species for the HF area is low because no historic surveys have been conducted other than several hawk counts during the late 1970’s (Famous 2009d). In addition, the number of species associated with the HF area is much lower in comparison to the VLF area due to the smaller size of the parcel, and the more uniform habitat types associated with this area of the Installation.

3.2.5.4 Fish

Very Low Frequency Area

Fish species that have been observed in the VLF area include American eel (*Anguilla rostrata*), fourspine stickleback (*Apeltes quadracus*), ninespine stickleback (*Pungitius pungitius*), banded killifish (*Fundulus diaphanous*), and mummichog (*Fundulus heteroclitus*). All of the fish that have been observed in the VLF area ponds were small in size (total length less than 2 inches) and likely represent young-of-the-year.

High Frequency Area

No fish were observed in surveys conducted in Huntley Creek. Although no fish were observed, the macroinvertebrate community that is occurs in the small stream represents a suitable food source for fish, and due to the perennial flow associated with this creek there is a high potential for fish to occur.

3.2.5.5 Invertebrates

The crowberry blue butterfly is a state listed species of special concern. Although this species has not been confirmed in either the VLF or HF areas at the time this document was produced, it is expected to occur in both the VLF and HF areas at NCTAMSLANT DET Cutler due to the presence of the low growing shrub, black crowberry, upon which this species is dependent. More information on this species is provided in Section 3.2.6.2 and Section 3.2.7.

Very Low Frequency Area

The overall diversity of invertebrate species collected from the ponds of the VLF was low. In addition to the aquatic invertebrates observed, common terrestrial forms expected to occur within the VLF area include the following: spiders (Arachnida); grasshoppers, katydids, crickets, mantids, walkingsticks, and cockroaches (order Orthoptera); earwigs (order Dermaptera); stink bugs (order Hemiptera); cicadas and aphids (order Homoptera); terrestrial beetles (order Coleoptera); butterflies and moths (order Lepidoptera); flies (order Diptera); and, ants, wasps, and bees (order Hymenoptera).

High Frequency Area

Common macroinvertebrates that occur within Huntley Creek include three species of case-maker caddisfly larvae (order Trichoptera), stonefly larvae (Plecoptera), adult and larval mayflies (order Ephemeroptera), and fingernail clam (family Sphaeriidae). Other macroinvertebrate types collected within the stream channel include water penny beetle (family Psephenidae), whirligig beetle (family Gyrinidae), backswimmer beetles (*Notonecta* sp.), predacious diving beetle (family Dytiscidae), dragonfly larva (suborder Anisoptera), damselfly larva (suborder Zygoptera), mosquito larva (family Culicidae), black fly larva (family Simuliidae), amphipod (order Amphipoda), snail (order Gastropoda), leech (class Hirudinea), and oligochaete worms (class Oligochaeta). The diversity of macroinvertebrates observed suggests the stream water is of moderately–high quality. Similar terrestrial invertebrates are expected to occur in the HF as in the VLF area.

3.2.6 Threatened and Endangered Species, and Species of Special Concern

Data and research on threatened and endangered, and special concern flora and fauna species that are known or expected to occur at NCTAMSLANT DET Cutler were collected during species specific searches conducted during the spring, summer, and fall months of 2009, as well as incidental observations of occurrence during site survey work. Direct observations or historical reports of known or suspected occurrence of threatened and endangered or special concern species, are discussed below for flora and fauna, including mammals, birds, fish, and invertebrates. No special status amphibian and reptile species were observed or expected to occur at the Installation. **Table 3.9** lists the federal and state threatened and endangered mammal and bird species known to occur at the Installation.

Eastern small-footed bat (*Myotis leibii*) and northern long-eared bat (*M. septentrionalis*) are also included in **Table 3.9** as they have the potential to occur at the Installation. These two bat species are not currently federally or state listed; however, the USFWS initiated a 90-day review on July 29, 2011 to determine if federal listing of these bat species is warranted (USFWS 2011a). As of January 2012, listing determination of these two species was still under review by USFWS.

Rare natural plant communities are described in Section 3.2.7. A complete list of rare, threatened, and endangered species associated with the Installation is provided in **Appendix C** of the NCTAMSLANT DET Cutler INRMP (Navy 2012), which includes many bird species listed as species of special concern in Maine, USFWS BCC; and birds protected by an IBA, the National Shorebird Plan, and DoD Partners in Flight (PIF).

3.2.6.1 Vegetation

No threatened or endangered plant species were detected during multiple rare plant surveys.

Very Low Frequency Area

Several species that were formally listed as rare in Maine, but have recovered, occur at NCTAMSLANT DET Cutler. These include Hooker's iris (*Iris setosa* var. *canadensis*; formerly listed as *Sedum roseum*), blue-eyed grass (*Sisyrinchium montamum*), and dragon's mouth (*Arethusa bulbosa*).

High Frequency Area

The longleaf summer bluet (*Houstonia longifolia*), a Maine Species of Special Concern and was detected in upland habitat of the HF area (**Figure 3.12**).

Table 3.9 Federal and State Threatened and Endangered, Special Concern, and Candidate Species of NCTAMSLANT DET Cutler, Cutler, Maine.

Common Name	Scientific Name	Status
Mammals		
Canada lynx	*Lynx canadensis*	FT
Eastern small-footed bat	*Myotis leibii*	UR
Northern long-eared bat	*Myotis septentrionalais*	UR
Birds		
Arctic tern	*Sterna paradisaea*	ST, BCC
Bald eagle	*Haliaeetus leucocephalus*	ST, BCC (breeding)
Grasshopper sparrow	*Ammodramus savannarum*	SE
Great cormorant	*Phalacrocorax carbo*	ST (nesting), BCC (non-breeding)
Harlequin duck	*Histrionicus histrionicus*	ST
Least tern	*Sternula antillarum*	SE
Peregrine falcon	*Falco peregrinus*	SE (breeding), BCC (breeding)
Piping plover	*Charadrius melodus*	FT, SE
Razorbill	*Alca torda*	ST
Red knot	*Calidris canutus*	FC
Roseate tern	*Sterna dougallii*	FE, SE
Short-eared owl	*Asio flammeus*	ST (breeding)
Upland sandpiper	*Bartramia longicauda*	ST, BCC
Invertebrates		
Crowberry blue butterfly	*Plebejus idas ssp. empetri*	SSC

BCC USFWS Bird of Conservation Concern
FC Federal Candidate
FE Federally Endangered
FT Federally Threatened
SCC Maine Species of Special Concern
SE Maine Endangered
ST Maine Threatened
UR Under USFWS Review for listing (USFWS 2011a)

3.2.6.2 Wildlife

Very Low Frequency Area

Mammals

In February 2009 a Canada lynx, a federally threatened mammal species, was observed along the road that leads from the VLF tower field to Sprague Neck during winter mammal track count surveys (Famous 2009a and **Figure 3.11**). Canada lynx is found in boreal forests in northern U.S. and Canada. Quality lynx habitat generally consists of large areas of young, dense stands of balsam fir and northern hardwoods under 30 years old after a major forest disturbance (e.g., cutting, fire). These habitats contain abundant snowshoe hare and denning sites (MDIFW 2003).

In 2009, the USFWS issued revised critical habitat for the Canada lynx. This designation included a section of northern Maine (Unit 1) and includes portions of Aroostook, Franklin, Penobscot, Piscataquis, and Somerset Counties (USFWS 2009). NCTAMSLANT DET Cutler is not located within the federally-designated critical habitat for this species. However, lynx habitat and its main food item, the snowshoe hare, occur on the Installation.

The forested habitats provide foraging habitat for the eastern small-footed and northern long-eared bats, and the Installation is within the documented range of both of these species (USFWS 2011a). Summer roosts of the eastern small-footed bat typically are within talus (a slope of accumulated rock debris) areas associated with rocky ridge-tops, but they are also known to roost on buildings and bridges, and behind loose bark on trees. Overwintering hibernacula of eastern small-footed bats, includes caves and abandoned mines. Eastern small-footed bats are nocturnal foragers, foraging primarily over streams, ponds, or other waterbodies that have high concentrations of nocturnal insects. They are considered generalist feeders, feeding primarily on soft-bodied prey that they capture during flight, or that they glean from surfaces.

Preferred summer roosts of the northern long-eared bat are generally associated with old-growth forests composed of trees 100 years old or older, and this species is dependent on intact interior forest habitats that have a low edge-to-interior ratio (USFWS 2011a). Relevant late-successional forest features include a high percentage of old trees, uneven forest structure, single and multiple tree-fall gaps, standing snags, and woody debris. This species appears to favor small cracks or crevices in cave ceilings for hibernation. Northern long-eared bats are opportunistic insectivores, obtaining prey both in flight and by gleaning from surfaces. Prey includes small insects, such as moths, flies, leafhoppers, and beetles. Forested hillsides and ridges are their preferred foraging habitat, with the presence of mature forest stands thought to play an important role in their foraging behavior. Foraging occurs at dusk over small ponds and forest clearings under the forest canopy, or along streams.

Although offshore areas of NCTAMSLANT DET Cutler are not covered by this INRMP, the following marine wildlife observations are provided as a reference to the importance of the marine habitat that surrounds the peninsula of the VLF area. In October 2009, a finback whale (*Balaenoptera physalus*), a federally threatened species, was observed about a mile offshore from Big Holly Cove feeding with a group of about 150 diving northern gannets and other seabirds. With the exception of years when schools of spawning herring (*Clupea* spp.) are present, fin whales and other cetaceans are uncommon near the Installation during most years. Minke whales (*Balaenoptera* sp.) have also been observed in Cross Island Narrows within 500 ft of Little Holly Cove in 1993 (Famous and Spencer-Famous 1994). One-week old gray seal pups were observed on ledges in Cross Island Narrows south of the Coast Guard Landing in 1993 and 1994 (Famous and Spencer-Famous 1994).

The endangered North Atlantic right whale (*Eubalaena glacialis*), threatened humpback whale (*Megaptera novaeangliae*), and Atlantic white-sided dolphin (*Lagenorhynchus acutus*) have been observed in the outer section of Little Machias Bay during the 1980’s (Turnbull 2009). Over 25% of the world population of the North Atlantic right whale summer in the lower Bay of Fundy, and individual whales have historically been observed in the Grand Manan Channel between NCTAMSLANT DET Cutler and Grand Manan Island. Other federally protected whale species documented in the Bay of Fundy region over the past three decades include sperm whale (*Physeter catodon*), blue whale (*Balaenoptera musculus*), and sei whale (*Balaenoptera borealis*; one occurrence).

Birds

Several state and federally protected bird species have been observed in the VLF area (**Table 3.9** and Navy 2012). The only federally endangered bird species observed in the VLF area is the roseate tern, which is also a Maine endangered species. At the Installation, individuals of this species forage and take advantage of shoreline habitat around Sprague Neck and Great Pond Cove for resting and roosting at high tide (Famous 2010). The roseate tern does not breed at the Installation, but uses the site and nearby beach areas of Little Machias Bay along with other terns, such as Arctic tern, a Maine threatened species, and may bring young there to rest. The highest numbers of terns using Sprague Neck is during high tide. Feeding terns are present in the Cross Island Narrows, in proximity to Machias Seal Island, and likely nest on The Brothers Islands.

Of the shorebird species associated with the Installation the piping plover is federally threatened and endangered in Maine. Piping plover was observed at Sprague Neck Bar and use habitat at the Installation for stopovers during migration flights. Breeding habitat for this species is present at the VLF area as well. Although not listed as threatened or endangered, the red knot (*Calidris canutus rufa*) is a candidate for federal listing, and this species has been documented to occur each year at Sprague Neck and in Little Machias Bay (Famous 2009c). These large shorebirds forage along the shores of the VLF area during stopovers along their migration flights, primarily the fall migration between late July and early October. Other birds species listed as endangered in Maine include grasshopper sparrow, least tern (*Sternula antillarum*), and the breeding population of peregrine falcon (*Falco peregrinus*).

In addition to Arctic tern, other bird species associated with the Installation that are listed as threatened in Maine include upland sandpiper, razorbill, bald eagle, nesting population of great cormorant, harlequin duck, and the breeding population of short-eared owl (**Table 3.9**). An additional 41 bird species observed at the Installation are listed as a species of special concern in Maine, 25 species are listed as BCC by the USFWS, and the habitat of eight other bird species known to occur at the VLF area have been designated as Important Bird Habitat by the state of Maine (MDIFW 2009, USFWS 2008, and Navy 2012).

The bald eagle was removed from the federal list of threatened and endangered wildlife on 7 July 2007 (USFWS 2007). The USFWS established National Bald Eagle Management Guidelines in 2007 that include protective measures outlined in the Eagle Act (16 USC §668–668c) and the MBTA, (16 USC §703–712). At NCTAMSLANT DET Cutler, bald eagles are found primarily near the immediate coastline or on nearshore ledges; they are distributed throughout most of Installation, but especially at the VLF site. MDIFW has designated areas in the vicinity of NCTAMSLANT DET Cutler as important bald eagle nesting habitat (MDEP 2009). The closest known bald eagle nest is located at Cape Wash Island (Todd 2010), located approximately ¼ miles southeast of the VLF peninsula. Due to their association with NCTAMSLANT DET

Cutler, the National Bald Eagle Management Guidelines have been included as a management measure in this INRMP for the protection of this species.

Fish: Atlantic Salmon (Federal Endangered Species)

Historically, the northeast section of Maine coastline, and its associated rivers were major migratory routes and spawning grounds for Atlantic salmon. Due to biological, environmental, and anthropogenic effects, such as pollution, habitat degradation, overfishing and bycatch, which have increased over the past several decades, the population of Atlantic salmon documented to use this area of the Maine coastline and area rivers for migration and spawning has declined significantly, resulting in the recent federal listing of this species as endangered by the USFWS and NOAA. Other factors that are thought to contribute to the decline in Atlantic salmon populations in the area include the presence of salmon aquaculture projects in the area, which can cause negative changes in the gene pool, contribute to the frequency of disease, and cause negative effects from competition (Fay et al. 2006).

The USFWS and NMFS listed the Gulf of Maine Distinct Population Segment of Atlantic salmon as endangered on December 17, 2000 (NMFS and USFWS 2005). The Gulf of Maine Distinct Population Segment includes all naturally reproducing populations of Atlantic salmon associated with the Kennebec River downstream of the former Edwards Dam site, extending northward to the mouth of the St. Croix River, as well as salmon taken for hatchery rearing for broodstock purposes, and any captive progeny from these salmon. The closest rivers to the Installation that support populations of the Gulf of Maine Distinct Population Segment are the Machias and East Machias rivers, which discharge into Machias Bay.

The freshwater habitat of this species includes clear, cold streams and rivers that have relatively unobstructed connection to the sea. Spawning habitat is characterized by coarse gravel or rubble bottom with suitable well-oxygenated, clean water of appropriate velocity and depth (NMFS and USFWS 2005). NOAA has designated critical habitat for Atlantic salmon for the NCTAMSLANT DET Cutler area and Atlantic salmon are known to utilize areas off the coast of the Installation and the nearby rivers. However, there is no suitable habitat at NCTAMSLANT DET Cutler that could support Atlantic salmon. The VLF area lacks drainages that have sustained flow, and only ephemeral drainages and manmade ditches occur within the VLF.

Invertebrates: Crowberry Blue Butterfly (Maine Species of Special Concern)

The crowberry blue butterfly is a Maine species of special concern, and has an MNAP Rank of S4 (apparently secure in Maine), and a Global Rank of G5 (demonstrably secure globally). Black crowberry shrubs are an essential component of the crowberry blue butterfly life cycle, as it is the preferred substrate on which eggs are deposited by the adult female. Upon hatching these larvae feed on black crowberry leaves until forming a pupa, from which the adult butterfly emerges. Within the VLF area, field biologists have tentatively identified crowberry blue butterflies in a sloping bog behind Davis Beach and in a small coastal peatland located west of the artillery range (**Figure 3.11**). If the presence of this species is confirmed in future surveys, these will be new U.S. records.

High Frequency Area

Mammals

No threatened or endangered mammal species were observed or are known to occur in the HF area.

Birds

Although a few of the sensitive bird species have been documented to occur at the HF area, a majority of the sensitive species that occur at NCTAMSLANT DET Cutler are associated with the VLF area, due to the coastal location and diversity of habitat types found at the VLF area. One exception is the short-eared owl, which is expected to utilize the habitats of the HF area and adjacent bog habitat for hunting. Although bald eagle observations are primarily associated with the VLF area, bald eagles also have been observed at the HF site, but with the exception of occasional dead carcasses, feeding habitat is limited at this site. Although rare, grasshopper sparrows and upland sandpipers have a low possibility of occurring at the HF area.

Fish: Atlantic Salmon (Federal Endangered Species)

Huntley Creek, a small perennial stream, flows through the HF area. Although this small stream maintains flow throughout the year, it lacks key features that are necessary for spawning Atlantic salmon habitat. First, there is a lack of suitable flow within the stream for salmon. In many areas, the stream becomes shallow (~0.5 ft) and narrow (<2 ft). Although gravel substrate was observed within the creek, there were scattered patches of finer grain material including clay. Lastly, before reaching Holmes Bay, Huntley Creek flows into a dammed reservoir at Huntley Creek Pond. This impoundment prevents potential passage to and/or from the sea. Therefore, inadequate flow, marginal substrate, and obstructed connection to the sea make it highly unlikely that Huntley Creek contains Atlantic salmon.

Invertebrates: Crowberry Blue Butterfly (Maine Species of Special Concern)

Black crowberry is one of the dominant plants that are associated with Kelley Heath Coastal Plateau Bog that straddles the southern border of the HF area (Navy 2012). Valuable crowberry blue habitat has also colonized disturbed areas in many sections of the HF site. It is particularly common on damp surfaces under and surrounding antenna structures on the south side and northeast corner of the site. In addition, large patches of black crowberry are present in the vicinity of the antenna located near the stream crossing as well as the antenna located on the north edge of the Installation above the stream crossing. Surveys for crowberry blue butterfly completed in 2009 did not detect this species within the peatland habitat located within or adjacent to the HF area, however adverse weather conditions during the survey period, access limitations, and timing of the surveys compromised the effectiveness of crowberry blue butterfly surveys conducted in the HF area.

3.2.7 Rare Communities and Significant Habitat

Special concern communities and habitat includes rare community types identified by the MNAP (e.g., state rank S1, S2, S3), and Significant Wildlife Habitat defined by MDIFW. MDIFW has defined and/or mapped the following Significant Wildlife Habitat areas: high and moderate value waterfowl and wading bird habitat, including nesting and feeding areas; shorebird nesting, feeding, and staging areas; significant vernal pools; and deer wintering habitat.

Very Low Frequency Area

The VLF area contains the MNAP Coastal Plateau Bog ecosystem, which is state-ranked S3, rare in Maine. Four coastal peatland communities occur entirely within the VLF and are located along the northern boundary of the site. These peatlands include one area of Heath–Crowberry Maritime Slope Bog (S2) and three areas of Deer-hair Sedge Bog Lawn (S3). The VLF tower field also supports two buried historic peatlands in the southeast portion of the southern antenna array. A fifth peatland is located along the northeast boundary of the VLF area and extends offsite. Minimal subsurface water movement occurs in the coastal peatlands because the wetland is perched on an impermeable layer (e.g., marine clay of the Presumpscot formation) that isolates it from the regional water table (Famous 2009c).

Coastal peatlands containing black crowberry support the rare crowberry blue butterfly, a species found only at 17 locations in the U.S. Black crowberry is the host plant for the caterpillar stage of this species. See Section 3.2.6.2 and Section 3.2.7 for a more thorough discussion of the crowberry blue butterfly. Habitat is also present that has the potential to support other state listed plants, including northern comandra (*Geocaulon lividum*), the diminutive boreal blueberry (*Vaccinium borealis*), screw-stem (*Bartonia paniculata*), Wiegand's sedge (*Carex wiegandii*), and former state listed and regionally rare/uncommon species such as dragon’s mouth, and baked-apple berry (*Rubus chamaemorus*).

The MDIFW has identified and mapped important waterfowl and wading bird habitat, and shorebird resting and feeding habitat throughout Maine. Maine contains numerous coastal and inland areas that are important for birds migrating southward. These areas are sought out by birds due to the availability of suitable roosting habitat in proximity to adequate food resources, which are critical for meeting their energy demands during breeding. As a result, shorebirds are often observed concentrating in large groups in order to utilize the limited number of these prime habitats, and are known to exhibit fidelity to these sites, which make them particularly vulnerable to habitat degradation, disturbance by humans and their pets, and habitat loss. Coastal areas located in the Bay of Fundy and eastern Maine are considered the most important southward staging area for shorebirds in eastern North America (MDIFW 2009b).

Much of the areas located along the coast of the VLF peninsula and Sprague Neck peninsula also have been designated as important habitat for tidal wading waterfowl (**Figure 3.11**). MDIFW has designated approximately 40% of the Little Machias Bay as significant high-use shorebird habitat (Famous 2010). In addition, MDIFW has identified important shorebird feeding habitat in the northeastern end of Holmes Bay, along the western edge of the VLF peninsula (from the southern end of Davis Beach, along Deep Cove, and in the vicinity of Great Pond and Great Pond Cove), and in the northern region of Little Machias Bay (**Figure 3.11**). MDIFW has also identified important shorebird roosting habitat along the northeastern edge of the VLF peninsula within Little Machias Bay, and along the northern edge of Little Machias Bay. Shorebirds feeding in Holmes Bay utilize both the end of Sprague Neck Bar as high tide roosting areas. Sprague Neck was a major roosting area until merlins, a shorebird predator, began nesting on Sprague Neck in the mid 1980s. Although many shorebirds now roost on the ledges of nearby Hog Island, some still utilize the end of Sprague Neck at lower levels. Seabirds do not nest at NCTAMSLANT DET Cutler, largely due to the presence of small mammals and other predators.

High Frequency Area

The MNAP classifies Kelley Heath as a Coastal Plateau Bog within the significant Coastal Plateau Bog ecosystem type. The Kelley Heath is approximately 225 acres in size, and extends south from the southern boundary of the HF site (**Figure 3.12**). Only the northern most section, approximately 8 acres, of Kelley Heath is located within the HF boundaries. Presently, the perimeter of the filled area at the HF site has been recolonizing naturally over the last 50 years by bog species characteristic of Coastal Plateau Peatlands, including six species of sphagnum moss. The Kelley Heath Coastal Plateau Bog is surrounded by black spruce flats (MNAP 2003). Dominant plant species within Kelley Heath include deer-hair sedge (*Trichophorum cespitosum*) and black crowberry. Tussock cotton-grass (*Eriophorum vaginatum*), sheep laurel (*Kalmia angustifolia*), bog laurel (*Kalmia polifolia*), small cranberry (*Vaccinium oxycoccos*), Labrador tea (*Rhododendron groenlandicum*), baked-apple berry, and black chokeberry (*Photinia melanocarpa*) are other plant species common to Kelley Heath.

Coastal peatlands containing black crowberry support the rare crowberry blue butterfly as well as other state listed plants. See the coastal peatland description for the VLF area above for other species that may occur within the coastal peatland communities.

The MNAP created two focus areas in the vicinity of NCTAMSLANT DET Cutler; The Cutler West Focus Area and the Larrabee Focus Area. The Cutler West Focus Area is located west of Route 191 and south of the HF area, and includes the Kelley Heath. The Larrabee Focus Area is located south of Sprague Neck peninsula. MNAP is in the process of combining these two separate focus areas into a single Machias Bay Focus Area.

3.3 HUMAN ENVIRONMENT

This EA assesses effects to the human environment, which consist of components such as (1) cultural resources, (2) infrastructure, and (3) socioeconomic resources.

3.3.1 Cultural Resources

A cultural resources survey was conducted at NCTAMSLANT DET Cutler in 2001 (NCTAMSLANT DET Cutler 2003). This survey was conducted in compliance with existing historic preservation obligations related to the transfer of the Administrative, HF, and VLF areas. Two goals for the survey were to: (1) to determine the overall archaeological sensitivity of the VLF, HF, and Administration areas; and, (2) to determine whether the Sprague Neck (VLF), HF, and Administration areas contained buildings or structures that would qualify for inclusion in the National Register of Historic Places (NRHP) based on their connection to the Cold War era. To meet these two goals the cultural survey consisted of two components: an archaeological reconnaissance survey, and a Cold War architectural resources survey. The archaeological reconnaissance survey included an evaluation of past ground disturbances, documentary analysis, review of aerial photographs, and a minimal amount of subsurface testing. In addition, the Cold War architectural resources survey was designed to expand on a similar Cold War architectural survey that was conducted in 1999–2000 in the VLF area. The following sections summarize the findings of the archaeological reconnaissance survey and the two Cold War Architectural Resources surveys.

Very Low Frequency Area

A significant amount of past ground disturbance across much of the Installation was documented in the archaeological reconnaissance survey. The Sprague Neck peninsula and most of the shoreline contains moderate to high sensitivity for archaeological resources. A prehistoric archaeological site on Sprague Neck (site number 62.2) was documented in the Cultural Resources Survey (NCTAMSLANT DET Cutler 2003). Subsequent subsurface testing (i.e., shovel test pits) recovered small quantities of prehistoric remains at the location, which provided confirmation for the location as a prehistoric archaeological site. In addition to the Sprague Neck site, one new prehistoric site (site number 62.49) was identified along the coastline of the VLF peninsula adjacent to Little Holly Cove. Artifacts unearthed at this Native American site were predominantly chips of stone from stone tool making. The two prehistoric sites documented within the Installation boundaries would require intensive-level testing to determine NRHP eligibility; however, this level of investigation has not been undertaken.

The first Cold War architectural resources evaluation of the VLF area conducted in 2000 determined that the VLF area contains one NRHP-eligible historic district, the NCTMS Cutler VLF Historic District. A similar survey of the Administrative and HF areas was conducted in 2001, and linked 96.7 acres within the HF area to the existing historic district. The combined, noncontiguous area is referred to as the Cutler VLF and HF Communications Historic District, and includes 140 contributing architectural resources including 118 in the VLF area and 22 in the HF area (NCTAMSLANT DET Cutler 2003) (**Figure 3.13**). The areas of coastline around the VLF peninsula are considered to have high archeological sensitivity. The antenna fields at the VLF are not considered to archeologically sensitive, as these areas have been subject to heavy disturbance since the Installation was constructed in the 1960's.

High Frequency Area

No archaeological sites were identified at the HF. Most of the HF site has been disturbed from installation of the antennas. Undisturbed portions of the HF contain moderate sensitivity for archaeological resources.

Figure 3.13. Cutler VLF and HF Communications Historic District NCTAMSLANT DET Cutler, Cutler, Maine.

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3.3.2 Infrastructure

Very Low Frequency Area

The panels in each antenna array are supported by 13 main towers, including a center tower surrounded by an inner circular array of six towers and an outer circular array of six towers. The main towers are approximately 800 to 1,000 ft tall. Each main tower is supported by one or two counterweights, which are supported by towers that are approximately 200 ft tall. Currently, 117 structures are located throughout the VLF area, including winch houses and electrical distribution buildings associated with the antennas and supporting towers, and support and operation facilities. The support and operation facilities include a centrally located transmitter building, two helix houses, a public works shop, a power plant building, and security and administrative buildings (Navy 2003).

High Frequency Area

The HF area is equipped with 19 high frequency transmitters and supporting antennas, and functions as a backup for the VLF area in the event of transmitter failure. In addition, the HF area supports other communication activities, including shore-to-ship and ground-to-air transmissions, and includes two buildings: the main operations building and the building that houses the emergency power generator.

3.3.3 Socioeconomic Resources

There are no residences located on NCTAMSLANT DET Cutler. Personnel that work at the Installation reside in the adjacent communities including Machias and Cutler. According to the 2000 Census, the population of Washington County was 33,941 (U.S. Census Bureau 2000). The U.S. Census Bureau estimates the 2009 population to be approximate 32,107 (U.S. Census Bureau 2010). Estimates for 2008 show that Washington County consists of White (93.5%), Black or African American (0.5%), American Indian and Alaska Native persons (4.4%), Asian (0.5%), and two or more races (1.2%) (U.S. Census Bureau 2010).

Results of the 2000 Census indicated that 59.7% of the population of the Town of Cutler was in the labor force, 45.8% civilian and 13.9% Armed Forces. Unemployment was at 1.1% and the largest employment sectors were agricultural, forestry, fishing and hunting, and mining (25.7%), education, health, and social services (21.4%), and public administration (9.0%). In 1999, the median income for a Cutler household was $30,625.

4 ENVIRONMENTAL CONSEQUENCES

This section assesses the known, potential, and reasonably foreseeable environmental consequences related to implementation of the Proposed Action: Alternative 1 (i.e., fully implementing the INRMP and natural resource recommendations); the Reduced Management Emphasis alternative: Alternative 2 (partial implementation of the INRMP projects and recommendations); the Reduced Outdoor Recreation Management Emphasis alternative: Alternative 3; and the No-Action/Status Quo alternative. As mentioned previously, the focus of the evaluation is on the effects of the proposed *programmatic approach* or natural resources management strategy, as opposed to the effects of a specific recommendation or project.

4.1 NATURAL ENVIRONMENT

Factors considered in determining whether an alternative would have a significant effect on the natural environment include the extent to which the alternative would negatively affect climate; air quality; geology, topography, and soils; water resources; vegetation, including rare communities and significant habitats; fish and wildlife; and threatened and endangered species, and species of special concern.

4.1.1 Climate and Air Quality

Potential pollutant emissions from direct and indirect sources associated with each alternative were considered to determine the annual effects on the region. Emissions from grounds maintenance equipment and other equipment associated with the proposed INRMP actions were considered; however, a General Conformity Rule or other detailed air quality analysis was not conducted.

Proposed Action – Alternative 1. The Proposed Action would not have a significant adverse effect on climate or air quality. The Proposed Action would have a positive effect on climate through implementation of proactive forestry practices identified by the forestry management programmatic objectives. Short-term, minor effects on air quality would be expected from implementation of the Proposed Action as a result of land management programmatic objectives that may create mobile source air emissions associated with grounds maintenance and restoration activities, which could potentially result in short-term minor effects to localized air quality. However, standard dust suppression methods, such as watering, would help reduce short-term emissions of dust and gaseous pollutants. NCTAMSLANT DET Cutler would ensure all air quality parameters remain at safe levels below national air quality standards. Additionally, BMPs would be implemented during land restoration or construction activities to control or minimize the effects of dust and particulate matter on air quality during construction activities. Therefore, short-term minor effects to localized air quality resources from routine grounds maintenance and restoration activities associated with the implementation of the Proposed Action would be minimized through the use of BMPs.

Environmental Effects of other Alternatives. Alternatives 2 and 3 would not have significant adverse environmental effects on climate or air quality. Similar to the Proposed Action, implementation of Alternatives 2 and 3would be expected to result in short-term, minor effects on air quality associated with grounds maintenance and restoration actions. Any potential effects to air quality would be minimized through the use of BMPs as described for the Proposed Action. Additionally, the level of implementation of management actions associated with Alternatives 2 and 3 would be expected to be less due to the lower level of natural resources management associated with both alternatives, and therefore the level of effects would be reduced compared to the Proposed Action.

Environmental Effects of the No Action/Status Quo Alternative. Implementation of the No Action/Status Quo alternative would continue the current strategy, which lacks proactive planning prior to construction and/or restoration activities, and results in reactive management and implementation of BMPs. The continuation of maintenance, construction, and restoration activities of the site without proactive planning and implementation of BMPs would potentially result in minor negative localized effects to air quality resources resulting from dust and particulate matter disturbed during Installation activities. Although reactive management and implementation of BMPs would be expected to minimize any effects, the lack of advanced planning would increase the likelihood of the occurrence of negative effects. No negative effects on climate would be expected from implementation of the No Action/Status Quo alternative.

4.1.2 Geology, Topography, and Soils

Factors considered in determining whether an alternative would have a significant effect on geology, topography, and soils include the extent to which the alternative would significantly alter existing geologic or soil conditions or topography. These include the potential for activities to result in a substantial change in soil or slope stability, disrupt geological features, or pose potential geological hazards. Factors include an increase in the rate of erosion and soil loss from disturbance, reduction in the amount of productive soils (such as prime farmland soils), alteration of the landscape that would affect important geologic features, and diminished slope stability.

Proposed Action – Alternative 1. The Proposed Action would not have a significant adverse effect on geology, topography, or soils. The Proposed Action does not include any actions that would result in major ground disturbance that would affect geologic or topographic resources. However, implementation of the Proposed Action would be expected to result in minor temporary effects to the soils of the Installation, as a result of potential restoration and/or habitat creation activities.

The Proposed Action includes proactive land management programmatic objectives geared towards reducing the erosion of soil. The land management programmatic objectives include proactively identifying areas with erosion or sedimentation, through implementation of annual erosion control surveys, and subsequent implementation of recommended erosion control actions identified during annual surveys. Erosion and sediment control training for Installation personnel also would be provided under the Proposed Action. Both land management and fish and wildlife management programmatic objectives include restoration and monitoring of disturbed bog habitat from ground disturbing activities. Some effects to soils would be expected from installation of outdoor recreation facilities; however, the use of BMPs to protect soils would minimize erosion during ground disturbing activities. The overall effects to geology, topography, and soils as a result of the Proposed Action would be expected to be minor and temporary. The

Proposed Action would have an overall positive effect on soils through implementation of the land management and fish and wildlife management programmatic objectives that would minimize soil loss.

Environmental Effects of other Alternatives. Similar to the Proposed Action, Alternatives 2 and 3 do not include any planned actions that would result in major ground disturbance activities that would affect geologic or topographic resources. Although minor temporary effects to the soils of the Installation may result from restoration activities, this would be reduced in scope compared to the Proposed Action.

The land management programmatic objectives under Alternatives 2 and 3 are similar to the Proposed Action, and include restoration and monitoring of disturbed bog habitat resulting from ground disturbing activities, and annual erosion surveys. In addition, the use of BMPs to protect soils and minimize erosion during ground disturbing activities would occur under Alternatives 2 and 3. Effects of outdoor recreation management on topography and soils associated with Alternatives 2 and 3 would be less in comparison to the Proposed Action as a result of result of the reduced outdoor recreation management measures associated with these alternatives. Alternative 2 would not include the development or implementation of corrective or preventive erosion and sediment control measures. The overall effects to geology, topography, and soils would be expected to be minor and temporary as a result of implementation of Alternatives 2 and 3, with both alternatives expected to have a positive effect on erosion prevention as a result of implementing the proposed land management and fish and wildlife management measures, thereby minimizing soil loss.

Environmental Effects of the No Action/Status Quo Alternative. Implementation of the No Action/Status Quo alternative would potentially result in negative effects on the geology, topography, and soils of the Installation. The primary threats would be associated with the reactive approach to identifying and addressing erosion and sedimentation issues related to wind and storm water runoff. The No Action/Status Quo alternative offers a less comprehensive program for the control and repair of damaged soils or control of erosion than the Proposed Action due to the lack of guidelines for resource use, protection, and impact minimization. Maintenance activities at NCTAMSLANT DET Cutler would be expected to continue, and would involve a more reactive approach to management of problems after their occurrence, rather than proactively managing the resources to prevent effects or to minimize the extent of unavoidable effects. Under the No Action/Status Quo alternative, implementation of effective BMPs and surveys for erosion would be a lower priority. For example, the lack of annual erosion monitoring and erosion control training for staff potentially would result in negative effects, as existing erosion areas associated with roadways potentially would go undetected or unaddressed, and could potentially cause harm to soils as a result of erosion. Consequently, negative effects to the geology, topography, and most importantly, soils of the Installation would potentially be greater under the No Action/Status Quo alternative compared to the Proposed Action, and other alternatives.

4.1.3 Water Resources

Factors considered in determining whether an alternative would have a significant effect on water resources include the extent to which the alternative would negatively affect water quality of surface water and/or groundwater, including waters used for drinking; would result in noncompliance with laws and regulations; would result in a net loss of jurisdictional wetlands as defined by USACE; would result in severe degradation of wetlands, or severe alternation of wetland characteristics; would increase risks associated with environmental hazards, such as activities in floodplain areas that would increase flood hazard risks; would negatively affect existing or future beneficial uses of surface waters; would reduce the availability of, or accessibility to, water resources; or would result in long-term, increased inundation, sedimentation, and/or damage to water resources.

Alternative 1 – Proposed Action. Implementation of the Proposed Action would be expected to have beneficial effects on groundwater, surface water, and wetland resources on the Installation. The Proposed Action would include actions that would improve of stormwater management through modification of the existing ditch systems to create small impoundments. This would be expected to result in positive effects to the water resources of the Installation, including a net increase in wetland habitat and increased attenuation of stormwater runoff during heavy rainfall, thereby reducing the potential for erosion. No other direct effects on the water resources on NCTAMSLANT DET Cutler would be anticipated under the Proposed Action.

The Proposed Action also would likely have an overall positive indirect effect on the water quality on the Installation by offering a more comprehensive erosion control and stabilization program than currently exists, proactively identifying potential problems, and subsequently mitigating them. Environmental staff would also receive erosion control training, and training to identify wetlands. Under the Proposed Action brief periods of increased erosion and sedimentation associated with stormwater runoff would result in short-term erosion effects during site maintenance and natural resource restoration or creation activities, but these potential effects to water resources would be avoided or minimized through increased environmental awareness and the use of BMPs. Biannual monitoring of nuisance species such as beavers would also occur to determine if nuisance wildlife or beaver lodge removal actions are necessary to protect water quality and stormwater flow. These surveys would aid in the rapid identification and repair of damaged and eroding areas, and avoidance and minimization of soil erosion and down-gradient effects on the water resources of the Installation. Therefore, implementation of the Proposed Action would be expected to have overall beneficial direct and indirect effects on the water resources at the Installation.

Environmental Effects of other Alternatives. Implementation of the Alternative 2 would be expected to have an overall beneficial effect on the groundwater, surface water, and wetland resources on the Installation. An overall positive indirect effect on water quality and wetlands would result from implementing a more comprehensive monitoring program than currently exists, by conducting annual surveys to identify potential erosion problems earlier and more frequently. Environmental staff would also receive erosion control training, and training to identify wetlands. The inclusion of annual erosion surveys would be expected to have more beneficial effects as compared to the current strategy under the No Action/Status Quo alternative, where erosion problems are only addressed reactively after negative effects have occurred, and not proactively. Any short-term erosion effects resulting from ground maintenance activities and restoration activities would be minimized through implementation of BMPs. However, these benefits would be less in comparison to the Proposed Action since the remedial action necessary to address any erosion or sedimentation control problems would not be required under Alternative 2. Implementation of Alternative 2 would result in an overall positive effect on water resources; however, the net benefit would be less in comparison to the Proposed Action, as this alternative does not include actions for creation of wetland habitat or creation of impoundments to attenuate stormwater runoff, or the requirement to implement remedial actions for protection of water quality and stabilization of infrastructure as identified in annual erosion surveys.

Implementation of Alternative 3 would provide the same benefit to water resources as described for the Proposed Action.

Environmental Effects of the No Action/Status Quo Alternative. The No Action/Status Quo alternative would not be expected to affect groundwater resources on the Installation. However, potential effects to the surface water and wetland resources associated with the No Action/Status Quo alternative would be expected to include minor impairment of water quality resulting from erosion and sedimentation associated with stormwater runoff along roads. Under the No Action/Status Quo alternative, maintenance activities would be expected to continue without structured monitoring and guidelines for water resources use, protection, and impact minimization. The No Action/Status Quo alternative offers no comprehensive program for monitoring the control and repair of damaged or naturally erodible areas that contribute sediment to surface water resources and wetlands. Consequently, the No Action/Status Quo alternative could result in undetected negative effects that may cause harm to the surface water resources and wetlands on the Installation, and erosion control and stabilization activities would be reactive, and would likely happen after negative effects have already occurred. Furthermore, environmental staff would not receive erosion control training, impoundments for stormwater attenuation would not be created, and nuisance wildlife activities that could affect water quality would not be monitored. Although no significant potential effects on surface or ground water resources, or wetlands are expected to be associated with the No Action/Status Quo alternative, effects to water resources associated with a reactive rather than proactive management approach would be greater under the No Action/Status Quo alternative than under the Proposed Action or other alternatives, and no direct benefit to water resources protection would be realized under this alternative.

4.1.4 Vegetation

Factors considered in determining whether an alternative would have a significant effect on vegetation include the extent to which the alternative would result in loss of habitat due to vegetation removal or construction activities, temporary losses of habitat from construction or other human activities, or direct effects to sensitive ecosystems and/or natural communities that are considered important habitat to protected species. Effects on flora species that are protected by federal and state ESAs are discussed in Section 4.1.6, and effects on state-specified rare communities and significant habitat are discussed in Section 4.1.7.

Alternative 1 – Proposed Action. The Proposed Action would be expected to have some short-term effects on vegetation associated with grounds maintenance and restoration/creation activities. However, implementation of the Proposed Action would be expected to have positive long-term effects on the Installation vegetation by providing enhanced management of vegetation resources on an integrated basis. The Proposed Action would base vegetation management on available scientific information, and rely on an adaptive ecosystem management strategy to achieve biological diversity and conservation. It would promote diversity of native species, and monitor and control invasive species, as emphasized in the Presidential memorandum to the heads of federal agencies (Office of the President 1994) and EO 13112, Invasive Species.

The Proposed Action would include several management measures that collectively, would be expected to result in positive effects to the vegetation at NCTAMSLANT DET Cutler. The Proposed Action would include GIS mapping of the location and extent of sensitive or important plant communities (e.g., black crowberry bogs), and would include actions for restoration, post-restoration monitoring, and protection of sensitive natural communities. This would result in beneficial effects regarding the protection of sensitive natural communities. Furthermore, the Proposed Action would include the collection of forestry data for development of a basic forest management plan that focuses on opportunities that improve forest communities for habitat and include regular monitoring of forest health. The Proposed Action also calls for the annual monitoring of, and removal of invasive species, as well as emphasizes planting or seeding with native species for restoration or habitat creation activities, and plant and tree identification training for environmental staff. The Proposed Action would incorporate comprehensive recommendations of natural resources personnel as well as those of cooperating partner agencies, and would be expected to result in a net benefit to vegetation of the Installation.

Environmental Effects of the other Alternatives. Alternative 2 would be expected to have short-term effects on vegetation associated with grounds maintenance and restoration/creation activities. However, implementation of management measures associated with this alternative would have some positive long-term effects on the Installation vegetation by removal of invasive species, ensuring restoration of disturbed habitats, and post-construction monitoring of restoration and habitat creation activities. A basic forest characterization survey is also included under Alternative 2; however, the survey would be reduced in scope in comparison to the Proposed Action, with the survey area limited to the forested habitat located within proximity of the developed areas, which is the forest habitat located along the northern boundary of the VLF. Under Alternative 2 the mapping of sensitive habitats, ground-truthing of vegetative communities, annual surveys for invasive species, development of a forest management plan, and training for environmental staff for identification of plant and tree species would not occur. As a result, this alternative would not provide the enhanced management of vegetation resources on an integrated basis that would be expected under the Proposed Action, since an ecosystem management strategy for management of Installation vegetation would not be implemented that could provide the most benefit to maintaining or improving biological diversity and conservation. Effects on natural communities, including those considered important habitat for protected species that occur at the Installation, could result in effects to these resources, as they would not be mapped. Additionally the lack of annual surveys to proactively identify stands of invasive species could potentially result in less effective or more costly restoration efforts of these areas. Overall, implementation of the Alternative 2 potentially would be expected to have some short-term minor, and long-term negative effects to vegetation, which when combined with some minor positive effects, would result in a net minor negative effect to vegetation.

Implementation of Alternative 3 would have the same positive effect as described for the Proposed Action.

Environmental Effects of the No Action/Status Quo Alternative. In the absence of structured monitoring and guidelines of vegetation resources of the Installation the No Action/Status Quo alternative would be expected to produce a lesser degree of ecosystem-wide benefits and have detrimental effects to the vegetation resources due to the reactive, rather than proactive, approach to any noted problems. Specifically, the reactive approach of the No Action/Status Quo alternative would emphasize site-specific responses to environmental compliance, and would not consider beneficial, community level actions to protect the vegetation resources. Additional studies, surveys, monitoring, and inventory of natural resources, and implementation of long-term programs, would have lower priority, and site-specific protective measures of sensitive and important habitat, from mowing effects for example, would not be provided. No invasive species management or control would be implemented under the No Action/Status Quo alternative. Species-level, reactive management without understanding the larger ecosystem context would promote management of one or a few species, which could cause harm to or neglect of others.

The lack of vegetation management at NCTAMSLANT DET Cutler under this alternative would increase the risk of allowing potential effects to go undetected, which in turn would not meet stewardship goals, or support biological diversity. The No Action/Status Quo alternative would be expected to result in vegetation resources that are imprudently managed, and would be expected to have at least some short-term minor effects from ground maintenance activities, and long-term negative effects on the vegetation resources of the Installation from lack of implementation of enhanced vegetation management on an integrated basis with other natural resources.

4.1.5 Fish and Wildlife

Factors considered in determining whether an alternative would have a significant effect on aquatic and terrestrial fish and wildlife resources, including migratory birds, would include the degree of effect to fish and wildlife or their habitats. Effects considered include changes to fish and wildlife population sizes, distribution, or their habitats. Effects on fauna species that are protected by federal and state ESAs are discussed in Section 4.1.6.

Alternative 1 – Proposed Action. Implementation of the Proposed Action would be expected to have overall beneficial effects on the fish and wildlife resources of NCTAMSLANT DET Cutler. The INRMP includes field surveys and management practices that would create baseline data on wildlife communities that occur at the Installation, including conducting a deer population survey and an assessment of available deer wintering habitat, a comprehensive fish survey, and a terrestrial invertebrate survey. Additional fish and wildlife habitat would be created from creation of small impoundments, and wildlife use of the Installation would be encouraged through installation of bat and bird boxes in appropriate habitat.

Other indirect benefits to fish and wildlife would occur from conducting an Installation-wide vernal pool survey (identification of Installation amphibians) and from mapping the general distribution of sensitive wildlife habitats and conducting a natural community survey to ground-truth vegetative community types present. Additionally an indirect benefit to wildlife that inhabits forest habitats would occur from implementation of a forest management plan.

Minor effects to nuisance wildlife could occur if removal of nuisance wildlife species, such as bats and beavers is determined to be necessary as a result of the biannual monitoring of nuisance wildlife that would occur. However, removal of nuisance wildlife would only occur if they are affecting water resources, or are threatening human health and safety.

Measures to protect nesting ospreys residing on the Installation would continue as recommended in the Installation Osprey Management Plan. Osprey would be discouraged from nesting on Installation antennas, and removal of inactive nests located on antennas would be conducted in consultation with the NRM. If active osprey nests are required to be removed to meet the objectives of the military mission, or to ensure safety of the birds, an MBTA Depredation Permit would be obtained from USFWS, and removal of active nests would be conducted in cooperation with a certified wildlife biologist, and in accordance with the recommendations outlined in the Installation Osprey Management Plan. Additional benefit to osprey habitat would result from conducting a feasible study for installation of artificial nesting platforms that potentially would discourage osprey from nesting on top of Installation antennas. Other bird species would benefit from development and implementation of migratory bird monitoring plans, especially for shorebird and grassland bird species known to occur at the Installation.

The Proposed Action provides recommendations for fish and wildlife management strategies based on input from natural resources personnel and cooperating partner agencies, and would include pursuit of new partnerships and cooperative agreements with interested agencies and private groups for continued or improved protection of fish and wildlife and the habitats on which they depend, including establishment of wildlife monitoring programs and re-engaging partnership talks with agencies interested in protection and conservation of the Sprague Neck Bar ERA. Based on this integrated approach to fish and wildlife management and application of ecosystem management principals, the Proposed Action would be expected to provide long-term positive effects to fish and wildlife resources of the Installation.

Environmental Effects of other Alternatives. Implementation of Alternative 2 would be expected to have some positive effects on the fish and wildlife resources of the Installation; however, management of these resources would primarily be focused on osprey management and management of nuisance wildlife. Osprey management would continue as recommended under the current Osprey Management Plan. A MBTA Depredation Permit would be obtained from USFWS before any active osprey nests are removed, and removal of active nests would be conducted in coordination with a certified wildlife biologist, and in accordance with the recommendations outlined in the Installation Osprey Management Plan. A feasibility assessment for establishing artificial nesting platforms on Sprague Neck would not occur under Alternative 2. No benefit to migratory birds, such as shorebird and grassland species that utilize the

Installation, would occur as development and implementation of migratory bird management plans would not be included under Alternative 2.

Biannual monitoring of nuisance wildlife such as bats and beavers would occur, and minor effects to these species could occur if monitoring determines that wildlife life removal is necessary to protect water resources or human health and safety. No field surveys would be implemented, no wildlife habitat improvements would occur, and no mapping of natural communities or sensitive wildlife habitat would occur. Development of a forest management plan, which would indirectly benefit forest wildlife, also would not occur under Alternative 2. Although Sprague Neck Bar would continue to be recognized as an ERA, discussions for conservation and protection of this area with interested parties would not occur, which represents a reduced benefit in comparison to the Proposed Action.

Without a broad and integrated fish and wildlife management approach as identified for the Proposed Action, data collection and resources would be focused on some wildlife groups (osprey and nuisance wildlife), while ignoring other wildlife groups that are known to occur at the Installation. Minor long-term effects from lack of implementation of fish and wildlife resource management on an integrated, ecosystem-wide basis would be expected under Alternative 2. Although an overall net positive benefit would be expected, the benefits would be expected to be lower in comparison to the broad range of fish and wildlife benefits expected from implementation of the Proposed Action.

Effects of implementing Alternative 3 would have the same overall benefit to fish and wildlife of the Installation as described for the Proposed Action.

Environmental Effects of the No Action/Status Quo Alternative. Implementation of the No Action/Status Quo alternative would be expected to result in long-term negative effects to fish and wildlife. The No Action/Status Quo alternative would be expected to emphasize a reactive, site- or species-specific response to environmental compliance, rather than a proactive approach to natural resources management. The reactive approach to wildlife management would mean that additional fish and wildlife studies, surveys and monitoring, and long-term programs would be given a lower priority in comparison with the Proposed Action and other alternatives. Species-level, reactive management would promote management of one or a few species, and could potentially cause harm to or neglect of other species, such as through implementation of predator control measures, plantings of specific host plants, and habitat enhancement efforts that target limited areas or species. Finally, the lack of a comprehensive fish and wildlife habitat management program and lack of structured monitoring and guidelines for natural resource use and impact minimization at the Installation, the No Action/Status Quo alternative would be expected to increase the potential for negative effects to fish and wildlife to go undetected, which would not help to meet stewardship goals, or support biological diversity. Benefits to fish and wildlife include continued management of osprey as recommended under the current Osprey Management Plan, including obtaining a MBTA Depredation Permit from USFWS for removal of active osprey nests, and coordinating the removal of active osprey nests with a certified biologist and in accordance with the recommendations of the Osprey Management Plan. Overall, implementation of the No Action/Status Quo alternative would be expected to have long-term negative effects to fish and wildlife resources of the Installation.

4.1.6 Threatened and Endangered Species, and Species of Special Concern

Factors considered in determining whether an alternative would have a significant effect on threatened and endangered species, and species of special concern known to occur at the Installation include the degree of effect to protected flora and fauna species or their habitats. Effects on flora and fauna species that are protected by federal and state ESAs include changes to the ecological value of habitats these species are dependent on, reduction in population sizes or distributions, and other actions that may jeopardize the continued existence of any ESA-listed species, or species identified as species of special concern. Effects on state-specified rare communities and significant habitat are discussed in Section 4.1.7

Alternative 1 – Proposed Action. Implementation of the Proposed Action would be expected to have a positive effect on federal and state threatened and endangered species, and species of special concern known or expected to occur at NCTAMSLANT DET Cutler. The Proposed Action includes specific recommendations for developing management plans that would provide protection of threatened and endangered species populations, and their habitat, including development and implementation of migratory bird management plans. A rare plant and community survey and annual surveys for crowberry blue butterfly (a Maine species of special concern) would be implemented under the Proposed Action. Most of the land management, general fish and wildlife management, and forestry management recommendations provided in this INRMP will indirectly benefit threatened, endangered, and species concern species that occur at the Installation.

The Installation is located within designated critical habitat for Atlantic salmon; however, the Installation does not contain any suitable habitat to support migrating or spawning salmon. Because the entire Installation is located within designated critical habitat for Atlantic salmon, INRMP activities that protect and improve water quality would contribute to protection of Atlantic salmon habitat within the HUC 10 watershed. Measures to prevent erosion and sedimentation into waterbodies, and wetland protection efforts would provide an indirect benefit to Atlantic salmon and designated critical habitat located downstream or immediately offshore of the Installation. The water quality protection measures and BMPs (such as erosion and sediment control, wetland protection, monitoring of nonpoint source pollution, protection of watersheds from hazardous materials, use of environmentally beneficial landscaping, and monitoring for and management of forests as shoreline buffers) would indirectly benefit Atlantic salmon critical habitats. Additionally, the management measures that would provide watershed benefits, would also provide indirect benefit to marine mammals protected by the Marine Mammal Protection Act that are known to occur immediately offshore of the Installation.

The management strategies and practices for protection of threatened and endangered species, and species of special concern under the Proposed Action are the result of years of on-the-ground research, monitoring, and management of the biological resources at the Installation, and consultations with local, regional, and federal natural resources management professionals. In addition to the recommendations of natural resources personnel and cooperating partner agencies, the Proposed Action would include the recommendation to pursue partnerships and cooperative agreements with interested agencies and private groups for continued and improved protection of federal and state listed wildlife and plant species, and habitats. Based on these recommendations for integrated management of threatened and endangered species, and species of special concern, the Proposed Action would be expected to provide overall positive effects to the threatened or endangered species and species of special concern of the Installation.

Environmental Effects of the other Alternatives. Implementation of Alternative 2 would be expected to have an indirect benefit to federal and state threatened and endangered species, and species of special concern of the Installation. However, this alternative would provide benefit to some of the threatened and endangered species, and species of special concern of the Installation, whereas other sensitive species, such as invertebrates, and migratory bird species, would not receive any special management attention. Long-term minor effects to federal and state protected species, and species of special concern would be expected as surveys for threatened, endangered, and special concern plant and wildlife species of the Installation would not occur. Although some indirect positive benefit to threatened and endangered species and species of special concern would be expected from implementation of Alternative 2, the overall positive effect would be expected to be less than under the Proposed Action, and other long-term negative effects potentially would be expected to occur to those species that would not receive any special management attention.

Effects of implementing Alternative 3 would have the same overall benefit to threatened, endangered, and special status plant and wildlife species of the Installation as described for the Proposed Action.

Environmental Effects of the No Action/Status Quo Alternative. Implementation of the No Action/Status Quo alternative potentially would result in long-term negative effects to known or future populations of federal and state threatened, endangered, and special concern plant and wildlife species associated with the Installation. Effects on protected species primarily would result from lack of development of species management plans, lack of structured monitoring and guidelines for natural resource use and impact minimization, lack of studies for improving habitat, and lack of surveys for protected species known to occur.

The No Action/Status Quo alternative would likely emphasize a reactive, site- or species-specific response to natural resource protection and environmental compliance, rather than a proactive approach to natural resources management. This reactive approach would not provide proactive protective benefits to threatened, endangered, or special status species, and would not employ baseline assessments of populations of protected species that are likely to occur at the Installation. Without baseline data on protected species populations or sensitive habitat, effects to these resources potentially would go undetected, which could result in negative effects to sensitive species or populations and could impede achievement of stewardship and natural resource management goals.

Additionally, implementation of additional plant and wildlife surveys, monitoring, and long-term programs, would be given a lower priority under the No Action/Status Quo alternative in comparison with the Proposed Action and other alternatives. Species level, reactive management would promote management of one or a few species, such as through implementation of predator control measures, plantings of specific host plants, and habitat enhancement efforts that target limited areas or species, and could potentially cause harm to or neglect of other sensitive species.

As a result, implementation of the No Action/Status Quo alternative would be expected to result in long-term negative effects to known or future populations of federal and state threatened, endangered, and special status plant and wildlife species associated with the Installation.

4.1.7 Rare Communities and Significant Habitat

Factors considered in determining whether an alternative would have a significant effect on vegetation include the extent to which the alternative would result in loss of habitat due to vegetation removal or construction activities, temporary losses of habitat from construction or other human activities, or direct effects to state-specified rare natural communities or significant habitat.

Alternative 1 – Proposed Action. Implementation of the Proposed Action would be expected to have a positive long-term effect on MNAP rare natural communities and MDIFW Significant Wildlife Habitat of the Installation. The mapping of rare or sensitive plant communities (e.g., MNAP Coastal Plateau Bog ecosystem or coastal peatlands), or Significant Wildlife Habitat (e.g., waterfowl and wading bird habitat, shorebird habitat, significant vernal pools, deer wintering habitat), would be expected to identify the locations of these habitats, thereby providing information for avoidance and protection of these areas when planning Installation projects and activities. For effects to rare communities and Significant Wildlife Habitat that are unavoidable (i.e., mowing), the Proposed Action would include measures for restoration and post-restoration monitoring to ensure success of the restoration effort, and to maintain or improve the condition of the effected habitats. Indirect benefit to protected species that may utilize rare or sensitive natural communities or habitats also would occur under the Proposed Action associated with identifying, protecting, restoring, and monitoring of these habitats.

The formal vernal pool survey and deer wintering habitat survey would identify areas of Significant Wildlife Habitat that occurs at the Installation, and surveys for rare plants and rare ecosystems would be included. Reengaging partnerships and cooperative agreements with agencies and private groups would ensure management of the existing ERA located at Sprague Neck Bar would provide improved protection of rare communities and Significant Wildlife Habitat of the Installation. Implementation of the Proposed Action would be expected to result in positive effects to identify, restore, and preserve rare natural communities and Significant Wildlife Habitat that occur at the Installation.

Environmental Effects of the other Alternatives. Implementation of Alternative 2 would be expected to have a minor positive effect on MNAP rare natural communities and MDIFW Significant Wildlife Habitat of the Installation. A comprehensive vernal pool survey to identify significant vernal pools would not occur, nor would rare plant or rare natural community surveys be conducted. However, sensitive vegetation that is effected from disturbances such as mowing would be restored and monitored for post-restoration success. The lack of implementation of an integrated ecosystem-based approach to natural resources management under Alternative 2 potentially would result in benefit to select communities and habitats, at the potential detriment of other undocumented rare plants or rare natural communities. The reduced level of post-restoration monitoring of restored sensitive habitats may result in a lower success rate of the restoration efforts. The ERA located at Sprague Neck Bar is not currently being actively managed, and under this alternative pursuit of partnerships and cooperative agreements with agencies and private groups for the continued or improved protection of rare natural communities and Significant Wildlife Habitat of the Installation would not occur. Although some positive effects to sensitive communities and Significant Wildlife Habitat would be expected to result from implementation of Alternative 2, the lack of rare community surveys and the reduction of post-restoration monitoring would be expected to result in negative effects.

Effects of implementing Alternative 3 would have the same overall benefit to rare communities and significant habitat of the Installation as described for the Proposed Action.

Environmental Effects of the No Action/Status Quo Alternative. The No Action/Status Quo alternative would be expected to have a negative effect on sensitive communities and Significant Wildlife Habitat on the Installation. No surveys, restoration, or monitoring would be implemented to identify areas with rare communities and Significant Wildlife Habitat. Effects to sensitive vegetation would occur, especially in those areas where they are located in or near areas mowed as part of routine grounds maintenance. This alternative would not include pursuit of partnerships and cooperative agreements with agencies and private groups for the continued or improved protection of rare communities and Significant Wildlife Habitat known to occur at the Installation, including the Sprague Neck Bar ERA, which currently is not being actively managed. As a result of the lack of any specific identification, monitoring, or management of rare communities or Significant Wildlife Habitat, the No Action/Status Quo alternative would be expected to have long-term negative effects on sensitive communities and Significant Wildlife Habitat that is associated with the Installation.

4.2 HUMAN ENVIRONMENT

Factors considered in determining whether an alternative would have a significant effect on the human environment include the extent to which the alternative would negatively affect cultural resources, infrastructure, or socioeconomic resources.

4.2.1 Cultural Resources

Section 106 of the NHPA requires that federal agencies take into account the effects of their actions on any district, site, building, structure, or object included in or eligible for inclusion in the NRHP. In accordance with Section 106 of the NHPA, the Navy has evaluated the Proposed Action and alternatives to determine their effects on NCTAMSLANT DET Cutler historic properties. **Figure 2.1** and **Figure 2.2** identify the NCTAMSLANT DET Cutler Historic District.

Alternative 1 – Proposed Action. Initial cultural resources surveys have determined that the Installation contains two prehistoric sites, and areas in both the VLF and HF areas have been determined to be NRHP-eligible as a historic district. Natural resource activities associated with the Proposed Action would avoid known archaeological sites. There is a potential for archeological resources to be effected in areas having moderate or high archeological sensitivity from ground disturbing activities areas, and additional archaeological surveys may be required. The PWD-ME Environmental CRM would consult with the Maine SHPO office in accordance with 36 CFR 800 of the NHPA prior to conducting any ground disturbing activities in moderate or high archeological sensitive areas. Consultation with Maine SHPO would ensure that the Navy avoids, minimizes, or mitigates any adverse effects to historic properties. In the event of an inadvertent archaeological discovery, all work would stop immediately until further directed by the CRM, and the Navy would follow the required procedures for inadvertent discoveries as outlined in 36 CFR 800.

Specific standard operating procedures regarding the management of cultural resources will be outlined in the ICRMP currently under preparation by Navy. Compliance with these procedures would ensure any potential effects to cultural resources from implementation of the Proposed Action would be minimized.

Environmental Effects of the other Alternatives. Similar to the Proposed Action, any natural resources activities associated with Alternative 2 and Alternative 3 would avoid known archeological sites. Prior to conducting any ground disturbing activities in moderate or high archeological sensitive areas, the CRM will consult with the Maine SHPO office in accordance with 36 CFR 800 of the NHPA to ensure any adverse effects to historic properties are avoided, minimized, or mitigated. In the event of an inadvertent archaeological discovery, all work would stop immediately until further directed by the CRM, and the Navy would follow the required procedures for inadvertent discoveries as outlined in 36 CFR 800, and specific standard operating procedures described in the ICRMP (under preparation).. As a result, effects to cultural resources resulting from implementation of Alternative 2 or Alternative 3 would be expected to be minimized.

Environmental Effects of the No Action/Status Quo Alternative. Similar to the Proposed Action and other alternatives the No Action/Status Quo alternative would avoid all known archeological sites, and the CRM would consult with the Maine SHPO in accordance with 36 CFR 800 prior to conducting any ground disturbing activities in areas having moderate to high archeological sensitivity to determine if additional archeological surveys would be required. In the event of an inadvertent archaeological discovery, all work would stop immediately until further directed by the CRM, and the Navy would follow the required procedures for inadvertent discoveries as outlined in 36 CFR 800, and specific standard operating procedures described in the ICRMP (under preparation). As a result, potential effects to cultural resources associated with implementation of the No Action/Status Quo alternative would be minimized.

4.2.2 Infrastructure

Factors considered in determining whether an alternative would have a significant effect on infrastructure include the extent to which the alternative would negatively affect existing infrastructure, or increase the need for buildings, structures, or utilities.

Alternative 1 – Proposed Action. Implementation of the Proposed Action would not be expected to effect the infrastructure of the Installation. No additional buildings, structures, or parking areas would be constructed, and no increase in the need for infrastructure would be expected under the Proposed Action. The Proposed Action would not be expected to result in an increase in waste use, wastewater generation, stormwater, and utilities such as electricity, natural gas or other fuels. Implementation of erosion control measures identified during annual erosion surveys and erosion control training for environmental staff would have a positive benefit to the infrastructure of the Installation, such as the roadway system, by implementing a proactive approach to erosion control problems. Therefore, the Proposed Action would not be expected to negatively affect infrastructure of the Installation.

Environmental Effects of the other Alternatives. Similar to the Proposed Action, Alternative 2 and Alternative 3 would not be expected to affect the infrastructure of the Installation. No additional buildings, structures, or parking areas would be constructed, and no increase in the need for infrastructure would be expected under implementation of Alternative 2 or Alternative 3. Additionally, Alternative 2 and Alternative 3 would not be expected to result in an increase in waste use, wastewater generation, stormwater, and utilities such as electricity, natural gas or other fuels. Both Alternative 2 and Alternative 3 would include erosion control training for environmental staff, which would have a positive benefit to the infrastructure of the Installation by implementing a proactive approach to erosion control problems. However, implementation of erosion control measures for protection of water quality and stabilization of infrastructure identified during annual erosion surveys would not be required under Alternative 2. Overall Alternative 2 and Alternative 3 would not be expected to affect infrastructure of the Installation; however, Alternative 3 would be expected to provide more of an overall benefit to Installation infrastructure in comparison with Alternative 2.

Environmental Effects of the No Action/Status Quo Alternative. Under the No Action/Status Quo alternative, no changes to the current infrastructure of the Installation would be expected. However, since annual erosion surveys would not be conducted under the No Action/Status Quo alternative there would be a potential for infrastructure, such as roadways, to be effected by erosion issues, which would be handled using a reactive approach to erosion control problems, addressing erosion issues after they occur rather than proactively identifying and addressing them. Therefore, the No Action/Status Quo alternative would be expected to have some short-term minor effects to the current infrastructure of the Installation.

4.2.3 Socioeconomic Resources

Factors considered in determining whether an alternative would have a significant effect on socioeconomic resources include the extent to which the alternative would increase or decrease regional growth, would affect public health or safety, or would affect specific socioeconomic groups.

Alternative 1 – Proposed Action. No negative effects to the socioeconomic resources of the area would be expected to result from implementation of the Proposed Action. The Installation currently is not open to the public (except with special permission) and implementation of the Proposed Action would not be expected to significantly change access to the Installation. Some limited recreational uses by the public (e.g., National Audubon Society annual Christmas Bird Count) would continue to be permitted when exercised with special coordination and permission, and the Installation would continue to serve many of the functions similar to surrounding open space areas such as aesthetic values, buffer between developed areas, and protection of environmental features.

Implementation of the Proposed Action would not be expected to either induce or inhibit growth in the surrounding communities, and would not be expected to affect the number, density, or racial composition of residents living in the general area surrounding the NCTAMSLANT DET Cutler. Overall, implementation of the Proposed Action would not be expected to affect the socioeconomic resources of the Installation or the surrounding communities.

Environmental Effects of the other Alternatives. Similar to the Proposed Action, no negative effects to the socioeconomic resources of the area would be expected to result from implementation of Alternative 2 or Alternative 3. There is only limited public access to the Installation for recreational use, which would remain unchanged following implementation of Alternative 2 or Alternative 3. No change to the social and community views regarding access to the Installation would be expected, and implementation of Alternative 2 or Alternative 3 would not modify the current aesthetic values or alter the buffers that exist between the Installation and adjacent residential and rural areas. Protection of environmental features of the Installation would continue, and implementation of Alternative 2 and Alternative 3 would not be expected to either induce or inhibit growth in the surrounding communities, nor would they be expected to effect the number, density, or racial composition of residents living in the general area. Overall, implementation of the Alternative 2 or Alternative 3 would not be expected to affect the socioeconomic resources of the Installation or surrounding communities

No Action/Status Quo Alternative. The No Action/Status Quo alternative would not be expected to effect the socioeconomic resources of the area. There is only limited public access to the Installation for recreational use, which would remain unchanged. No changes in population numbers or composition, housing conditions, and economic conditions, and no change to the number, density, or racial composition of residents living in the general area would be expected to occur under the No Action/Status Quo alternative. Therefore, implementation of the No Action/Status Quo alternative would not be expected to affect socioeconomic resources of the Installation or the surrounding communities.

5 FINDINGS AND CONCLUSIONS

This section summarizes the unavoidable effects, cumulative effects, and recommended mitigation for potential environmental consequences associated with implementation of the Proposed Action. Section 5.4 provides the conclusions regarding the potential effects associated with implementation of the Proposed Action.

5.1 UNAVOIDABLE EFFECTS

Implementation of the Proposed Action would result in some unavoidable effects to air quality, soils, water resources, and vegetation associated with disturbance from maintenance and restoration activities. However, all of these effects would be expected to be short-term or temporary minor effects, as long as the control measures and BMPs described in the INRMP and discussed above are implemented properly to avoid or minimize potentially adverse effects, and would improve the long-term viability, stability, and ecosystem health of the Installation. Potential effects to cultural resources may occur from ground disturbance activities conducted in areas designated as having a moderate to high archeological sensitivity; however, the Navy would follow procedures outlined in the Installation ICRMP currently being prepared, and 36 CFR 800, which would minimize effects to cultural resources. Minor effects to nuisance wildlife species would be expected as a result of implementation of the Proposed Action; however no effect to wildlife, threatened and endangered species or special concern species, rare communities and Significant Wildlife Habitat, cultural resources, infrastructure, or socioeconomic resources would be expected.

5.2 CUMULATIVE IMPACTS

A cumulative impact is defined in 40 CFR §1508.7 as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Cumulative effects can result from individually minor, but collectively significant actions taking place locally or regionally over a period of time.

Implementation of the Proposed Action would result in the development of a comprehensive environmental strategy for the Installation that would include compliance, restoration, prevention, and conservation. Initially, implementation would be expected to improve the existing environmental conditions at the Installation, as shown by the potential for beneficial effects provided in **Table 2.1**. Over time, adoption of the Proposed Action would enable NCTAMSLANT DET Cutler to achieve its goals of maintaining ecosystem diversity. Projects that would be implemented under the Proposed Action would also directly support regional ecosystem management initiatives and would enhance and protect the human and natural environment, including federal and state listed threatened and endangered species and species of special concern. No cumulative impacts are associated with management of the Cross Island National Wildlife Refuge, located due south of the VLF Peninsula, and implementation of the Proposed Action is expected to positively benefit natural resources at both the refuge and the Installation. Current management actions at Cross Island National Wildlife Refuge include periodic surveys for invasive species, and the USFWS has currently applied to the U.S. Congress to have the refuge designated as a National Wilderness Area (USFWS 2011b). As such, as environmental protection and sustainable management practices are put into place, it would ensure the long-term viability and sustainability of the natural resources of the Installation.

Monitoring programs, annual reviews, and formal 5-year reviews of the INRMP would allow continuous reassessment of management goals and objectives and would help to avoid undesirable cumulative impacts. Additionally, appropriate NEPA procedures and coordination with stakeholders such as USFWS and MDIFW would be undertaken for any action that could result in cumulative impacts.

5.3 MITIGATION

Mitigation measures would be employed to offset the adverse effects of the Proposed Action on the natural or human environment. Based on the assessment of environmental consequences associated with implementation of the Proposed Action on the resources present at the Installation, only short-term or temporary minor effects are anticipated, and these would be mitigated through the use of BMPs implemented as part of the Proposed Action. No significant effects would be expected to result from implementation of the Proposed Action, and therefore no additional mitigation is proposed.

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7 LIST OF AGENCIES AND PERSONS CONSULTED

The following agencies were consulted verbally or in writing to obtain information for this EA. Several other agencies and groups are referenced throughout the document and are included in Section 8.

Federal Agencies
United States Fish and Wildlife Service
National Oceanic and Atmospheric Administration, National Marine Fisheries Service

State Agencies
Maine Department of Inland Fisheries and Wildlife

Local/Regional Agencies
None

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Appendix A

Agency Correspondence

Appendix B

NCTAMSLANT DET Cutler Natural Resources Project Recommendations

Appendix B. NCTAMSLANT DET Cutler Natural Resources Project Recommendations.

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
Land Management								
LA01 FW01	Conduct biannual monitoring of invasive and nuisance wildlife, such as beavers and bats, to determine if wildlife removal or other remedial actions are necessary to protect natural resources and/or human health and safety.	A, G, H	II	1	X	X	X	
LA02 FW02	Create small impoundments (¼-acre to ½-acre in size), within the existing ditch system, and in areas that will not impact the military mission.	A	III	1	X		X	
LA03	Conduct annual erosion surveys to identify soil problem areas. Focus areas will include the area along roadways, and others areas of ground disturbance adjacent to, and along edges of wetlands, surface waters, and the coastline.	E, F	I	4	X	X	X	
LA04	Develop and implement erosion remedial and preventive measures to protect water quality and ensure shoreline stabilization, based on annual survey results.	E, F	I	4	X		X	
LA05 FW03	Conduct a natural community survey of the Installation to collect ground-truthed GIS data of the vegetative community types present.	A	III	1	X		X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
LA06 FW04	Map the general distribution of larger populations of sensitive wildlife habitats (e.g., black crowberry plants and clusters of bog inhabiting plant, such as pitcher plants, ericaceous shrubs, hare's tail sedge).	A	III	1	X		X	
LA07 FW05	Restore bog habitat affected by ground disturbing activities. Bog restoration projects will be overseen by an ecologist who is experienced with peatland restoration, and post-restoration monitoring will be conducted for at least 5 years, or until post-restoration success is determined. If post-restoration monitoring determines that the restoration project is unsuccessful, an adaptive management/corrective action plan will be prepared and implemented to ensure success.	A, F, G	III	2	X	X	X	
LA08 FW06	Post-construction bog restoration monitoring will include presence/absence surveys for the crowberry blue butterfly and other rare plants and wildlife. Monitoring and mapping of adjacent bog habitat and large lawn-like mats of black crowberry will also be included.	A, F, G	III	1	X	X	X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
LA09	Conduct removal and restoration of areas infested with invasive species. For small stands, manual removal of all above ground biomass as well as the underground rhizome by which they spread is preferred. If manual removal is not appropriate, invasive species should be treated with a glyphosate herbicide.	A	III	1	X	X	X	
LA10	Conduct annual site surveys to proactively identify and treat new occurrences of invasive species, and to monitor restoration sites for regrowth.	A	III	2	X		X	
LA11	Coordinate with MNAP to conduct a general rare plant survey that focuses on rare ecosystem types present at the Installation.	A	III	3	X		X	
LA12 FW07	Conduct an Installation-wide vernal pool survey during the appropriate survey window, and in accordance with MDIFW protocols. Unique features of the pools, photographic documentation, and GIS mapping of each pool will be included in the survey.	A	III	3	X		X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
LA13 FW08 FO03	Conduct a deer wintering habitat assessment to document valuable deer wintering habitat at the Installation. Consult with MDIFW to obtain approved assessment protocols.	A	III	1	X		X	
LA14	Erosion and sediment control training for Installation natural resources personnel.	A, E, F, G, H	II	2	X	X	X	
LA15	Wetlands, and plant, tree, and shrub identification training for natural resources and grounds maintenance personnel.	A, E, F, G, H	II	2	X		X	
LA16 FW23 FO04 OR03	Develop a GIS system for natural resources, and provide training to staff to maintain the GIS database.	A	II	2	X	X	X	
Fish and Wildlife Management								
LA01 FW01	Conduct biannual monitoring of invasive and nuisance wildlife, such as beavers and bats, to determine if wildlife removal or other remedial actions are necessary to protect natural resources and/or human health and safety.	A, G, H	II	1	X	X	X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
LA02 FW02	Create small impoundments (¼-acre to ½-acre in size), within the existing ditch system, and in areas that will not impact the military mission.	A	III	1	X		X	
LA05 FW03	Conduct a natural community survey of the Installation to collect ground-truthed GIS data of the vegetative community types present.	A	III	1	X		X	
LA06 FW04	Map the general distribution of larger populations of sensitive wildlife habitats (e.g., black crowberry plants and clusters of bog inhabiting plant, such as pitcher plants, ericaceous shrubs, hare's tail sedge).	A	III	1	X		X	
LA07 FW05	Restore bog habitat affected by ground disturbing activities. Bog restoration projects will be overseen by an ecologist who is experienced with peatland restoration, and post-restoration monitoring will be conducted for at least 5 years, or until post-restoration success is determined. If post-restoration monitoring determines that the restoration project is unsuccessful, an adaptive management/corrective action plan will be prepared and implemented to ensure success.	A, F, G	III	2	X	X	X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
LA08 FW06	Post-construction bog restoration monitoring will include presence/absence surveys for the crowberry blue butterfly and other rare plants and wildlife. Monitoring and mapping of adjacent bog habitat and large lawn-like mats of black crowberry will also be included.	A, F, G	III	1	X	X	X	
LA12 FW07	Conduct an Installation-wide vernal pool survey during the appropriate survey window, and in accordance with MDIFW protocols. Unique features of the pools, photographic documentation, and GIS mapping of each pool will be included in the survey.	A	III	3	X		X	
LA13 FW08 FO03	Conduct a deer wintering habitat assessment to document valuable deer wintering habitat at the Installation. Consult with MDIFW to obtain approved assessment protocols.	A	III	1	X		X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
FW09 FO02	A forest management plan should be developed upon completion of the forest characterization assessment. The management plan should include a summary the field characterization data, including the stand boundaries, a description of each stand including but not limited to dominant and common tree species, sizes, age class, absolute density, soils, topography, key habitat features, and any other distinctive features. The plan should also include a prescription for each stand and a schedule for conducting forest health monitoring. The management plan will focus on opportunities for improving the forest for wildlife habitat. Forest health monitoring should be conducted once every 5 years and the results incorporated into the forest management plan as an update to reflect the findings of the monitoring and management recommendations, if appropriate.	A	III	1	X		X	
FW10	Conduct a baseline survey of terrestrial invertebrates to generate representative data for the diversity and relative abundance of the invertebrates of the Installation.	A	III	1	X		X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
FW11	Install bat boxes in appropriate habitats to increase the diversity of bats utilizing the Installation for foraging and to discourage use of interior areas of Installation buildings for roosting and hibernating. Bat house construction methods and installation should follow guidelines provided by Bat Conservation International (BCI).	A	III	1	X		X	
FW12	Conduct a comprehensive fish survey within a variety of habitats, including streams and ponds; utilizing beach seining and electrofishing methods; and targeting the seasons of spring, summer and fall. Data on species, size and health information will be collected, and barriers to fish passage (dams or hanging culverts) will be identified	A, D	III	3	X		X	
FW13 OR01	Install benches and interpretive signage at the watchable wildlife areas to enhance and promote use of these areas, and to encourage viewers to remain in the viewing area to avoid disturbing the wildlife being viewed. Access to these areas will be developed in accordance with the Americans with Disabilities Act.	A	III	1	X	Partially implemented, reduced scope	Partially implemented, reduced scope	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
FW14	Conduct a deer population survey to determine deer population levels. Consult with MDIFW to obtain approved survey protocols and to develop survey methodology.	A	III	1	X		X	
FW15	Conduct surveys for crowberry blue butterflies during the appropriate flight season (early July through mid-August) to verify the unconfirmed sighting of this species during 2009 field activities and to determine the presence and extent of this rare species at the Installation. Multiple surveys scheduled throughout the flight season are recommended to ensure that survey efforts do not miss extant populations due to poor weather conditions or inadequate sampling.	A, C	III	3	X			
FW16	Conduct annual surveys for threatened, endangered, rare, and special concern species known to occur at the Installation during the appropriate season.	A, D	III	3	X		X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
FW17	Install nest boxes at the Installation to encourage birds to nest outside of the areas mowed within the managed grasslands habitat, utilizing the guidance provided by USFWS National Conservation Training Center for planning the nest box programs.	A, B	III	1	X		X	
FW18	Prepare and implement migratory bird monitoring plans (e.g., for grassland and shorebird species known to occur at the Installation) in coordination with Institute for Bird Population Studies (IBP), MDIFW, and USFWS.	A, B	III	1	X		X	
FW19	For active osprey nests that are identified as having a negative impact on the military mission, or to the osprey's health, the Installation will obtain a MBTA Depredation Permit from USFWS. Removal of active nests will be conducted in cooperation with a certified wildlife biologist, and in accordance with the recommendations outlined in the Installation Osprey Management Plan.	A, B	0	4	X	X	X	X

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
FW20	Conduct a feasibility assessment for installation of artificial nesting platforms for osprey.	A, B	III	1	X		X	
FW21	Coordinate with interested federal or state agencies, NGOs, or private entities (i.e., with DoD Partners in Flight and IBP) to establish wildlife monitoring programs.	A, B	III	1	X		X	
FW22 OR03	Re-engage partnership and cooperative agreement discussions that were initiated during the establishment process of the Sprague Neck Bar ERA. Agencies and organizations that should be part of this process include, but are not limited to DoD PIF, USFWS, MDIFW, University of Maine–Machias, Ducks Unlimited, and The Nature Conservancy.	A, B	III	1	X	Partially implemented	X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
LA16 FW23 FO04 OR03	Develop a GIS system for natural resources, and provide training to staff to maintain the GIS database.	A	II	2	X	X	X	
Forestry Management								
FO01	Conduct a basic characterization of Installation forest stands. Characterization should include delineation of each stand, which is an easily defined area of the forest containing the same species mixture with similar heights, ages, diameters, densities, soils, health or other unifying characteristics (Maine Forest Service Department of Conservation 2006). Field data should include dominant and common tree species, sizes, age class, absolute density, soils, topography, key habitat features, and other distinctive features.	A	III	1	X	Partially implemented, reduced scope	X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
FW09 FO02	A forest management plan should be developed upon completion of the forest characterization assessment. The management plan should include a summary the field characterization data, including the stand boundaries, a description of each stand including but not limited to dominant and common tree species, sizes, age class, absolute density, soils, topography, key habitat features, and any other distinctive features. The plan should also include a prescription for each stand and a schedule for conducting forest health monitoring. The management plan will focus on opportunities for improving the forest for wildlife habitat. Forest health monitoring should be conducted once every 5 years and the results incorporated into the forest management plan as an update to reflect the findings of the monitoring and management recommendations, if appropriate.	A	III	1	X		X	
LA13 FW08 FO03	Conduct a deer wintering habitat assessment to document valuable deer wintering habitat at the Installation. Consult with MDIFW to obtain approved assessment protocols.	A	III	1	X		X	

Project No.[1]	Project Description	Prime Legal Driver/ Initiative[2]	Class[3]	Navy Environmental Readiness Level[4]	Alternative 1 Proposed Action	Alternative 2 Reduced Management Emphasis	Alternative 3 Reduced Outdoor Recreation Management	No Action/Status Quo Alternative
LA16 FW23 FO04 OR03	Develop a GIS system for natural resources, and provide training to staff to maintain the GIS database.	A	II	2	X	X	X	
Outdoor Recreation Management								
FW13 OR01	Install benches and interpretive signage at the watchable wildlife areas to enhance and promote use of these areas, and to encourage viewers to remain in the viewing area to avoid disturbing the wildlife being viewed. Access to these areas will be developed in accordance with the Americans with Disabilities Act.	A	III	1	X	Partially implemented, reduced scope	Partially implemented, reduced scope	
FW22 OR02	Re-engage partnership and cooperative agreement discussions that were initiated during the establishment process of the Sprague Neck Bar ERA. Agencies and organizations that should be part of this process include, but are not limited to DoD PIF, USFWS, MDIFW, University of Maine–Machias, Ducks Unlimited, and The Nature Conservancy.	A, B	III	1	X	Partially implemented	X	
LA16 FW23 FO04 OR03	Develop a GIS system for natural resources, and provide training to staff to maintain the GIS database.	A	II	2	X	X	X	

[1] Project No.: LA = Land Management; FW = Fish and Wildlife Management; FO = Forestry Management; OR = Outdoor Recreation Management

[2] Legal Drivers and Initiatives:

A OPNAVINST 5090.1C-Ch-1 Chapter 24

B Migratory Bird Treaty Act of 1918

C SAIA of 1960, as amended

D Endangered Species Act of 1973, as amended

E Clean Water Act of 1972, as amended

F Soil and Water Conservation Act of 1977, as amended

G Executive Order 11990 (Protection of Wetlands)

H Executive Order 11988 (Floodplain Management)

I Coastal Zone Management Act

[3] Class 0: recurring administrative and management; Class I: current compliance; Class II: maintenance requirements; Class III: enhancement or actions beyond compliance

[4] Navy Environmental Readiness Level: Level 4=compliance requirement, Level 3=Navy proactive involvement, Level 2=Navy or DoD policy requirement, and Level 1=Navy environmental stewardship

APPENDIX B

Cross-Reference of INRMP Guidance for Navy Installations to DOD INRMP Template

Cross Reference of *Integrated Natural Resources Management Plan* Guidance for Navy Installations to DoD INRMP Template

DOD *Integrated Natural Resources Management Plan* Template	Cross-Reference to NSA Cutler INRMP Update Table of Contents
Title Page	**Title Page (see front matter)**
Signature Page	**Signature Page (see front matter)**
Executive Summary	**Executive Summary (see front matter)**
Table of Contents	**Table of Contents (see front matter)**
1. Overview	**Section 1.6 Overview of Natural Resources Management**
a. Purpose	Section 1.1 Purpose and Authority
b. Scope	Section 1.2 Scope
c. Goals and Objectives	Section 1.3 Goals
d. Responsibilities	Section 1.4 Responsibilities
(1) Installation stakeholders	Section 1.4.1 Facility Stakeholders
(2) External stakeholders	Section 1.4.2 External Stakeholders
e. Authority	Section 1.1 Purpose and Authority
f. Stewardship and Compliance	Section 1.8 Compliance and Stewardship
g. Review and Revision Process	Plan Updates (see front matter)
h. Management Strategy	Section 1.6 Overview of Natural Resources Management; Section 1.14 Environmental Planning
2. Current Conditions and Use	**Section 2.0 Existing Conditions**
a. Installation Information	Section 2.0 Existing Conditions; Section 2.1 Site Details; Section 1.5; Installation History and Military Mission
(1) General Description	Section 2.1 Site Details; Section 1.5 Installation History and Military Mission
(2) Regional Land Uses	Section 1.11 Encroachment and Adjacent Land Use
(3) Abbreviated History and Pre-Military Land Use	Section 1.5 Installation History and Military Mission
(4) Military Mission	Section 1.5 Installation History and Military Mission; 5.1 Supporting Sustainability of the Military Mission and the Natural Environment
(5) Operations and Activities	Section 1.14 Environmental Planning; Section 2.0 Existing Conditions; Section 2.1 Site Details; Section 1.5 Installation History and Military Mission

(6) Constraints Map	No map but constraints are discussed in Section 5.1.2 Impacts to the Military Mission
(7) Opportunities	Section 1.3 Goals; Section 1.9 Mission Impacts on the Environment
b. General Physical Environment	Section 2.0 Existing Conditions
(1) Climate	Section 2.2 Climate
(2) Physiography and Soils	Section 2.3 Geology, Topography, and Soils
(3) Surface Water and Ground Water	Section 2.4 Water Resources; Section 2.4.1 Watersheds and Floodplains; Section 2.4.2 Surface Waters; Section 2.4.5 Groundwater; Section 2.4.6 Water Quality, Section 2.4.7 Nearshore Environment
c. General Biotic Environment	Section 2.0 Existing Conditions
(4) T & E Species and Species of Concern	Section 2.7 Threatened and Endangered Species and Species of Special Concern; Section 2.8 Rare Communities and Significant Wildlife Habitat
(5) Wetlands and Deep Water Habitats	Section 2.4.3 Wetlands
(6) Fauna	Section 2.6 Wildlife
(7) Flora	Section 2.5 Vegetation
3. Environmental Management Strategy and Mission Sustainability	**Section 5.0 INRMP Implementation**
a. Supporting Sustainability of the Military Mission and the Natural Environment	Section 5.1 Supporting Sustainability of the Military Mission and the Natural Environment
(1) Integrate Military Mission and Sustainable Land Use	Section 5.1.1 Integration of Military Mission and Land Use
(2) Define Impact to the Military Mission	Section 5.1.2 Impacts to Military Mission
(3) Describe Relationship to Range Complex Management Plan or other operation area plan	Section 5.1.3 Relationship of Range Complex Management Plan or Other Operation Area Plan
b. Natural Resources Consultation Requirements	Section 5.2 Natural Resources Consultation Requirements
c. NEPA Compliance	Section 5.4 NEPA Compliance

d. Beneficial Partnerships and Collaborative Resource Planning	Section 1.7 Partnerships and Outreach, Section 3.2.8 Partnerships and Outreach, Section 3.4.2 Partnerships and Outreach, Section 4.2.5 Partnerships and Outreach, Section 4.4.1 Partnerships and Outreach
e. Public Access and Outreach	Section 1.7 Partnerships and Outreach
(1) Public Access and Outdoor Recreation	Section 3.4.1 Outdoor Recreation Opportunities at NCTAMSLANT DET Cutler
2) Public Outreach	Section 3.4.1 Outdoor Recreation Opportunities at NCTAMSLANT DET Cutler; Section 1.7 Partnerships and Outreach
f. Encroachment Partnering	Section 1.11 Encroachment and Adjacent Land Use
g. State Comprehensive Wildlife Plans	Section 3.2.1 General Fish and Wildlife Management
4. Program Elements	**Section 3.0 Natural Resources Management Programmatic Objectives and Recommendations**
a. T & E Species Management and Species benefit, Critical Habitat, and Species of Concern Management	Section 3.1.8 Rare Communities and Significant Wildlife Habitat; Section 3.2.5 Threatened, Endangered, and Special Concern Species Management; Section 4.1.3 Vegetation Management; Section 4.2.2 Threatened, Endangered, and Special Concern Species Management
b. Wetlands and Deep Water Habitats Management	Section 3.1.1 Water Resources Management; Section 3.1.5 Wetland Management; Section 4.1.1 Water Resources Management
c. Law Enforcement of Natural Resources Laws and Regulations	Section 3.2.9 Conservation Law Enforcement
d. Fish and Wildlife Management	Section 3.2.1 General Fish and Wildlife Management; Section 4.2.1 General Fish and Wildlife Management
e. Forestry Management	Section 3.3 Forestry Management; Section 4.3 Forestry Management Areas
f. Vegetation Management	Section 3.1.3 Vegetation Management; Section 3.1.6 Pollinator Friendly Management; Section 4.1.3 Vegetation Management

g. Migratory Birds Management	Section 3.2.6 Migratory Bird Management; Section 4.2.3 Migratory Bird Management
h. Invasive Species Management	Section 3.1.4 Invasive Plant Species Management; Section 3.2.7 Nuisance Wildlife Management; Section 3.3.3 Insects and Diseases; Section 4.1.4 Invasive Plant Species Management; Section 4.2.4 Nuisance Wildlife Management
i. Pest Management	Section 3.2.7 Nuisance Wildlife Management; Section 4.2.4 Nuisance Wildlife Management
j. Land Management	Section 3.1 Land Management; Section 4.1 Land Management Areas
k. Agricultural Outleasing	N/A
l. Geographical Information Systems (GIS) Management, Data Integration, Access, and Reporting	Sections 1.13, 3.2.11, 3.3.5, and 3.4.5 GIS Management, Data Integration, Access, and Reporting
m. Outdoor Recreation	Section 3.4 Outdoor Recreation Management; Section 4.4 Outdoor Recreation Management Areas
n. Bird Aircraft Strike Hazard	N/A
o. Wildland Fire Management	Section 3.1.7 Wildland Fire Management; Section 4.3 Forestry Management Areas
p. Training of Natural Resource Personnel	Sections 1.12, 3.1.15, 3.2.10, 3.3.4, and 3.4.4 Training of Natural Resources Personnel
q. Coastal/Marine Management	Section 3.1.1.3 Water Quality Management; Section 3.1.2 Coastal Zone Management, 3.2.2 Marine Wildlife Standings, 3.4.3 Special Natural Areas Management; Section 4.1.1 Water Resources Management; Section 4.1.2 Coastal Zone Management
r. Floodplains Management	Section 3.1.1 Water Resources Management; Section 4.1.1 Water Resources Management
s. Other Leases	3.1.13 Leases
5. Implementation	**Section 5.0 INRMP Implementation**
a. Summarize Process of Preparing Prescriptions that Drive the Projects	Section 5.5 Project Development and Classification
b. Achieving No-Net-Loss	Section 5.3 Achieving No Net Loss
c. Use of Cooperative Agreements	Section 5.8 Use of Cooperative Agreements
d. Funding	Section 5.6 Funding Sources

N/A = Not Applicable

APPENDIX C

NSA CUTLER NATURAL RESOURCES PROJECT SCHEDULE, 2018–2023, CUTLER, MAINE

APPENDIX C

NSA Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine

Project No.	Project Description	INRMP Section Ref.	Implementation Schedule (FY)	Prime Legal Driver/ Initiative[1]	Class[2]	Navy Environmental Readiness Level[3]	Cost Estimate	Funding Sources[4]
Land Management								
LA01 FW01	Conduct biannual monitoring of invasive and nuisance wildlife, such as beavers and bats, to determine if habitat modification to discourage beavers or wildlife removal of nuisance bats (excluding federally or state protected bat species) or other remedial actions are necessary to protect natural resources and/or human health and safety. Create a habitat modification plan to address beaver activity.	3.1.1 3.2.7	Biannually beginning in 2018	A, G, H	II	4	$10,000	FR, AO
LA02	Conduct annual erosion surveys to identify soil problem areas. Focus areas will include the area along roadways, and other areas of ground disturbance adjacent to, and along edges of wetlands, surface waters, and the coastline.	3.1.1.3	Annually beginning in 2018	E, F	I	4	$10,000	O&MN
LA03	Implement erosion remedial and preventive measures to protect water quality and ensure shoreline stabilization, prioritize activities based on erosion survey results.	3.1.1.3	Annually beginning in 2018	E, F	I	4	$32,000 annually, or as needed	O&MN
LA04 FW03	Conduct a natural community survey of the Installation to collect ground-truthed GIS data of the vegetative community types present.	3.1.3 3.2.1	2019 – 2021	A	III	4	$30,000	FR, AO
LA05 FW04	Map the general distribution of larger populations of sensitive wildlife habitats (e.g., black crowberry plants and clusters of bog inhabiting plant, such as pitcher plants, ericaceous shrubs, hare's tail sedge).	3.1.3 3.2.1	2019 – 2021	A	III	4	$12,000	LP, FR, AO
LA06 FW05	Restore bog habitat affected by ground disturbing activities. Bog restoration projects will be overseen by an ecologist who is experienced with peatland restoration, and post-restoration monitoring will be conducted for at least 5 years, or until post-restoration success is determined. If post-restoration monitoring determines that the restoration project is unsuccessful, an adaptive management/corrective action plan will be prepared and implemented to ensure success.	3.1.3 3.2.1	As needed	A, F, G	III	4	To be determined	FR

APPENDIX C

NSA Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine

Project No.	Project Description	INRMP Section Ref.	Implementation Schedule (FY)	Prime Legal Driver/ Initiative[1]	Class[2]	Navy Environmental Readiness Level[3]	Cost Estimate	Funding Sources[4]
LA07 FW06	Post-construction bog restoration monitoring will include presence/absence surveys for the crowberry blue butterfly and other rare plants and wildlife. Monitoring and mapping of adjacent bog habitat and large lawn-like mats of black crowberry will also be included.	3.1.3 3.2.1	As needed	A, F, G	III	4	$16,800	FR, AO
LA08	Conduct removal and restoration of areas infested with invasive species. For small stands, manual removal of all above ground biomass as well as the underground rhizome by which they spread is preferred. If manual removal is not appropriate, invasive species should be treated with a glyphosate herbicide.	3.1.4	As needed	A	III	4	$37,000	LP, FR, AO
LA09	Conduct annual site surveys to proactively identify and treat new occurrences of invasive species, and to monitor restoration sites for regrowth.	3.1.4	2018	A	III	4	$13,600	FR, AO
LA10	Coordinate with MNAP to conduct a general rare plant survey that focuses on rare ecosystem types present at the Installation.	3.1.8	2020	A	III	4	$57,500	FR, AO, Non-DoD
LA11 FW07	Conduct follow-up an Installation-wide vernal pool surveys during the appropriate survey window, and in accordance with MDIFW protocols. Unique features of the pools, photographic documentation, and GIS mapping of each pool will be included in the survey.	3.1.8 3.2.1	2021	A	III	4	$75,000	LP, FR, AO
LA12 FW08 FO02	Conduct additional deer population surveys over multiple years to allow for annual and seasonal variation as funding allows. The findings of these surveys should be incorporated into the deer management plan.	3.1.8 3.2.3 3.3.2	2019	A	III	4	$20,720	FR, AO
LA13	Erosion and sediment control training for Installation natural resources personnel.	3.1.15	As needed	A, E, F, G, H	II	4	$8,400	FR,AO
LA14	Wetlands, and plant, tree, and shrub identification training for natural resources and grounds maintenance personnel.	3.1.15	As needed	A, E, F, G, H	II	4	$12,000	FR,AO

APPENDIX C

NSA Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine

Project No.	Project Description	INRMP Section Ref.	Implementation Schedule (FY)	Prime Legal Driver/ Initiative[1]	Class[2]	Navy Environmental Readiness Level[3]	Cost Estimate	Funding Sources[4]
LA15 FW28 FO03 OR03	Develop a GIS system for natural resources, and provide training to staff to maintain the GIS database.	3.1.16 3.2.11 3.3.5 3.4.5	2018	A	II	4	$34,300	FR, AO
	Fish and Wildlife Management							
LA01 FW01	Conduct biannual monitoring of invasive and nuisance wildlife, such as beavers and bats, to determine if habitat modification to discourage beavers or wildlife removal of nuisance bats (excluding federally or state protected bat species) or other remedial actions are necessary to protect natural resources and/or human health and safety. Create a habitat modification plan to address beaver activity.	3.1.1 3.2.7	Biannually beginning in 2018	A, G, H	II	4	$10,000	FR, AO
LA04 FW03	Conduct a natural community survey of the Installation to collect ground-truthed GIS data of the vegetative community types present.	3.1.3 3.2.1	2019 – 2021	A	III	4	$25,000	FR, AO
LA05 FW04	Map the general distribution of larger populations of sensitive wildlife habitats (e.g., black crowberry plants and clusters of bog inhabiting plant, such as pitcher plants, ericaceous shrubs, hare's tail sedge).	3.1.3 3.2.1	2019 – 2021	A	III	4	$12,000	LP, FR, AO
LA06 FW05	Restore bog habitat affected by ground disturbing activities. Bog restoration projects will be overseen by an ecologist who is experienced with peatland restoration, and post-restoration monitoring will be conducted for at least 5 years, or until post-restoration success is determined. If post-restoration monitoring determines that the restoration project is unsuccessful, an adaptive management/corrective action plan will be prepared and implemented to ensure success.	3.1.3 3.2.1	As needed	A, F, G	III	4	To be determined	FR
LA07 FW06	Post-construction bog restoration monitoring will include presence/absence surveys for the crowberry blue butterfly and other rare plants and wildlife. Monitoring and mapping of adjacent bog habitat and large lawn-like mats of black crowberry will also be included.	3.1.3 3.2.1	As needed	A, F, G	III	4	$16,800	FR, AO

APPENDIX C
NSA Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine

Project No.	Project Description	INRMP Section Ref.	Implementation Schedule (FY)	Prime Legal Driver/ Initiative[1]	Class[2]	Navy Environmental Readiness Level[3]	Cost Estimate	Funding Sources[4]
LA11 FW07	Conduct follow-up an Installation-wide vernal pool surveys during the appropriate survey window, and in accordance with MDIFW protocols. Unique features of the pools, photographic documentation, and GIS mapping of each pool will be included in the survey.	3.1.8 3.2.1	2021	A	III	4	$75,000	LP, FR, AO
LA12 FW08 FO02	Conduct additional deer population surveys over multiple years to allow for annual and seasonal variation as funding allows. The findings of these surveys should be incorporated into the deer management plan.	3.1.8 3.2.3 3.3.2	2019	A	III	4	$30,000	FR, AO
FW09 FO01	A forest management plan should be developed upon completion of the forest characterization assessment. The management plan should include a summary the field characterization data, including the stand boundaries, a description of each stand including but not limited to dominant and common tree species, sizes, age class, absolute density, soils, topography, key habitat features, and any other distinctive features. The plan should also include a prescription for each stand and a schedule for conducting forest health monitoring. The management plan will focus on opportunities for improving the forest for wildlife habitat. Forest health monitoring should be conducted once every 5 years and the results incorporated into the forest management plan as an update to reflect the findings of the monitoring and management recommendations, if appropriate.	3.2.1 3.3.2	2020 – 2023	A	III	4	$18,240	FR, AO
FW10	Conduct follow-up surveys, every 3 to 5 years, to assess terrestrial invertebrates to generate representative data for the diversity and relative abundance of the invertebrates of the Installation.	3.2.1	Every 3 to 5 years	A	III	4	$37,000	LP, FR, AO
FW11	Install bat boxes in appropriate habitats to increase the diversity of bats utilizing the Installation for foraging and to discourage use of interior areas of Installation buildings for roosting and hibernating. Bat house construction methods and installation should follow guidelines provided by Bat Conservation International (BCI).	3.2.1	2020	A	III	4	$12,000	FR, AO

APPENDIX C

NSA Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine

Project No.	Project Description	INRMP Section Ref.	Implementation Schedule (FY)	Prime Legal Driver/ Initiative[1]	Class[2]	Navy Environmental Readiness Level[3]	Cost Estimate	Funding Sources[4]
FW12	Conduct a comprehensive fish survey within a variety of habitats, including streams and ponds; utilizing beach seining and electrofishing methods; and targeting the seasons of spring, summer and fall. Data on species, size and health information will be collected, and barriers to fish passage (dams or hanging culverts) will be identified	3.2.1	2019	A, D	III	4	$70,160	FR, AO, Non-DoD
FW13 OR01	Install benches and interpretive signage at the watchable wildlife areas to enhance and promote use of these areas, and to encourage viewers to remain in the viewing area to avoid disturbing the wildlife being viewed. Access to these areas will be developed in accordance with the Americans with Disabilities Act.	3.2.1 3.4.3.2	2018	A	III	4	$19,000	FR, AO
FW14	Implement the NSA Cutler deer management plan, once available.	3.2.3	2013	A	III	4	$12,000	FR, AO
FW15	Conduct surveys for crowberry blue butterflies during the appropriate flight season (early July through mid-August) to verify the unconfirmed sighting of this species during 2009 field activities and to determine the presence and extent of this rare species at the Installation. Multiple surveys scheduled throughout the flight season are recommended to ensure that survey efforts do not miss extant populations due to poor weather conditions or inadequate sampling.	3.2.5.3	Annually beginning in 2018	A, D	III	4	$33,500	FR, AO, Non-DoD
FW16	Conduct periodic follow-up surveys for threatened, endangered, rare, and special concern species known to occur at the Installation during the appropriate season. Surveys should be compiled every 3 to 5 years and include a review of federally and state protected species list as well as species of special concern added since completion of the last survey.	3.2.4.3	As needed	A, D	III	4	To be determined	FR, AO, Non-DoD
FW17	Install nest boxes at the Installation to encourage birds to nest outside of the areas mowed within the managed grasslands habitat, utilizing the guidance provided by USFWS National Conservation Training Center for planning the nest box programs.	3.2.6	2019	A, B	III	4	$12,000	FR, AO, Non-DoD

APPENDIX C
NSA Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine

Project No.	Project Description	INRMP Section Ref.	Implementation Schedule (FY)	Prime Legal Driver/ Initiative[1]	Class[2]	Navy Environmental Readiness Level[3]	Cost Estimate	Funding Sources[4]
FW18	Prepare and implement migratory bird monitoring plans (e.g., for grassland and shorebird species known to occur at the Installation) in coordination with Institute for Bird Population Studies (IBP), MDIFW, and USFWS.	3.2.6 3.2.6.1	2020	A, B	III	4	$41,440	FR, AO, Non-DoD
FW19	Implement the bird and bat conservation strategy.	3.2.6	Every 2 to 3 years	A, B	III	4	$30,000	O&MN
FW20	Conduct follow up raptor migration surveys. Surveys should be condcuted in accordance with the Eagle Protection Plan.	3.2.6	Every 2 to 3 years	A, B	III	4	$25,000	O&MN
FW21	Continue to conduct eagle use surveys to document nesting and migratory eagle movement in relation to the antenna fields.	3.2.6	Every 2 to 3 years	A, B	III	4	$30,000	O&MN
FW22	Conduct follow up surveys to monitor and estimate take of migratory birds and bats. Surveys should be conducted in accordance with the Bird and Bat Conservation Strategy. When possible, FW22 and FW23 should occur concurrently.	3.2.6	As needed	A, B	III	4	$75,000	O&MN
FW23	Conduct avian radar and acoustic surveys every two to three years to collect near continuous radar data on bird and bat activitiy across the installation. When possible, FW22 and FW23 should occur concurrently.	3.2.6	Every 2 to 3 years	A, B	III	4	$80,000	O&MN
FW24	For active osprey nests that are identified as having a negative impact on the military mission, or to the osprey's health, the Installation will obtain a MBTA Depredation Permit from USFWS. Removal of active nests will be conducted in cooperation with a certified wildlife biologist, and in accordance with the recommendations outlined in the Installation Osprey Management Plan.	3.2.6.2	Annually	A, B	0	4	$10,000	O&MN
FW25	Conduct a feasibility assessment for installation of artificial nesting platforms for osprey.	3.2.6.2	2019	A, B	III	4	$26,000	LP, FR, AO
FW26	Continue to coordinate with interested federal or state agencies, NGOs, or private entities (i.e., with DoD Partners in Flight and IBP) to establish wildlife monitoring programs.	3.2.8	2018	A, B	III	4	$24,800	LP, FR, AO, Non-DoD

APPENDIX C

NSA Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine

Project No.	Project Description	INRMP Section Ref.	Implementation Schedule (FY)	Prime Legal Driver/ Initiative[1]	Class[2]	Navy Environmental Readiness Level[3]	Cost Estimate	Funding Sources[4]
FW27 OR02	Re-engage partnership and cooperative agreement discussions that were initiated during the establishment process of the Sprague Neck Bar ERA. Agencies and organizations that should be part of this process include, but are not limited to DoD PIF, USFWS, MDIFW, University of Maine–Machias, Ducks Unlimited, and The Nature Conservancy.	3.2.8 3.4.3.1	2018	A, B	III	4	$9,200	LP, FR, AO, Non-DoD
LA15 FW28 FO03 OR03	Develop a GIS system for natural resources, and provide training to staff to maintain the GIS database.	3.1.16 3.2.11 3.3.5 3.4.5	2018	A	II	4	$34,300	FR, AO
FW09 FO01	A forest management plan should be developed using the completed forest characterization assessment. The management plan should include a summary the field characterization data, including the stand boundaries, a description of each stand including but not limited to dominant and common tree species, sizes, age class, absolute density, soils, topography, key habitat features, and any other distinctive features. The plan should also include a prescription for each stand and a schedule for conducting forest health monitoring. The management plan will focus on opportunities for improving the forest for wildlife habitat. Forest health monitoring should be conducted once every 5 years and the results incorporated into the forest management plan as an update to reflect the findings of the monitoring and management recommendations, if appropriate. The plan should include measures for protection of standing dead trees (snags) and trees with loose bark or cavities, which represent important roosting habitat for bats.	3.2.1 3.3.2	2019 – 2021	A	III	4	$25,000	FR, AO
LA12 FW08 FO02	Conduct additional deer population surveys over multiple years to allow for annual and seasonal variation as funding allows. The findings of these surveys should be incorporated into the deer management plan.	3.1.8 3.2.3 3.3.2	2019	A	III	4	$20,720	FR, AO
LA15 FW28 FO03 OR03	Develop a GIS system for natural resources, and provide training to staff to maintain the GIS database.	3.1.16 3.2.11 3.3.5 3.4.5	2018	A	II	4	$34,300	FR, AO

APPENDIX C

NSA Cutler Natural Resources Project Schedule, 2018–2023, Cutler, Maine

Project No.	Project Description	INRMP Section Ref.	Implementation Schedule (FY)	Prime Legal Driver/ Initiative[1]	Class[2]	Navy Environmental Readiness Level[3]	Cost Estimate	Funding Sources[4]
FW13 OR01	Install benches and interpretive signage at the watchable wildlife areas to enhance and promote use of these areas, and to encourage viewers to remain in the viewing area to avoid disturbing the wildlife being viewed. Access to these areas will be developed in accordance with the Americans with Disabilities Act.	3.2.1 3.4.3.2	2020	A	III	4	$19,000	FR, AO
FW27 OR02	Re-engage partnership and cooperative agreement discussions that were initiated during the establishment process of the Sprague Neck Bar ERA. Agencies and organizations that should be part of this process include, but are not limited to DoD PIF, USFWS, MDIFW, University of Maine–Machias, Ducks Unlimited, and The Nature Conservancy.	3.2.8 3.4.3.1	2018	A, B	III	4	$9,200	LP, FR, AO, Non-DoD
LA15 FW28 FO03 OR03	Develop a GIS system for natural resources, and provide training to staff to maintain the GIS database.	3.1.16 3.2.11 3.3.5 3.4.5	2013	A	II	4	$34,300	FR, AO

[1] Legal Drivers and Initiatives:

A OPNAVINST 5090.1C Ch. 24
B Migratory Bird Treaty Act of 1918
C Sikes Act of 1960, as amended
D Endangered Species Act of 1973, as amended
E Clean Water Act of 1972, as amended
F Soil and Water Conservation Act of 1977, as amended
G Executive Order 11990 (Protection of Wetlands)
H Executive Order 11988 (Floodplain Management)
I Coastal Zone Management Act

[2] Class 0: recurring administrative and management; Class I: current compliance; Class II: maintenance requirements; Class III: enhancement or actions beyond compliance

[3] Navy Environmental Readiness Level: Level 4=compliance requirement, Level 3=Navy proactive involvement, Level 2=Navy or DoD policy requirement, and Level 1=Navy environmental stewardship

[4] Funding Sources: O&MN=Operations and Maintenance Environmental Fund; LP=Legacy Program; FR=Forestry Revenues; AO=Agricultural Outleasing Funds; and Non-DoD=Non-DoD Funds

APPENDIX D

Project Planning Environmental Checklist

PWD-ME ENVIRONMENTAL CHECKLIST – PART 1

This Environmental (EV) Checklist is used to determine the environmental requirements associated with a proposed action. Complete Part 1 of this form, attach a <u>site map</u> and submit the form electronically to PWD-ME (EV) NEPA Manager.

General Project Information (Attach additional sheets as needed)

1	Requesting Organization:			
2	Project Manager /Phone /Date		Ext.	Date (MM/DD/YY):
3	Name of Project:			
4	Project Number (if any):			
5	Project Location:			
6	Project Phase	**Construction**		
7	Brief Description of the Project: (attach additional sheets as needed)			
8	Purpose and need for project.			
9	Award/Construction Start Date			

	Does the project involve any of the following?	**YES**	**NO**	**UNSURE**
10	Ground Disturbing Activities (i.e. excavation, grading, demolition, site work, borings, etc.):	☐	☐	☐
a.	Size of Disturbance (square feet):			
b.	Estimated Quantity of Excess Soil to be generated (cubic yard):0			
11	New Impervious Surface (square feet): 0	☐	☐	☐
12	Lead paint, Asbestos, or PCB handling/removal (identify type and estimated quantity below)	☐	☐	☐
13	Air emission-generating equipment (i.e., paint booth, emergency generator, boiler):	☐	☐	☐
a.	Fuel burning equipment with maximum design heat input ≥ 1.0 MMBtu/hr	☐	☐	☐
b.	Emergency Generator Capacity ≥ 50 kW	☐	☐	☐
c.	Stationary Internal Combustion Engines (i.e. generators, diesel fire pumps) ≥ 0.5 MMBtu/hr	☐	☐	☐
d.	Refrigerant containing equipment (□ 50 lbs. refrigerant)	☐	☐	☐
14	Temporary stockpiling of soil	☐	☐	☐
15	Utility connections (i.e. water, sewer, storm drain, etc.)	☐	☐	☐
16	Tree removal	☐	☐	☐
17	Removal and/or installation of aboveground and/or underground storage tanks	☐	☐	☐

	As depicted on the Shipyard's Land Use Map*, will the project be located within: *Contact PWD-ME EV for projects at other sites in PWD-ME's AOR.	**YES**	**NO**	**UNSURE**
18	An Installation Restoration Program Site	☐	☐	☐
19	A historic building	☐	☐	☐
20	An archaeological area	☐	☐	☐
21	A surface water (i.e. river, pond) or wetland or within **100** feet of a surface water or wetland	☐	☐	☐

Additional Comments

PWD-ME ENVIRONMENTAL CHECKLIST – PART 2

PLEASE NOTE: Part 2 is to be completed by the PWD-ME EV NEPA Manager and EV Program Managers. The Environmental Review is only valid for 1 year

ENVIRONMENTAL REQUIREMENTS (Issues that can affect the project□s timeline, cost or site location).

Environmental Aspect	YES	NO	Environmental Requirement	Project Impacts
National Env Policy Act (NEPA)	☐	☐	CATEX □2 weeks; EA □12 months; EIS □24	Cannot award till complete
Endangered Species	☐	☐	Consultations with Regulators required	Process may take 6 months
Wetland□Surface Water	☐	☐	Permits and possible mitigation required	Process may take 2-7
Tree Mitigation	☐	☐	Compensation for tree loss or mitigation is required	This may add costs to project
Coastal Zone Mgmt Act	☐	☐	Coastal Consistent Determination (CCD) is required	Process takes 120 days
Storm Water Management	☐	☐	Permit□Best Management Practice (varies by State)	Process may take 2-7
Site Location Development Act	☐	☐	Permit Modification for any change in land use	Process takes 120 days
Marine Resources	☐	☐	Consultations with NOAA□NMFS required	Process takes minimum 60
Natural Res. Protection Act	☐	☐	Permit for work within□near a natural resource	Full permit requires 120 days
Cultural Resources	☐	☐	Consultations with SHPO required	Process may take 2-9
Major Air Emission Source	☐	☐	Permit modification is required	Process takes 6 months
Construction Emissions	☐	☐	Air Conformity Record of Non-Applicability is required	Process takes two week
Installation Restoration	☐	☐	Land-use controls exist or consultation w□EPA	Process may take 4 months
Erosion □ Sediment Control	☐	☐	Required for projects with any ground disturbance	Incorporate into the design
Spill Preventative Measures	☐	☐	Secondary containment required for oil tank □55-gal	Incorporate into the design

ENVIRONMENTAL PROGRAM MANAGER COMMENTS (Additional comments may be provided on Page 3)

Program	Name□Date	Comments□Requirement
Cultural Resources	Date:	
Natural Resources	Date:	
Air Quality	Date:	
Water Resources	Date:	
Installation Restoration□Soils Management	Date:	
Asbestos Program	N□A Date	
Other (Haz Waste, Petroleum, etc)	Date:	

PWD-ME NEPA Program Manager	**Date**	**Code 106 Environmental**	**Date**

NEPA Action: ☐ CATEX ☐ EA ☐ EIS ☐ No NEPA action required

PWD-ME ENVIRONMENTAL CHECKLIST - PART 3
ADDITIONAL INFORMATION

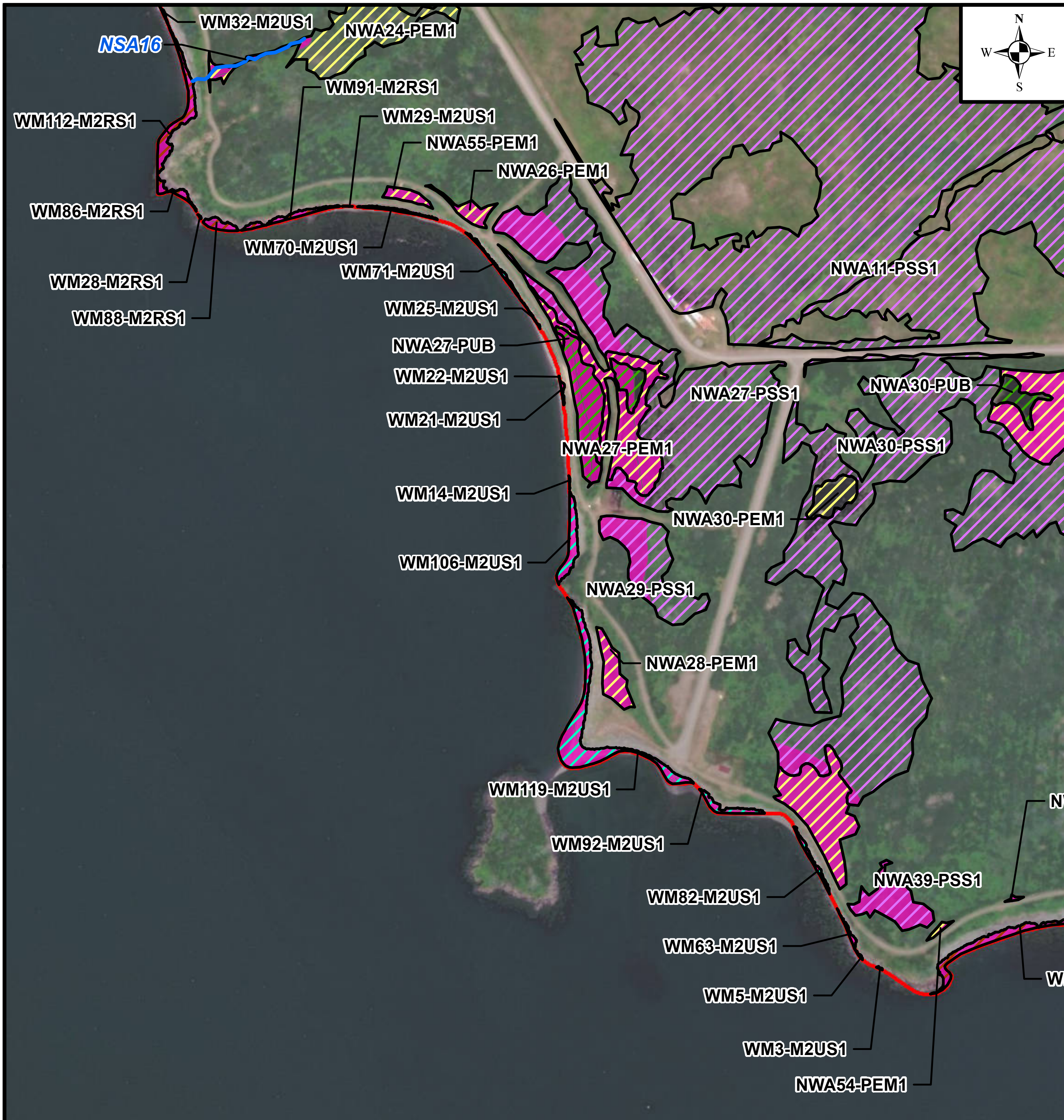
Part 3 of this form may be used by EV Program Managers if additional information is required. Program, Name and Date <u>must</u> be provided with each additional comment.

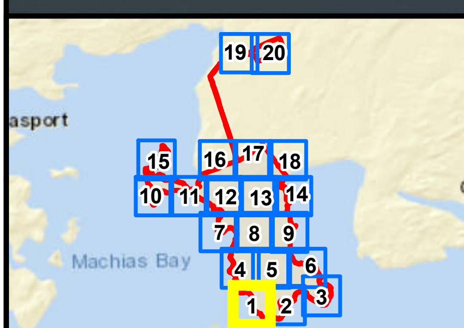
APPENDIX E

NSA CUTLER WETLANDS AND COMMUNITY TYPE MAPS

ENCLOSURES

- **Maps 1-1 to 1-18. Very Low Frequency Area Jurisdictional Wetlands NSA Cutler, Cutler, Maine**
- **Maps 1-19 to 1-20. Very High Frequency Area Jurisdictional Wetlands NSA Cutler, Cutler, Maine**
- **Map 2-A. Very Low Frequency Area Community Types NSA Cutler, Cutler, Maine**
- **Map 2-B. High Frequency Area Community Types NSA Cutler, Cutler, Maine**
- **Map 3. Very Low Frequency Area and High Frequency Area Jurisdictional Wetlands "D" Size Figure NSA Cutler, Cutler, Maine**





Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000
Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2RS1
- PSS
- M2US1
- PUB
- PEM

Figure 1-1.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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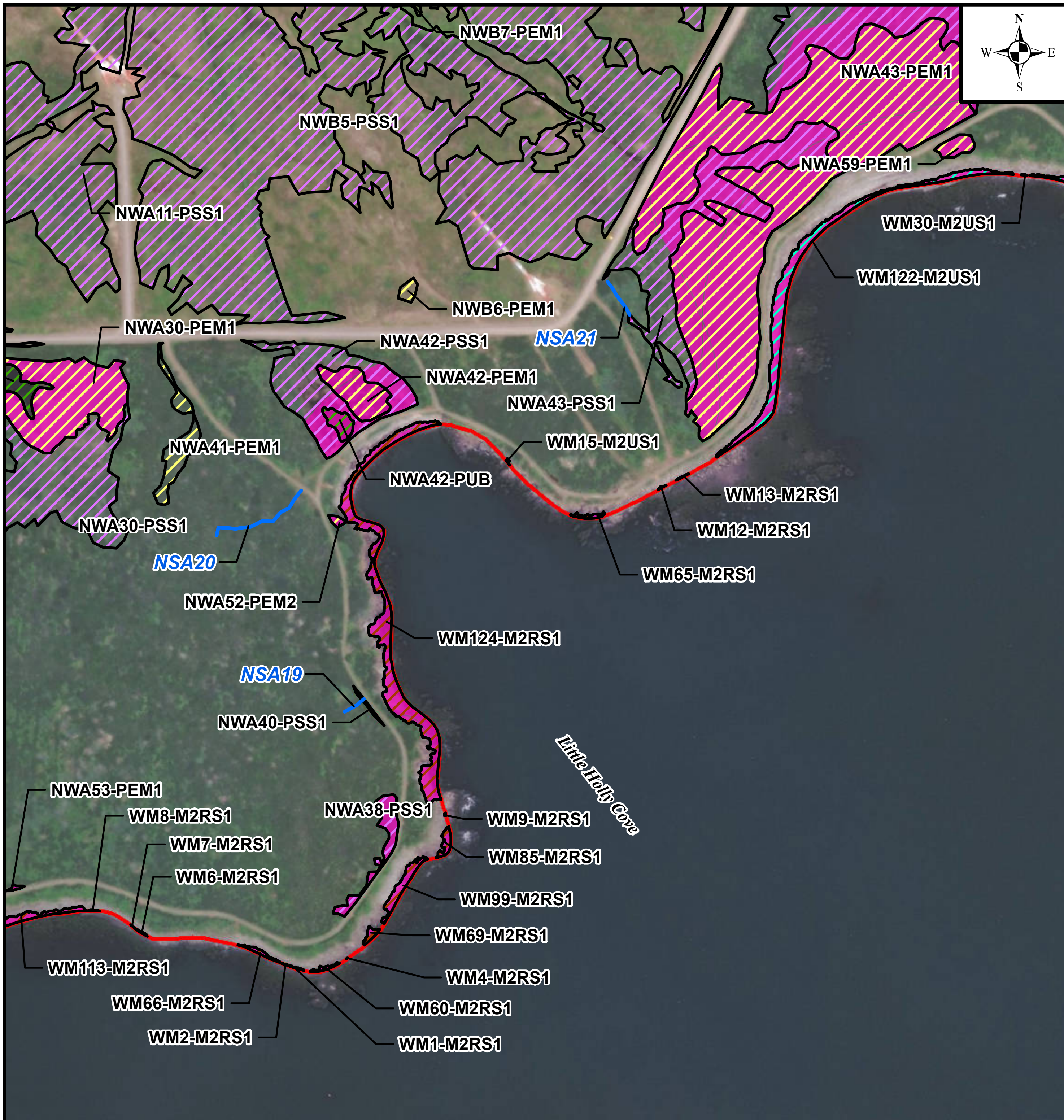

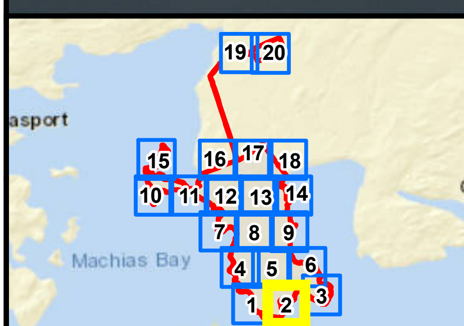

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2RS1
- PSS
- M2US1
- PUB
- PEM

Figure 1-2.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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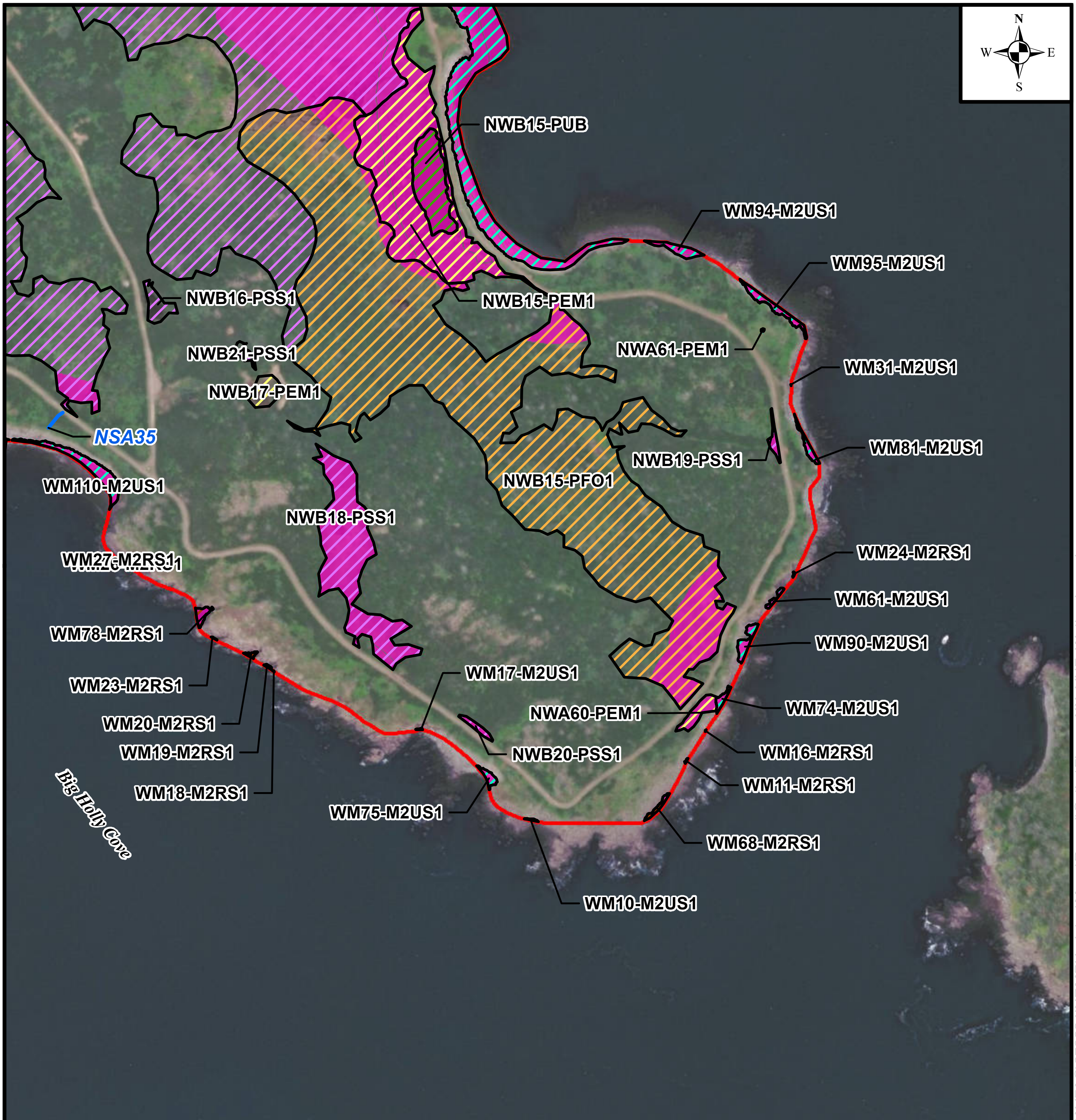

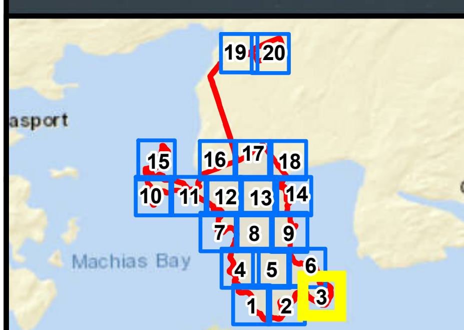

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2RS1
- M2US1
- PEM
- PFO
- PSS
- PUB

Figure 1-3.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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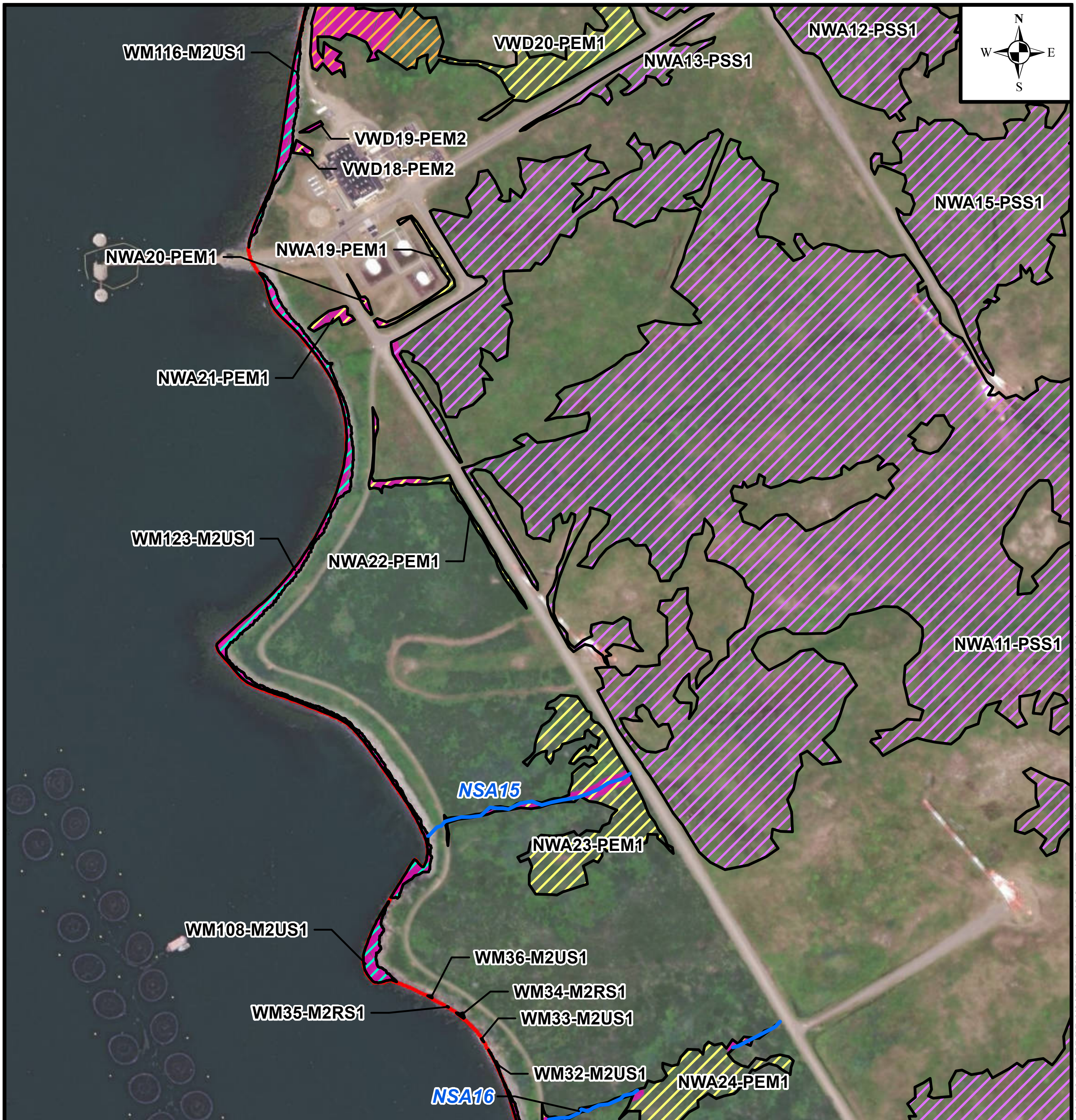

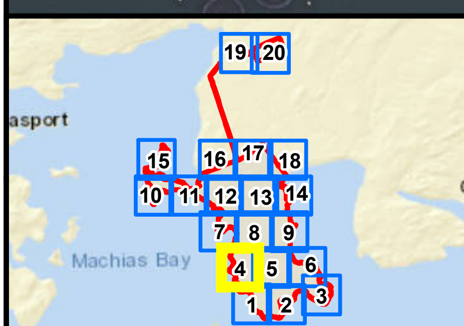

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2RS1
- PFO
- M2US1
- PSS
- PEM

Figure 1-4.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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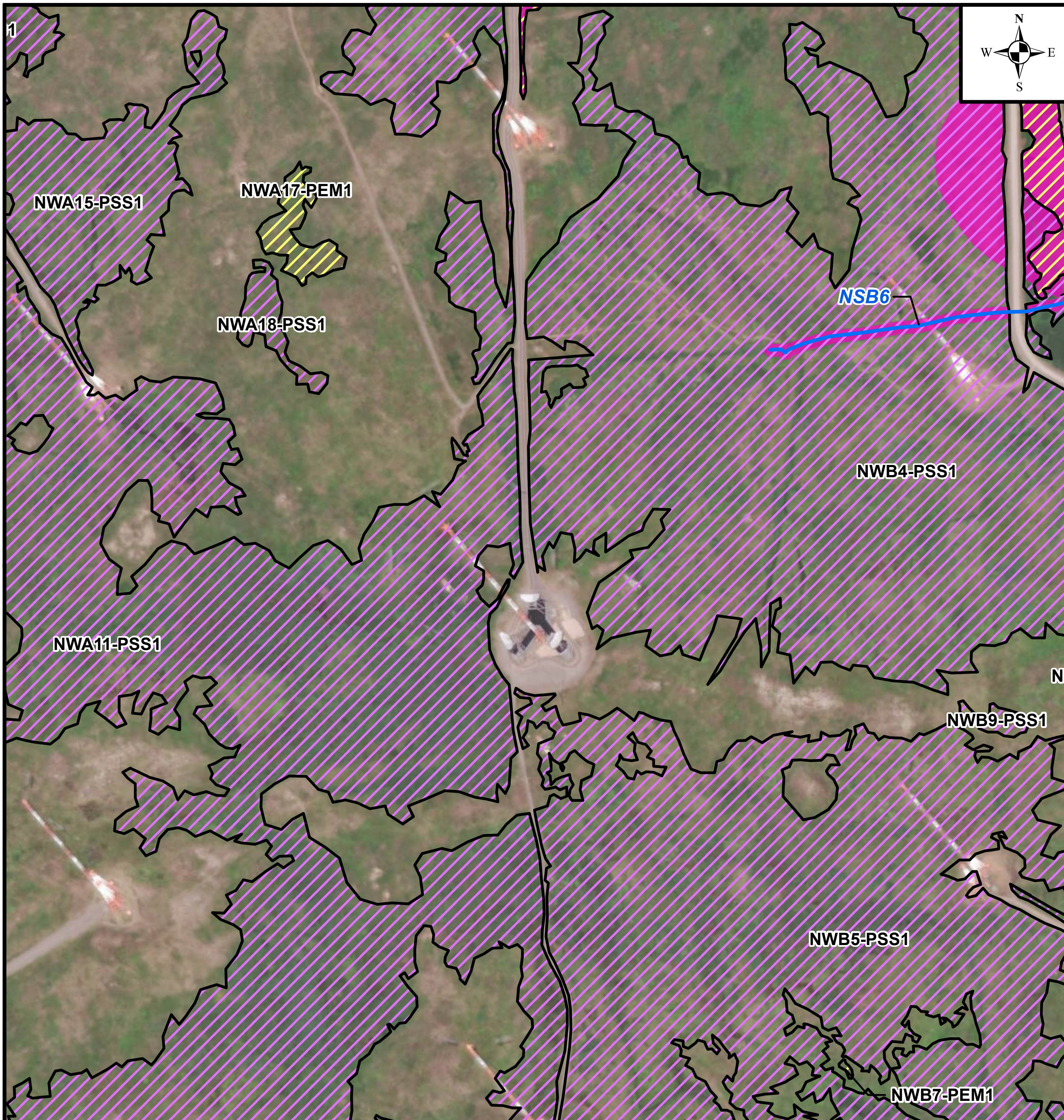

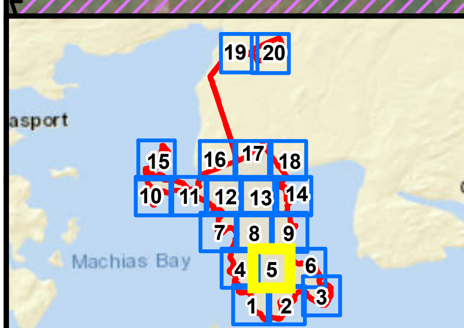

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2US1
- PSS
- PEM

Figure 1-5.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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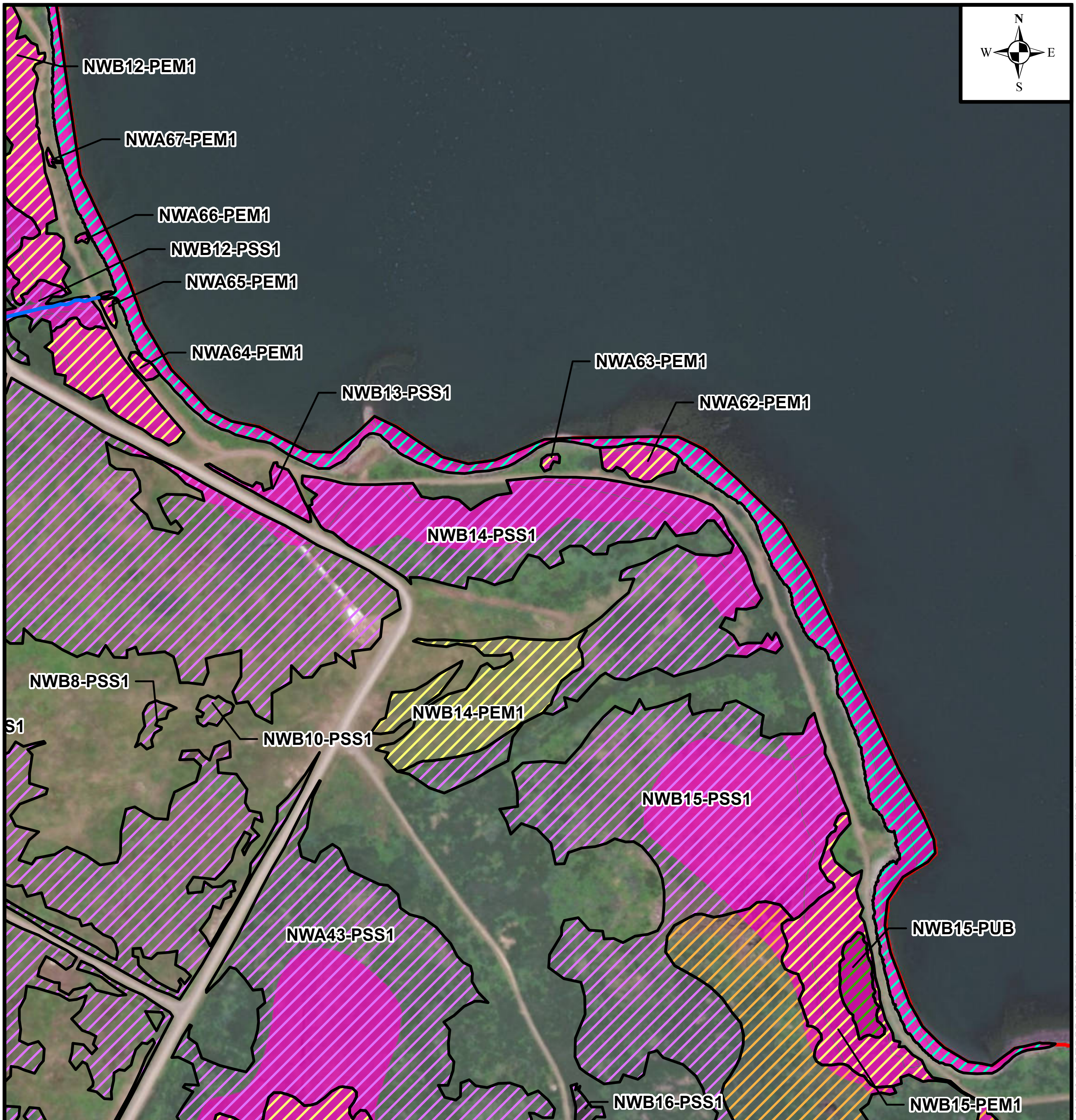

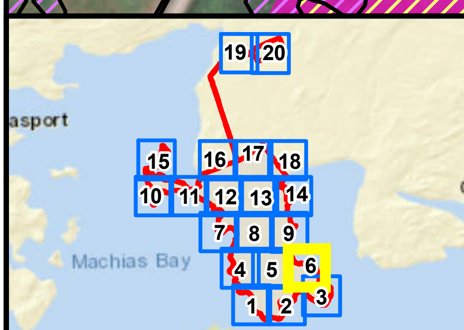

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

NSA Cutler Project Boundary

Streams (Tetra Tech)

Wetlands of Special Significance

COWARDIN

M2US1
PSS
PEM
PUB
PFO

Figure 1-6.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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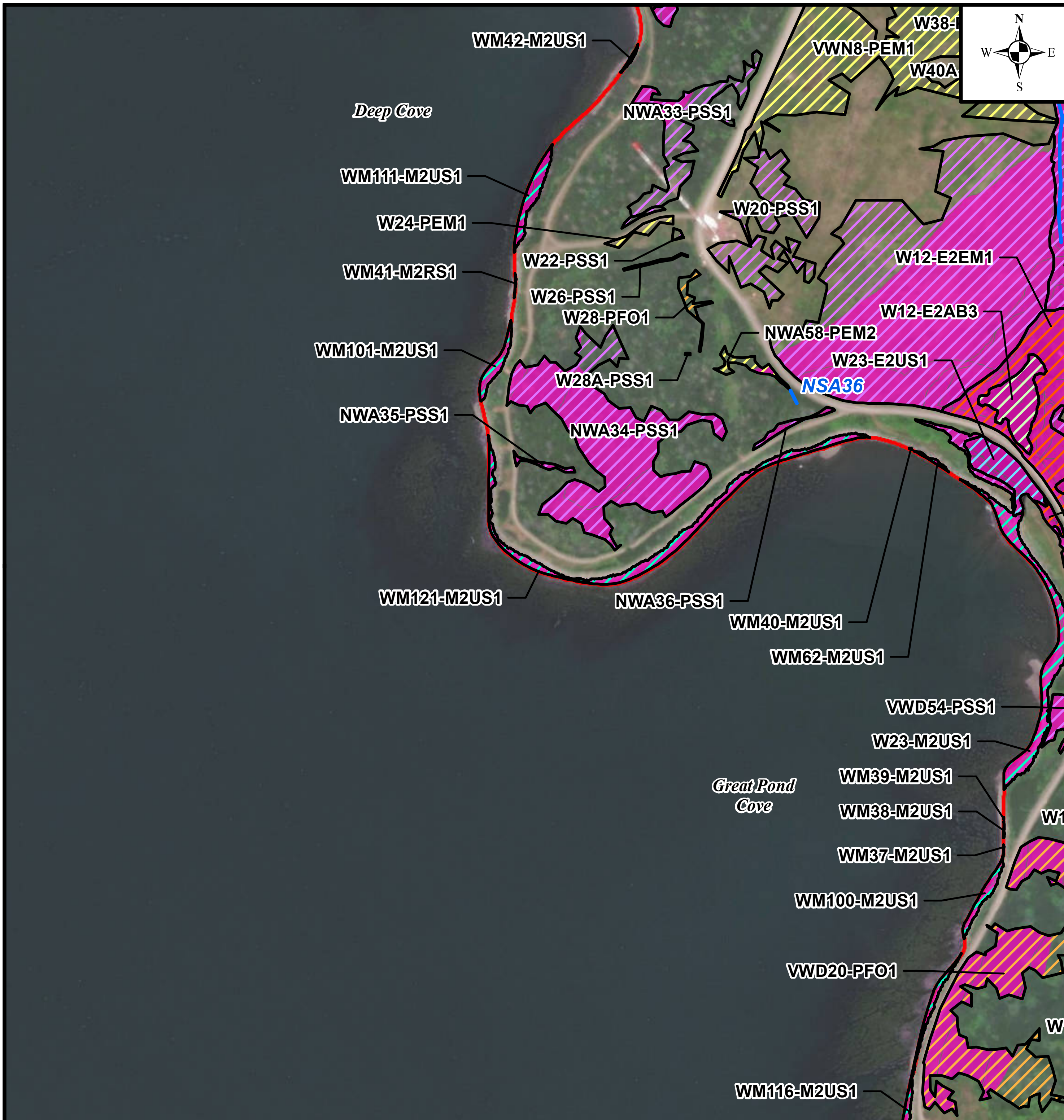

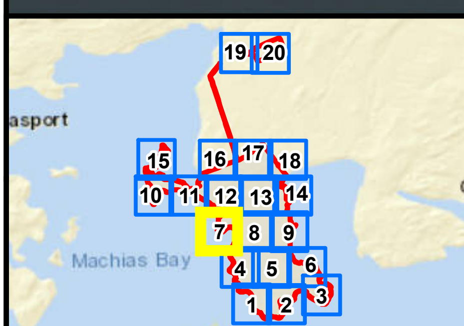

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

E2AB3	M2US1
E2EM1	PEM
E2US1	PFO
M2RS1	PSS

Figure 1-7.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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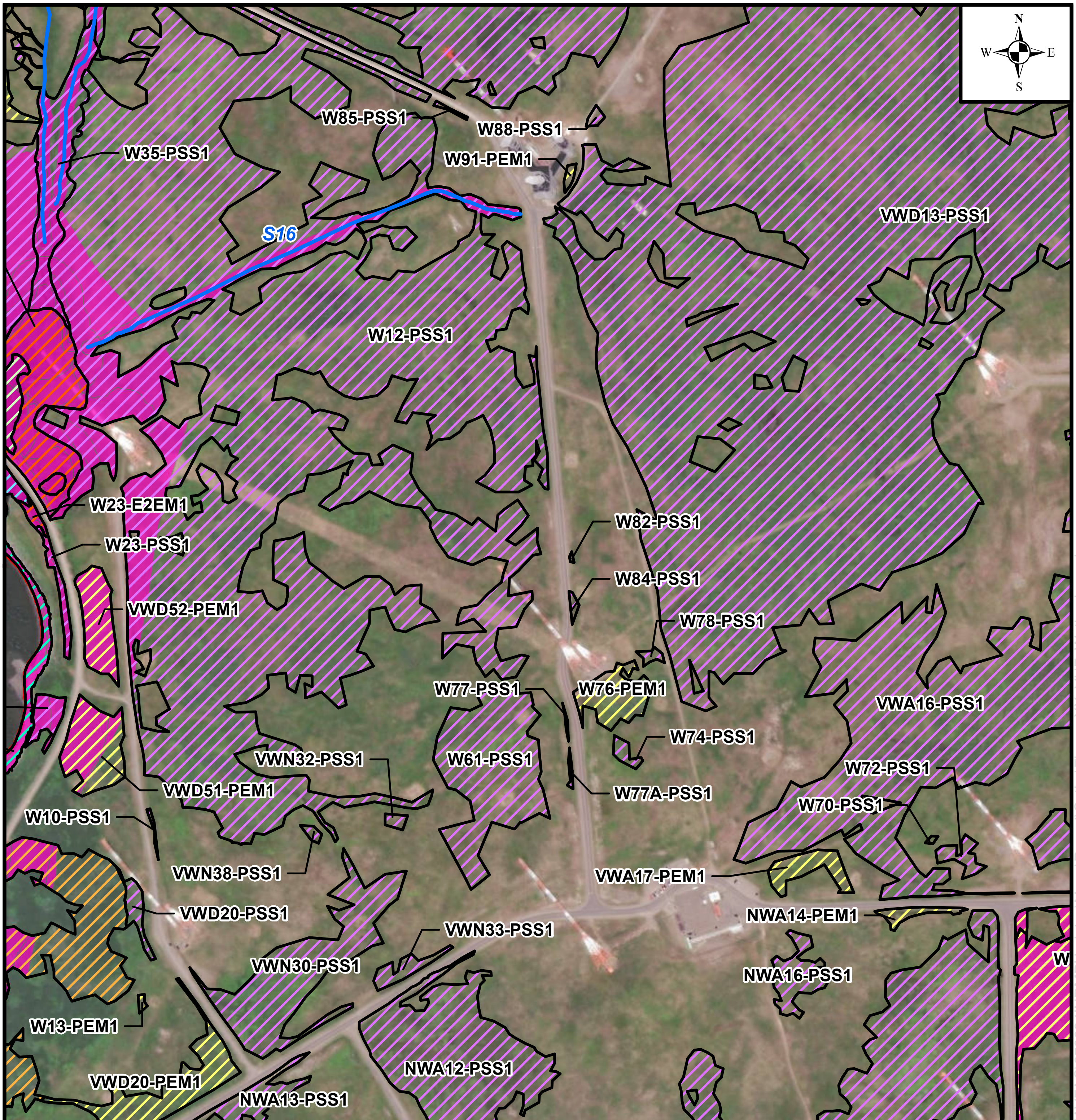

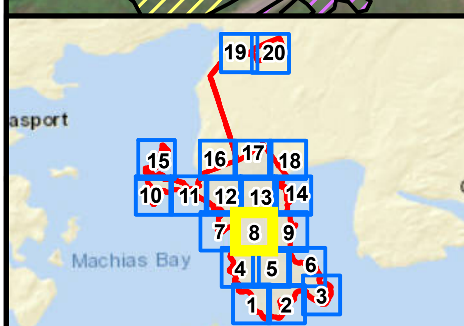

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- E2AB3
- E2EM1
- E2US1
- M2US1
- PEM
- PFO
- PSS

Figure 1-8.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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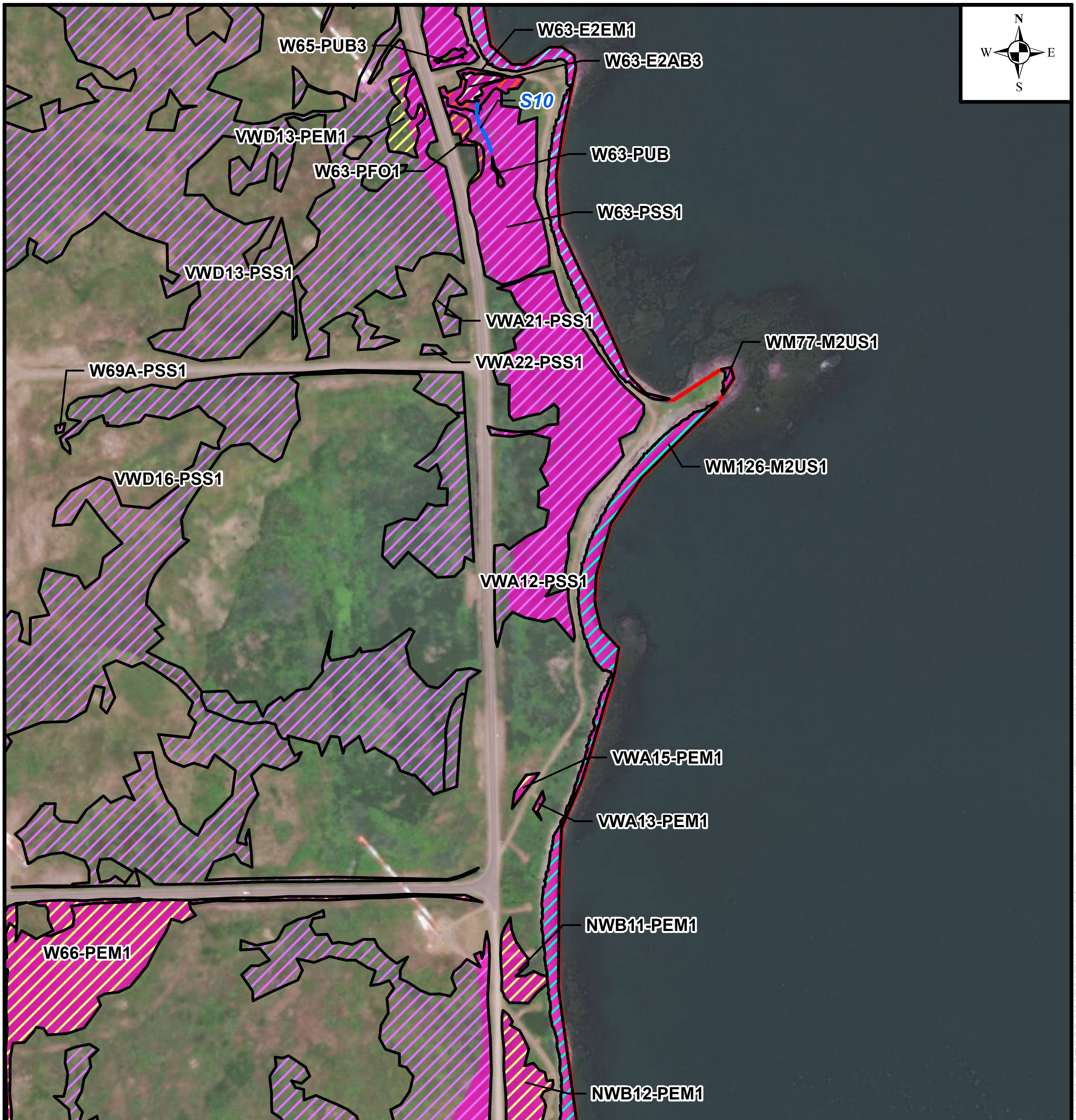

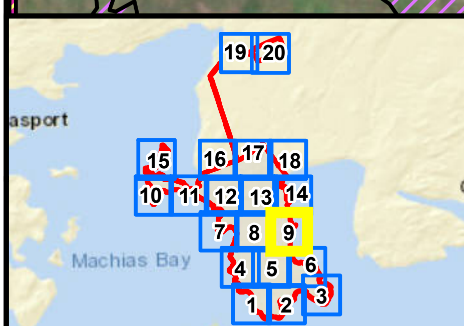

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

E2AB3	PEM
E2EM1	PFO
E2US1	PSS
M2US1	PUB

Figure 1-9.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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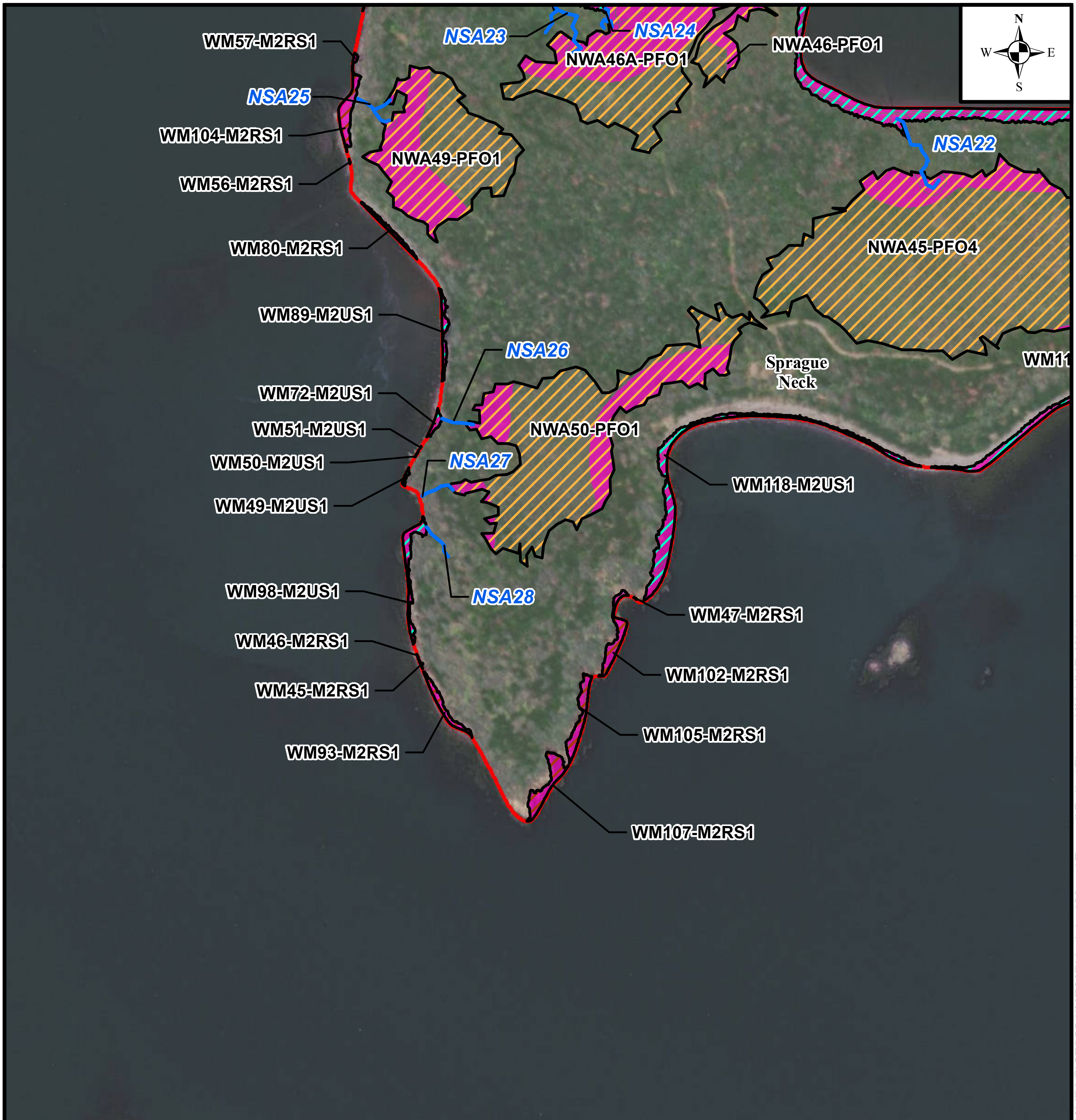

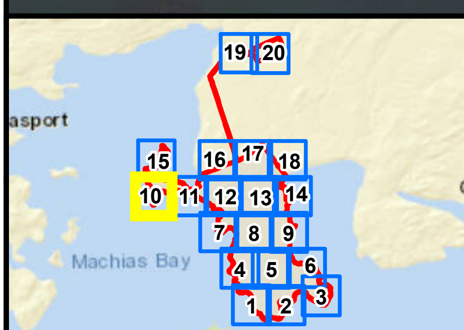

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2RS1
- PFO
- M2US1

Figure 1-10.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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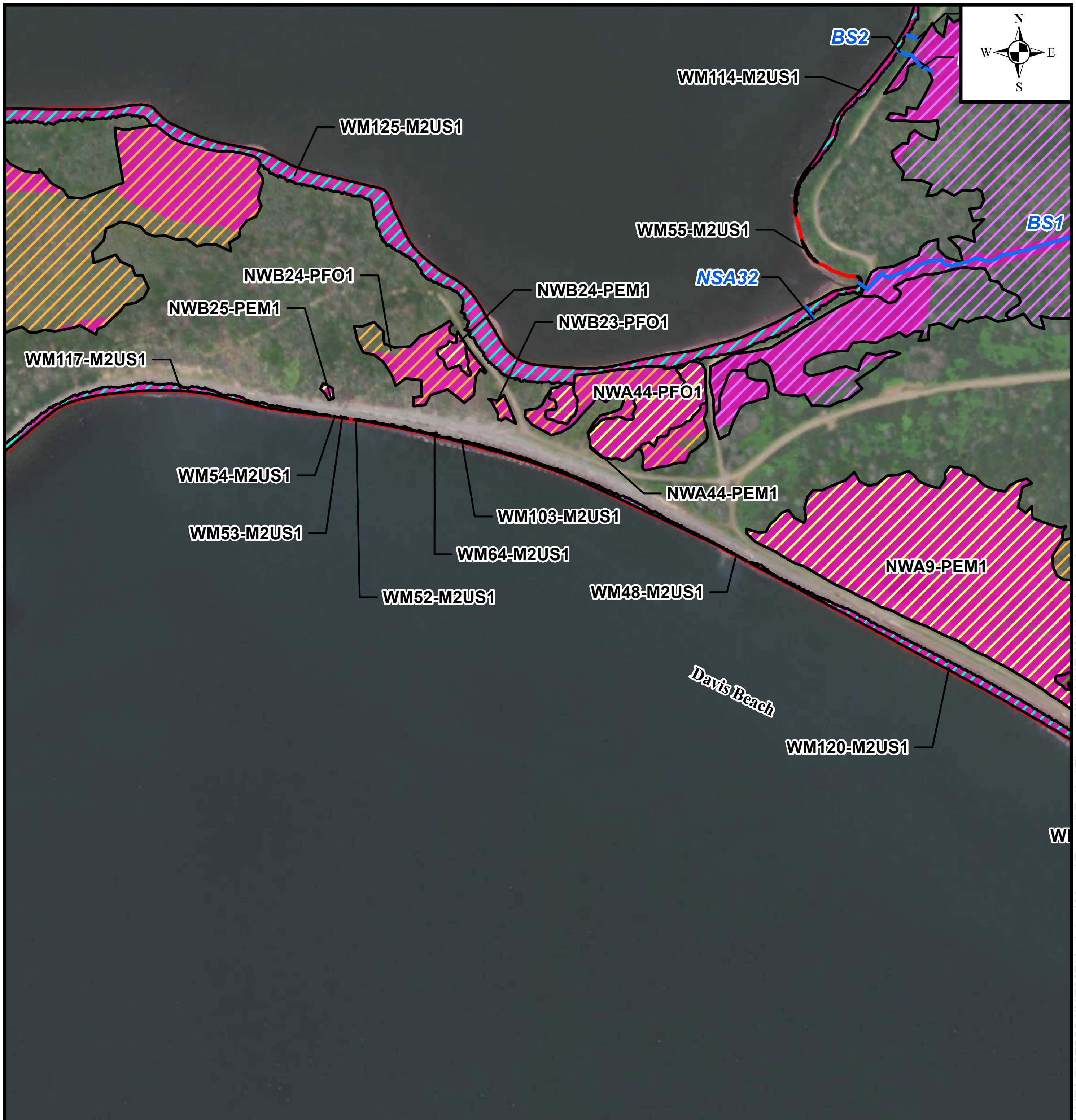

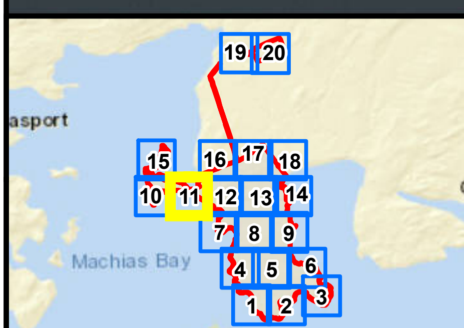

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

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Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2US1
- PSS
- PEM
- PUB
- PFO

Figure 1-11.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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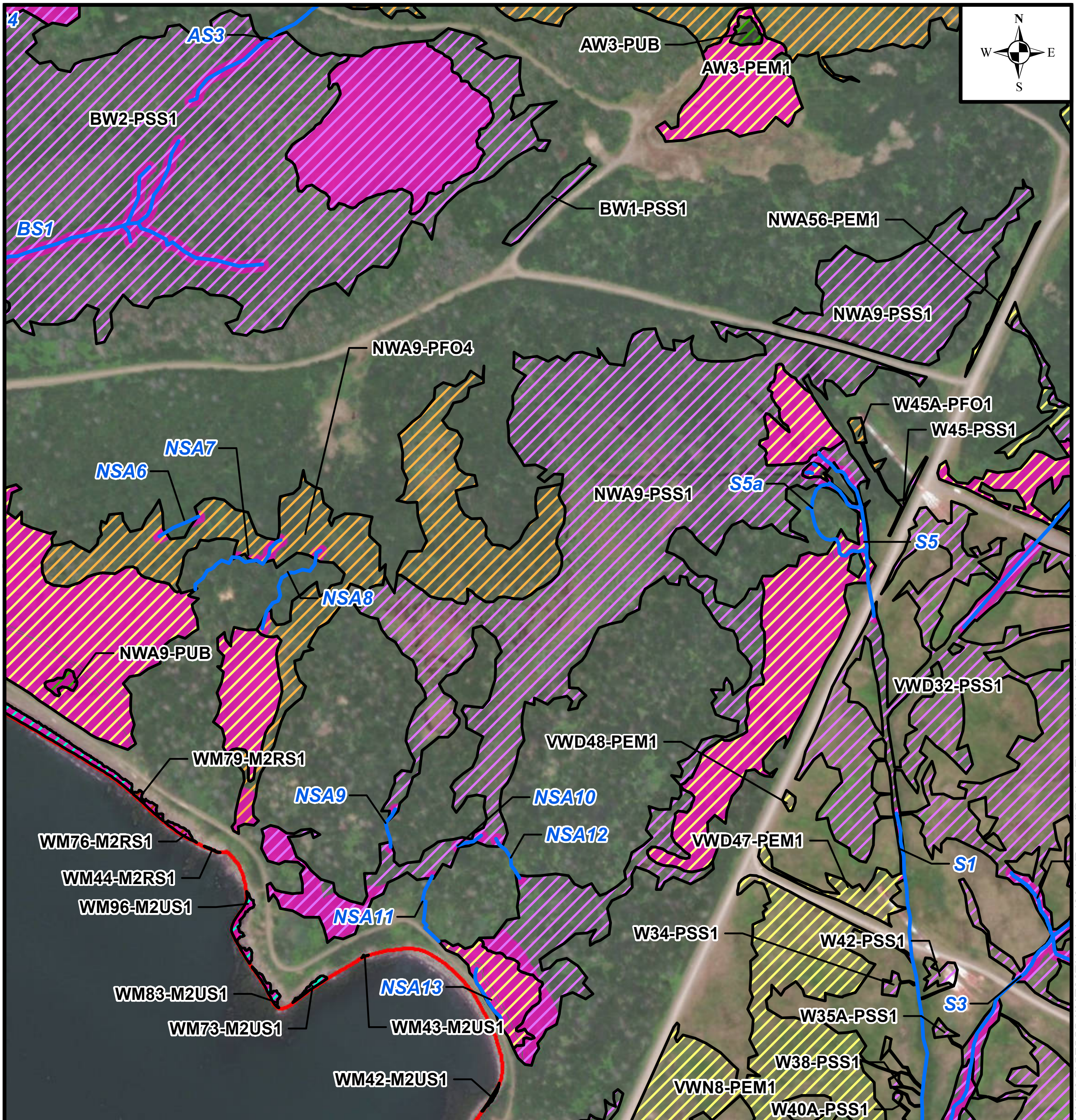

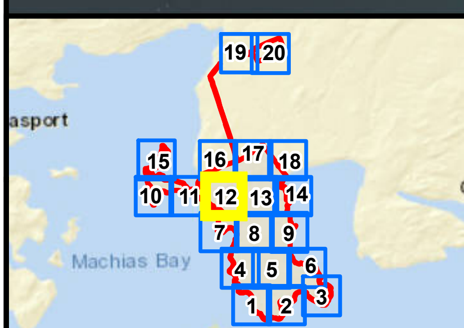

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

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Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2RS1
- PFO
- M2US1
- PSS
- PEM
- PUB

Figure 1-12.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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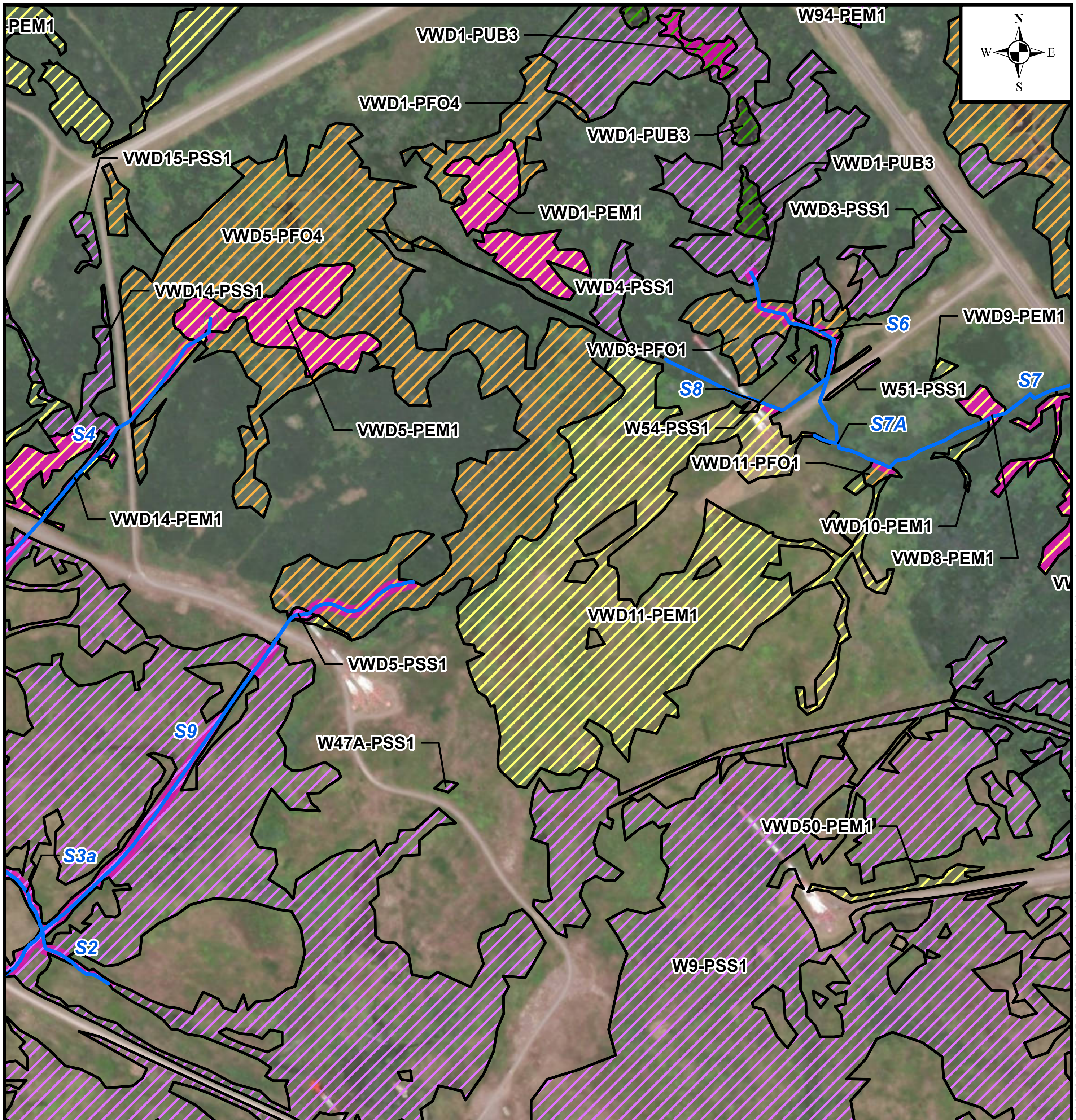

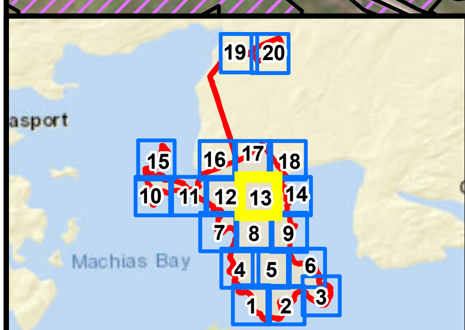

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

NSA Cutler Project Boundary

Streams (Tetra Tech)

Wetlands of Special Significance

COWARDIN

PEM PSS

PFO PUB

Figure 1-13.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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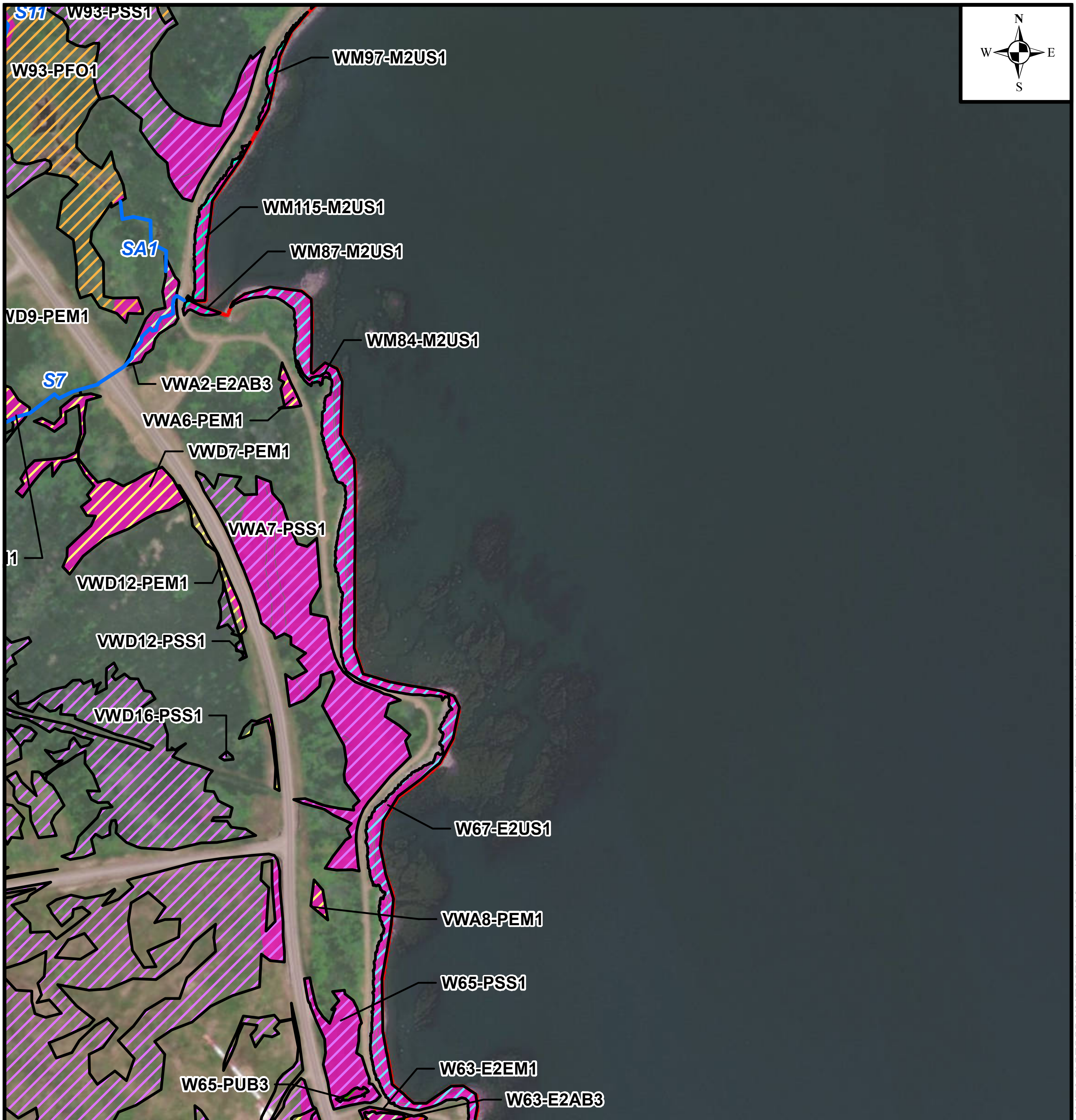

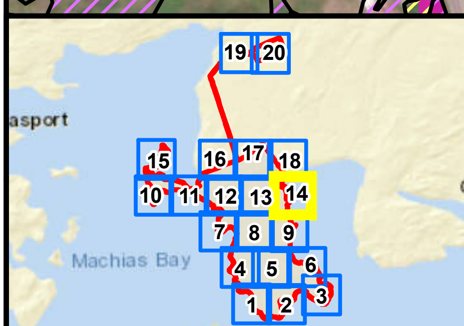

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000
Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- E2AB3
- E2EM1
- E2US1
- M2US1
- PEM
- PFO
- PSS
- PUB

Figure 1-14.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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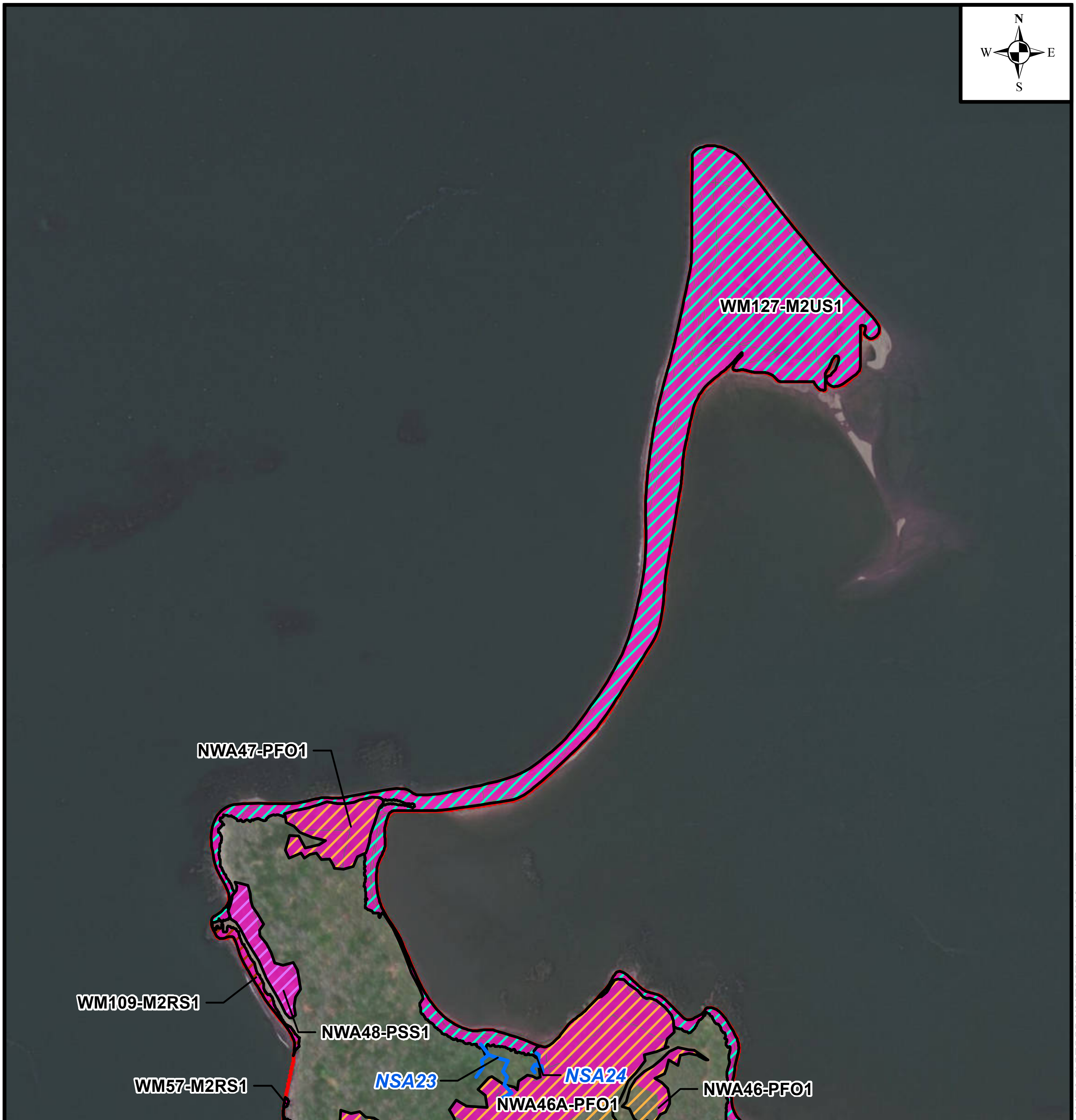

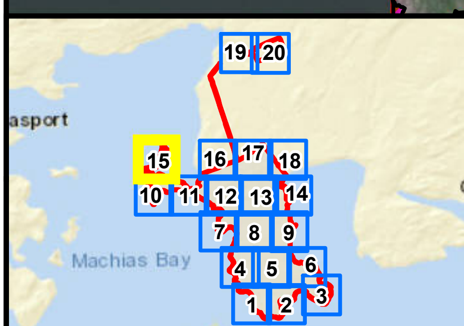

Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000
Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- M2RS1
- PFO
- M2US1
- PSS

Figure 1-15.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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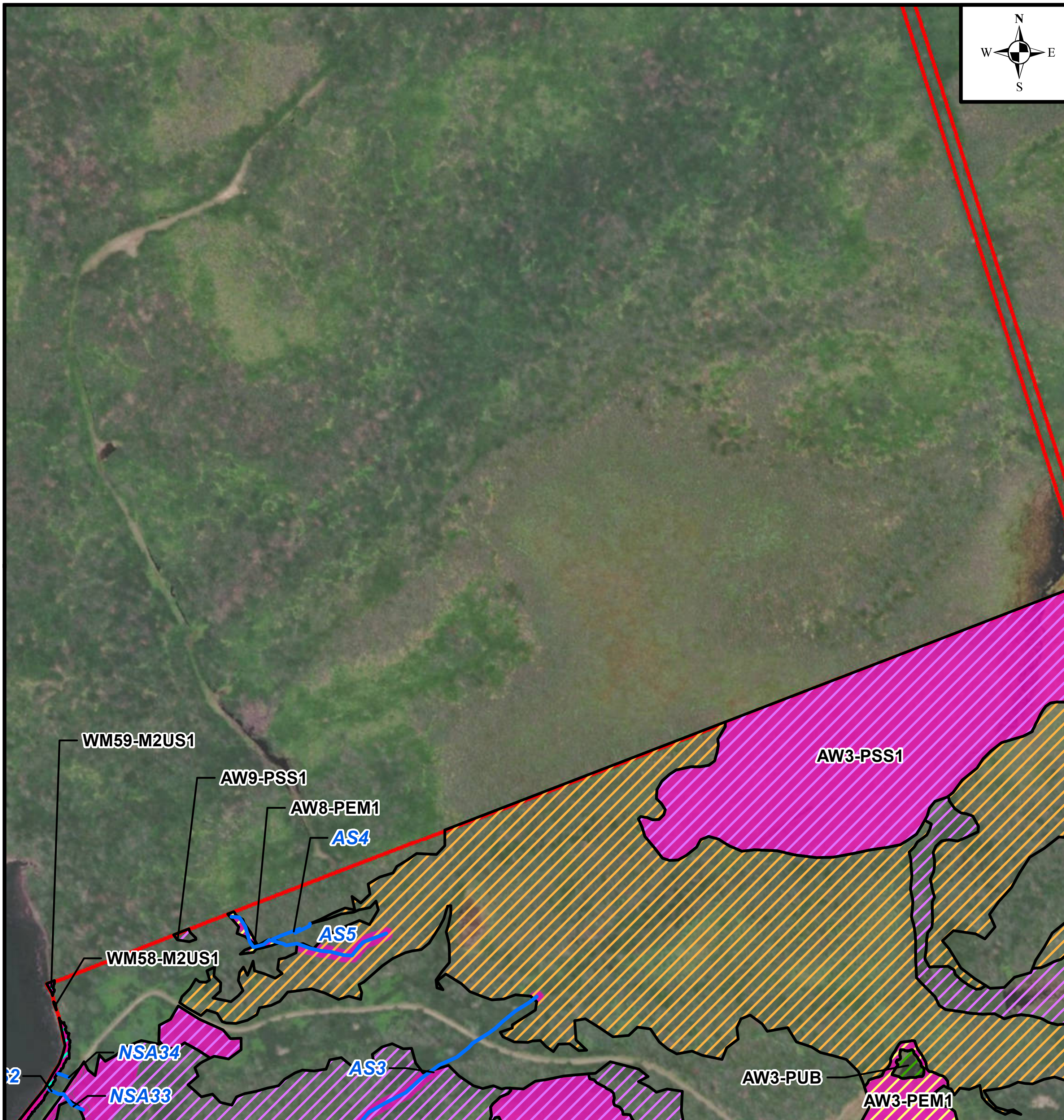
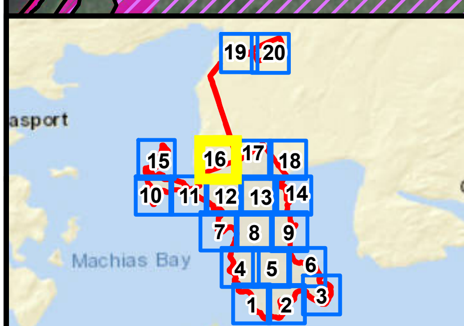




Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

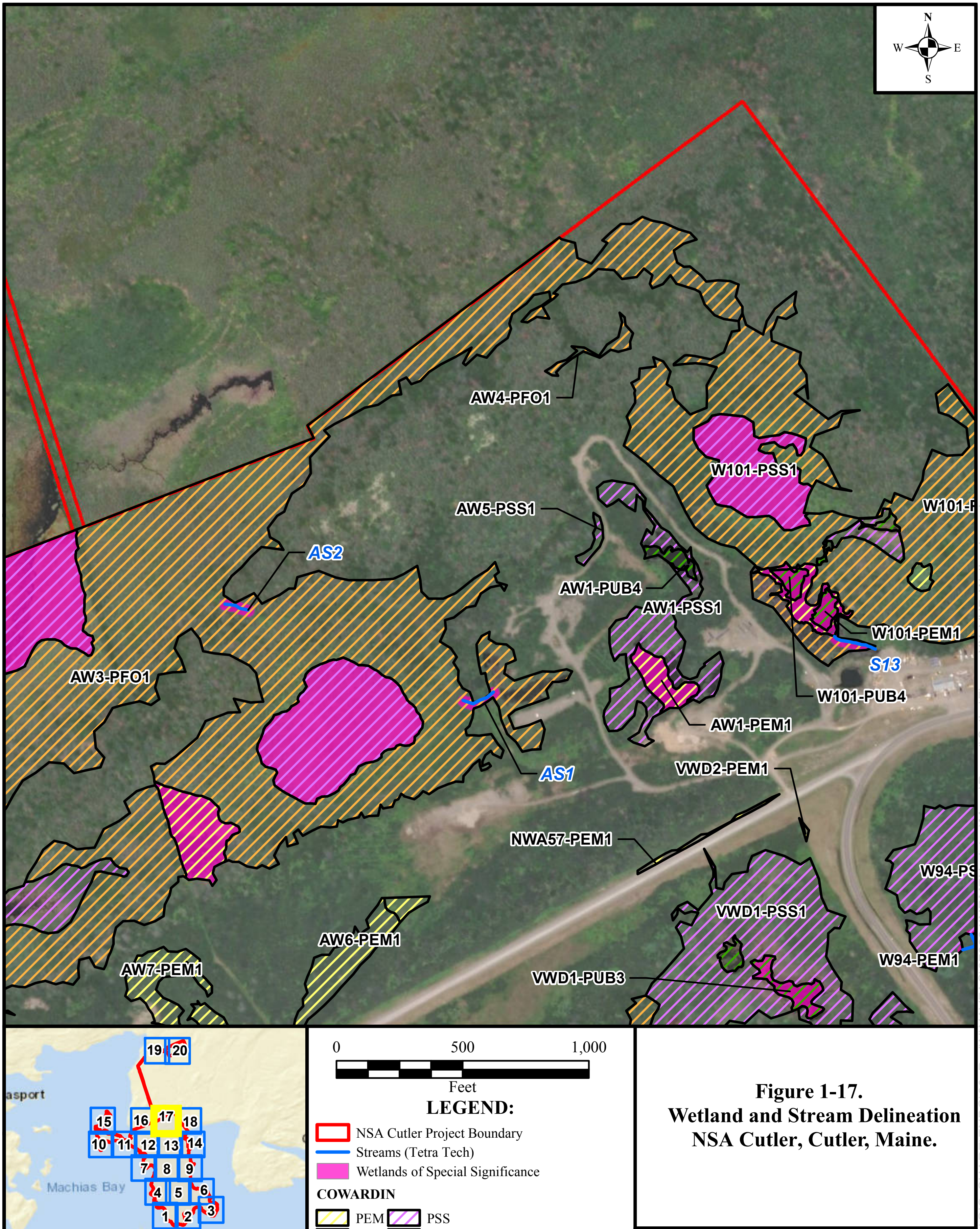
COWARDIN

- M2US1
- PSS
- PEM
- PUB
- PFO

Figure 1-16.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

\\brooksidefiles\GIS_SHARE\ENBG\00_Proj\N\NAVFAC\676834\INRMPUpdates\Maps\Report\Cutler\Figure_XX_VHF_Wetlands.mxd



Source: ESRI, USA Base Map Data; Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- PEM
- PSS
- PFO
- PUB

Figure 1-17.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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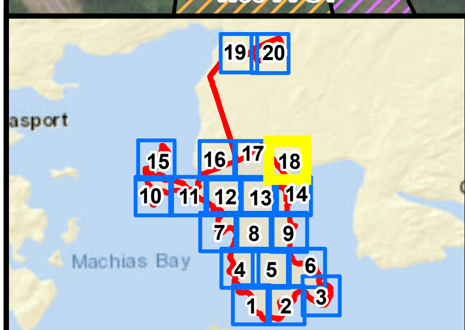


Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

NSA Cutler Project Boundary

Streams (Tetra Tech)

Wetlands of Special Significance

COWARDIN

M2US1

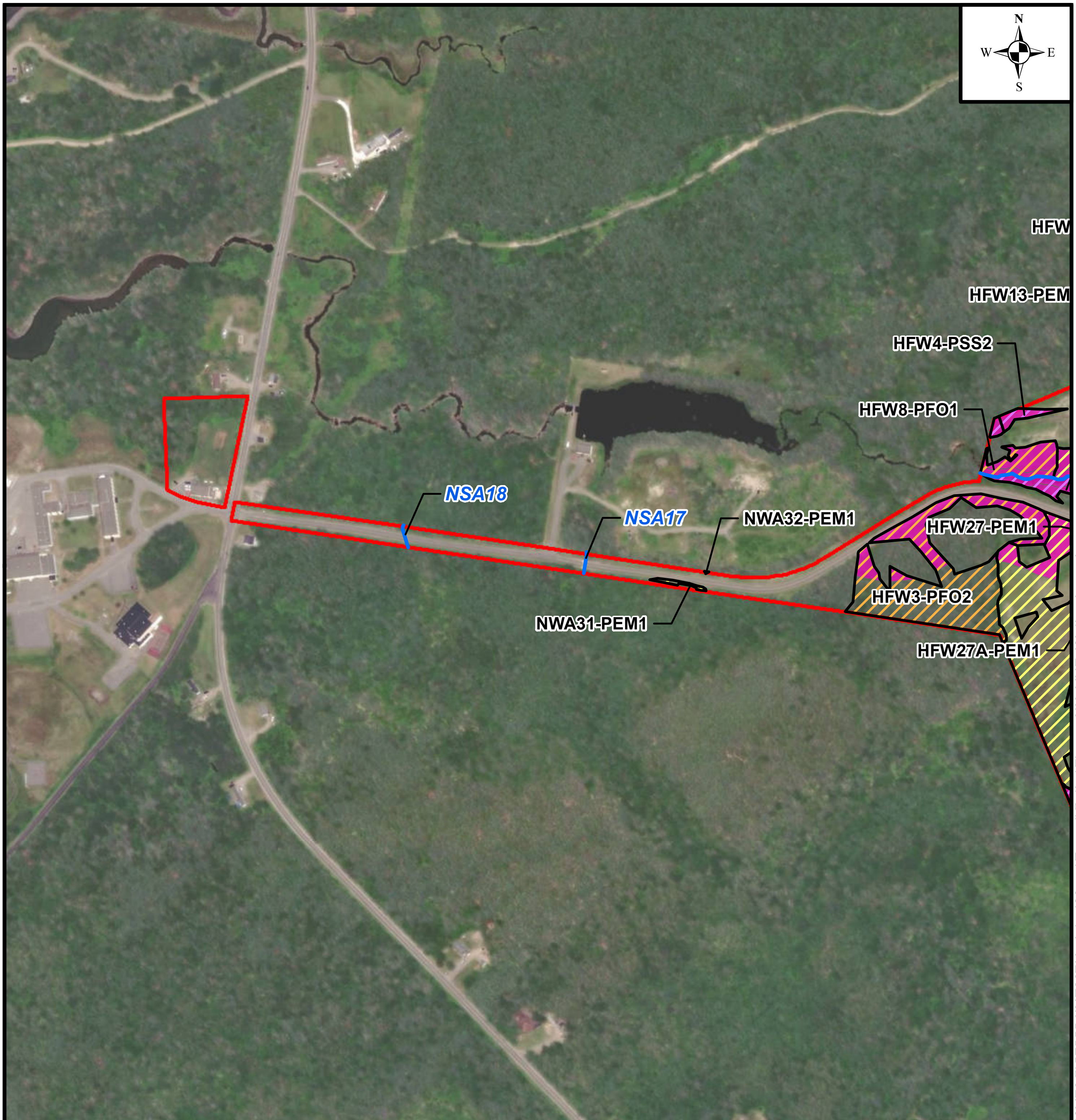
PFO

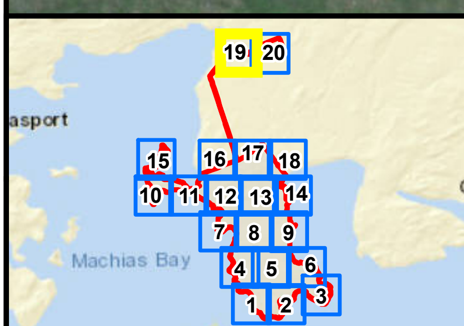
PEM

PSS

Figure 1-18.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18





Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

COWARDIN

- PEM
- PSS
- PFO

Figure 1-19.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18

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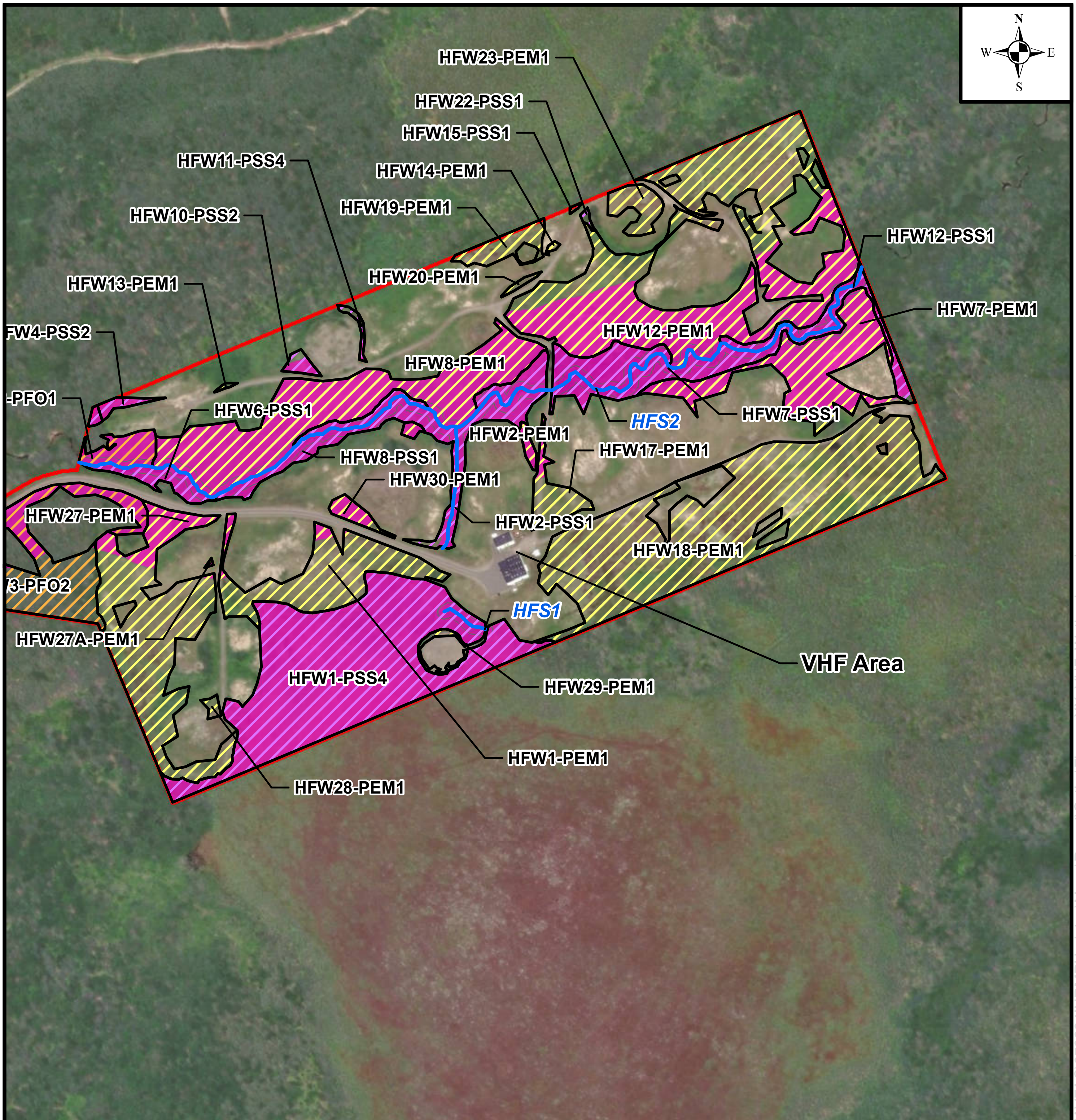
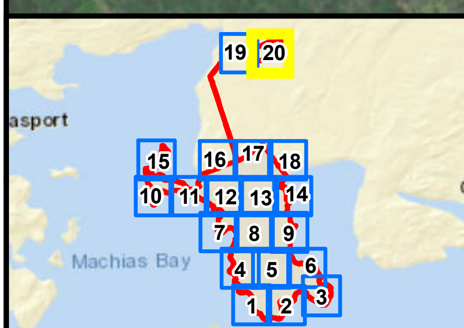




Source: ESRI, USA Base Map Data;
Navy 2016, 2017, 2018; Maine Office of GIS

0 500 1,000

Feet

LEGEND:

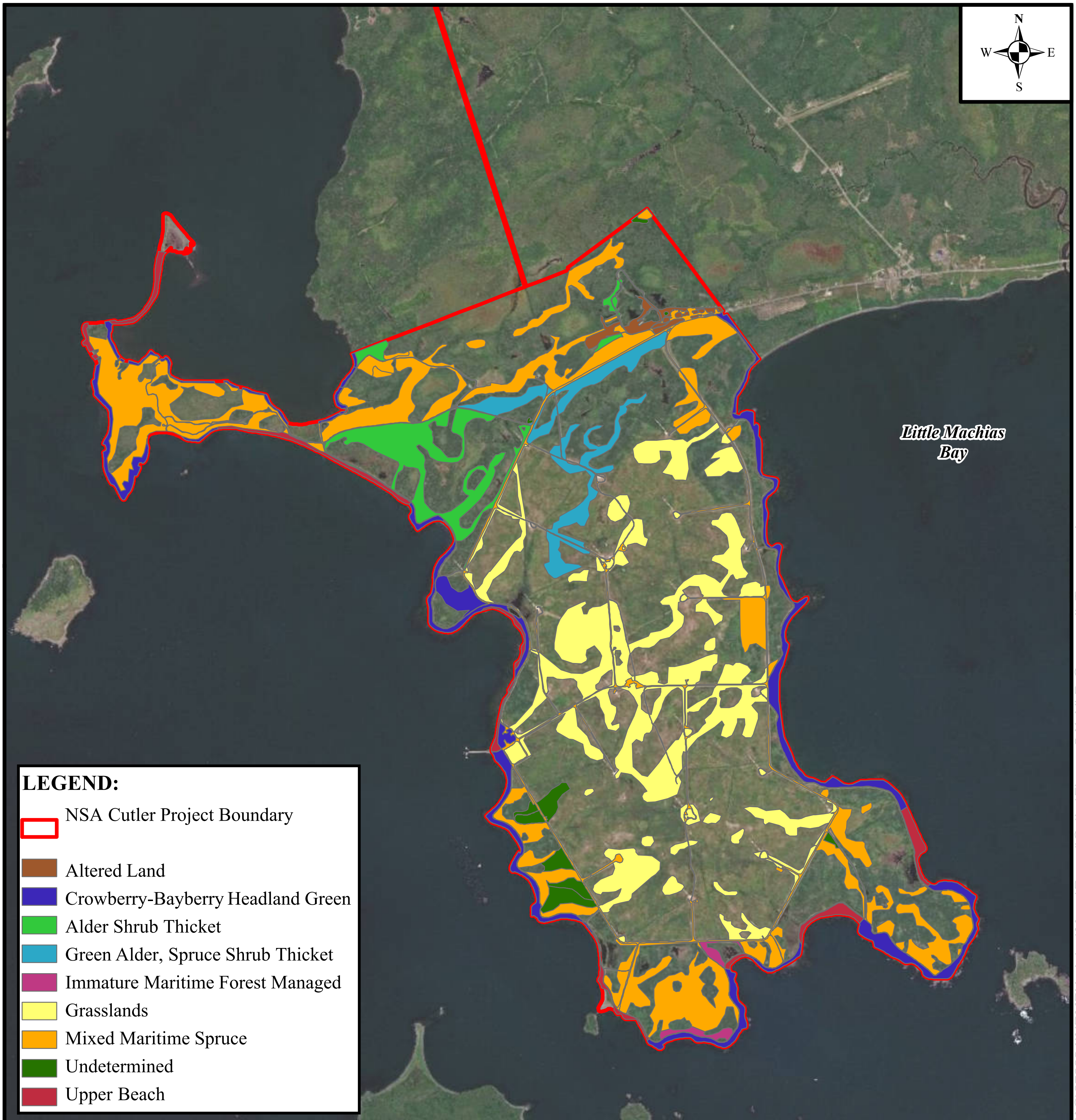
- NSA Cutler Project Boundary
- Streams (Tetra Tech)
- Wetlands of Special Significance

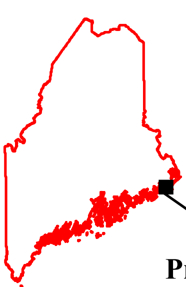
COWARDIN

- PEM
- PSS
- PFO

Figure 1-20.
Wetland and Stream Delineation
NSA Cutler, Cutler, Maine.

Date:
08/18





Source: ESRI, USA Base Map Data;
Navy 2016, 2017

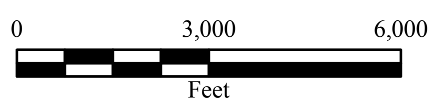
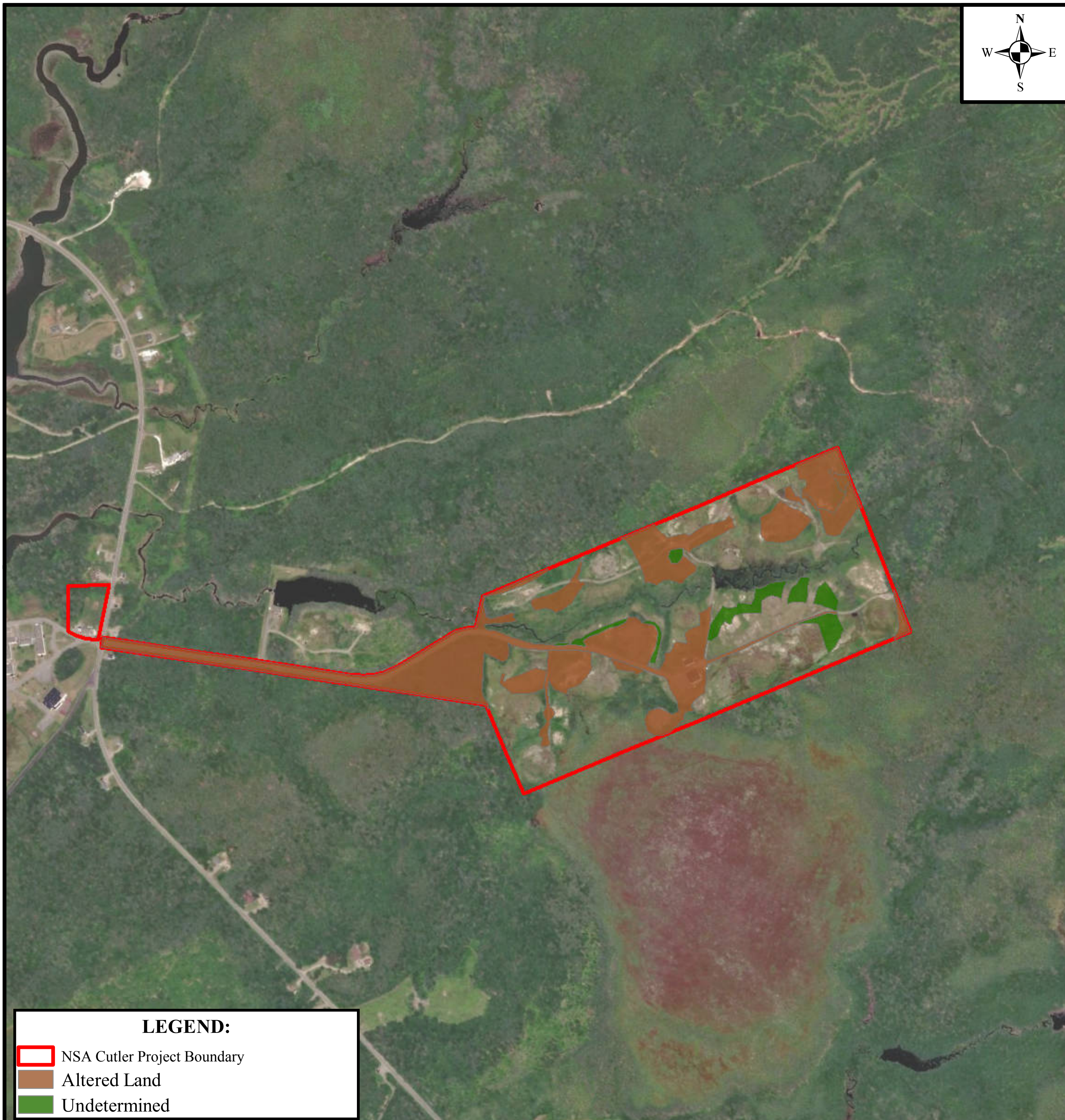
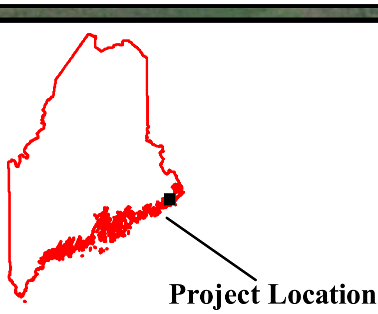


Figure 2-A. Very Low Frequency Community Types NSA Cutler, Cutler, Maine.

Date:
08/18





Source: ESRI, USA Base Map Data;
Navy 2016, 2017

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Feet

Figure 2-B High Frequency Area Community Types NSA Cutler, Cutler, Maine.

Date:
08/18

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LEGEND:

NSA Cutler Project Boundary Streams (Tetra Tech)

Wetlands of Special Significance

COWARDIAN

E2AB3
E2EM1
E2US1
M2RS1
M2US1
PEM
PFO
PSS
PUB

Wetland and Stream Delineation

NSA Cutler

Cutler, Maine.

Source: ESRI, USA Base Map Data; Navy 2016, 2017, 2018; Maine Office of GIS, ESRI, World Imagery, online mapping

LOCATOR MAP

SCALE 1" = 1,000' (1:12,000)
PAGE SIZE: 22x34 INCHES

DATE: 8/22/2018

0 1,000 2,000

Scale In Feet

JACOBS

CREATED BY: SA

CHECKED BY: EJ

APPENDIX F

USACE Wetland Delineation and Determination Request, NSA Cutler, Cutler, Maine

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF
Regulatory Division
CENAE-R-53
File Number: NAE-2013-63-M1

February 3, 2015

Elizabeth Nashold
Commander Navy Mid-Atlantic Region
Code N-45, Regional Environmental Group
1510 Gilbert Street
Norfolk, VA 23511-2737

Dear Ms. Nashold:

This letter responds to your request for a determination of jurisdiction for wetlands areas located within the Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler (NCTAMSLANT DET Cutler) facility off Route 191 at Cutler, Maine.

Staff of the Maine Project Office of our Regulatory Division conducted an office review of the information you supplied for the project area, specifically the document entitled "Request for Preliminary Jurisdictional Determination for areas within the USACE New England District for Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler, Cutler, Maine dated "19 September 2015" and email with revised tables from Agius, Brad entitled "[External] Cutler PJD - Response to wetland comments" dated "Friday, December 19, 2014".

Your wetland delineation was reviewed in accordance the 1987 Corps of Engineers Wetland Delineation Manual and its Regional Supplement. All areas (labeled on the attached plans as wetlands and/waterways) were reviewed for potential jurisdiction. The delineation of waters of the United States, including jurisdictional wetlands, on the drawings you submitted in the information packet listed above is accurate.

Our verification of this project's wetland delineation under the Corps of Engineers Wetlands Delineation Manual and the Regional Supplement is valid for a period of five years from the date of this letter unless new information warrants revision of the determination before the expiration date.

This letter contains a preliminary jurisdictional determination for your site. If you object to this determination or a determination of a certain site, you may a request formal jurisdictional determination for the waters in question. Formal jurisdictional determinations can take up to six months and would required substantial additional information from you.

Enclosed with this letter is a form and supporting documentation explaining the basis for our jurisdictional determination. If you have any questions please contact Shawn Mahaney of my staff, at 207-623-8367 ext 4 or 978-318-8492 at our Manchester, Maine Project Office.

Sincerely,

For: Frank J. Del Giudice
Chief, Permits & Enforcement Branch
Regulatory Division

Enclosures

US Army Corps of Engineers ®
New England District

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

1. Report completion date for Preliminary Jurisdictional Determination (JD): 2 February 2014.

2. Name and Address of Person Requesting Preliminary JD: Elizabeth Nashold, Commander Navy Mid-Atlantic Region, Code N-45, Regional Environmental Group, Norfolk, VA 23511-2737

3. District office, file name and number: New England District, NCTAMSLANT DET Cutler, NAE-2014-381-M1.

4. Project location(s) and background information: Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler (NCTAMSLANT DET Cutler) facility off Route 191 at Cutler, Maine.

See attached table of waters and wetlands

State: Maine County: Washington City: Cutler
Coordinates of site (lat/long in degree decimal format):
Beginning Lat. 44.6450432 ° N, Long. -67.2822772 ° W
End Lat. ° N, Long. ° W
Universal Transverse Mercator: Zone 19

Name of nearest waterbody: Machias Bay

Identify (estimate) amount of waters in the review area:
Non-wetland waters: 45,917.2 linear feet: varying width (ft) and/or acres.
Cowardin Class: PUB.
Stream Flow: Perennial, intermittent, ephemeral.
Wetlands: 1,426.93 acres
Cowardin Class: EAB, EEM, EUB, MUS, PEM, PSS, PFO. PUB.

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal: Machias Bay & Little Machias Bay.
Non-Tidal:

5. Review performed for site evaluation (check all that apply):
☒ Office (Desk) Determination. Date: 02 February 2015
☐ Field Determination. Date(s):

a. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

b. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

c. Supporting Data. Data reviewed for Preliminary JD - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: See attached report entitled "Request for Preliminary Jurisdictional Determination for areas within the USACE New England District for Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler, Cutler, Maine" dated "19 September 2014" and email with revised tables from Agius,Brad entitled "[External] Cutler PJD - Response to wetland comments" dated "Friday, December 19, 2014".

☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant. See attached report.

- ☒Office concurs with data sheets/delineation report.
- ☐ Office does not concur with data sheets/delineation report.

☐ Data sheets prepared by the Corps:

☐ Corps navigable waters' study:
☒ U.S. Geological Survey Hydrologic Atlas:
☐ USGS NHD data. see attached report.
☒USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: 1:24,000 MACHIAS BAY, ME, 15 Minute MACHIAS, ME-1918
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: See attached report &Web Soil Survey
☒ National wetlands inventory map(s). Cite name: See attached report & USFWS, NWI KMZ Files for Google Earth, USFWS NWI Map MACHIAS BAY, ME Quad 5/1983 & USFWS "An Ecological Characterization of Coastal Maine" Atlas Map 1, 1980
☐ State/Local wetland inventory map(s):
☒ FEMA/FIRM maps: See attached report.
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒Aerial (Name & Date):Google Earth, 05/14/1996-09/08/2014
or ☐ Other (Name & Date):
☐ Previous determination(s). File no. and date of response letter:
☐ Other information (please specify):

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

2 FEB 2015

Shawn B, Mahaney Date
Regulatory Project Manager

11Feb15

Elizabeth Nashold Date
Commander Navy Mid-Atlantic Region
Code N-45, Regional Environmental Group
1510 Gilbert Street
Norfolk, VA 23511-2737

SEE ATTACHED REPORT FOR WETLAND AND WATERS TABLES

From:	Agius, Brad
To:	Mahaney, Shawn B NAE
Cc:	Trefry, Ian W CIV NAVFAC MIDLANT, PWD Maine; McDonald, Thaddeus B CIV NAVFAC MIDLANT, EV; Watts, Sarah
Subject:	[EXTERNAL] Cutler PJD - Response to wetland comments
Date:	Friday, December 19, 2014 2:37:02 PM
Attachments:	Table 1 Page 5 v2.pdf Table 1 Page 33 v2.pdf Table 1 Page 4 v2.pdf

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Hi Shawn,

I am following up on our discussion we had last Friday regarding your review of the PJD request for NCTAMSLANT DET Cutler. We have addressed all of your comments on the four wetlands in question below:

1) HFW19

   * We concur that wetland HFW19 is jurisdictional. The attached Table 1, page 4, includes this revision.

   * Changed Potential Jurisdiction from "No" to "Yes".

2) HFW29

   * We concur that wetland HFW29 is jurisdictional, the attached Table 1, page 5, includes this revision.

   * Changed Potential Jurisdiction from "Unknown" to "Yes".

3) NWA61

   * We recommend that wetland NWA61's Potential Jurisdiction remain "No".

   * Based on review of field notes and photos, we further confirmed that the approximately 95 sq. ft. wetland is isolated. In addition, it may have been used as a borrow area for road building. It appeared to be a man-made excavated depression along the road edge, was mostly rock substrate, but a little bit of organic soil in some pockets.

4) W85

   * We recommend that wetland W85's Potential Jurisdiction be changed from "Possible" to "No". The attached Table 1, page 33, includes this revision.

   * We make this recommendation based on additional review that indicates that there is an upland mound between wetland W12 and the isolated W85 ditch wetland.

Please let us know if these address all of your concerns in order to proceed with issuing the PJD letter, or if you need any additional information.

Thank you, and happy holidays,

--Brad

Brad Agius, GISP, PWS | GIS Manager – Senior Ecologist

Main: **207.358.2400** | Direct: **207.358.2402** | Fax **207.879.9481** | brad.agius@tetratech.com

President-Elect of the Maine Association of Wetland Scientists

Tetra Tech | Complex World, Clear Solutions™

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
HFW19	PSS4, PEM1	0.56	24,444.8	Yes	Partially	PSS4 surrounding Antenna F-2 pad. Sparsely vegetated PEM1 inclusions located along the east side. Dominated by stunted larch, balsam fir, sedges, flat-topped goldenrod, flat-topped Symphyotrichum, raspberries, and *Calamagrostis canadensis*.	
HFW2	PEM1, PSS1	2.18	94,973.6	Yes	No	Large PEM1 and PSS1 complex on the southwest side of Huntley Brook. The PEM1 portion is dominated by *Calamagrostis canadensis*, sedges, scattered willows, *Spiraea alba,* and flat-topped Symphyotrichum. The PSS1 wetland is primarily found along the side of the brook and is dominated by speckled alder, willows, and *Spiraea alba*. Patches of PSS1 within the PEM1 are dominated by green alder, willows, and *Spiraea alba*.	IWWH, Stream
HFW20	PEM1	0.06	2,646.4	Yes	Yes	Small PEM1 running parallel to the road on the south SSW side of Antenna F-2. Dominated by *Calamagrostis canadensis, Scirpus microdiscus, Glyceria* sp., soft rush, and blue flag.	
HFW22	PSS1	0.04	1,776.5	Yes	No	Small PSS1 located at the top of the forested valley along the road between Antennas F-2 and C-1 (N side of road near the boundary fence). Dominated by red maple, *Ilex mucronata*, balsam fir, and *Spiraea alba*.	
HFW23	PEM1	0.54	23,352.4	Yes	Yes	Stunted PEM1 surrounding Antenna C-1. Located on coarse sand and gravel fill, it is dominated by *Empetrum nigrum*, sedges, scattered stunted ericaceous shrubs, soft rush, sedges (*Carex* spp.), and *Scirpus microdiscus, Spiraea alba, Spiraea tomentosa* and *Lonicera*.	
HFW27	PEM1	4.92	214,246.5	Yes	Yes	PEM1 along tree line west of H-2. Antenna fill colonized by stunted ericaceous shrubs, *Empetrum nigrum*, sedges, green alder, and five species of orchids. Meadow along the tree line dominated by *Calamagrostis canadensis*, sedges, green alder, and *Spiraea alba*.	IWWH

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
HFW27A	PEM1	0.01	431.0	Yes	Yes	Small PEM1 along W tree line W of H-2. Antenna fill colonized by stunted ericaceous shrubs, *Empetrum nigrum*, sedges, green alder and five species of orchids. Meadow along the tree line dominated by *Calamagrostis canadensis*, sedges, green alder, and *Spiraea alba*.	IWWH
HFW28	PEM1	0.08	3419.1	Yes	Yes	Small PEM1 Inclusion below Wet-27 along H-2 access road. Dominated by sedges and *Calamagrostis canadensis*.	
HFW29	PEM1, PSS2	0.14	6,013.3	Yes	Partially	Regenerating wetlands on sand and gravel fill. Bog vegetation redevelopment is exemplary.	
HFW3	PFO2, PFO4	3.32	144,630.6	Yes	No	PFO2 and PFO4 wetland complex that extends north from the SE corner of the HF site to the paved road; dominated by larch, Balsam fir, red and black spruce, red maple, speckled alder, and *Ilex mucronata*. *Osmunda* spp., bunchberry, *Rubus hispidula*, and *Carex trisperma* were common in the herb layer. *Sphagnum* spp. comprised most of the bryophyte layer.	IWWH
HFW30	PEM1	0.26	11,485.3	Yes	Yes	PEM1 SW of Antenna SC-1. Near road and dominated by *Calamagrostis canadensis*, rushes, and sedges.	IWWH
HFW4	PFO4 with PSS1 inclusion	0.21	9,071.6	Yes	No	Small mixed PSS (PSS1 □ PSS2) addition to the PFO portion of HFW4, extending NNW from the end of the road to Antenna Q-2. It starts at the road and extends NW to the HF boundary fence. It is dominated by larch, Balsam fir, green alder, willows, and *Spiraea alba*. Scattered sedges and rushes were present.	IWWH
HFW6	PSS1, PFO2	0.52	22,729.9	Yes	No	Narrow streamside PSS1 band running parallel to the north side of the paved access road and south side of Huntley Brook. Dominated by speckled alder, *Spiraea alba, Calamagrostis canadensis*, larch, and red maples with PFO2 inclusions.	IWWH

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
W65	PUB3, PSS1	0.06	2,403.2	Yes	No	Shrubland with small pockets of protected forested areas further from the ocean. Areas of standing water, above tidal influence, and a small open water area connected to W63 through culvert under the road. Only receives tidal influence under the highest of tides.	FEMA 100-year flood zone
W66	PEM1	5.38	234,225.5	Yes	Yes	PEM wetland that continues beyond survey area. Dominated by *Typha latifolia* with areas of standing water. Likely mowed during winter.	□20,000 sq. ft. PEM, Shoreline buffer
W67	EUS1	5.02	218,738.2	Yes	No	Intertidal beach fringed by narrow band of salt marsh vegetation.	FEMA 100-year flood zone, TWWH
W69A	PSS1	0.02	865.7	Yes	Yes	Small wetland depression, narrow wetland connected to the larger VWA16.	
W70	PSS1	0.02	695.7	Yes	Yes	Small wetland depression.	
W72	PSS1	0.26	11,206.9	Yes	Yes	Wetland on slope, loosely disconnected from VWA16 by low topography.	
W74	PSS1	0.13	5,776.6	Yes	Yes	Small mowed PSS wetland.	
W76	PSS1	0.91	39,813.8	Yes	Yes	Mowed PSS wetland with low shrubs.	
W77	PSS1	0.01	595.9	No	Yes	Mowed roadside ditch.	
W77A	PSS1	0.03	1,234.6	No	Yes	Mowed roadside ditch.	
W78	PSS1	0.07	3,195.1	Yes	Yes	Mowed wetland area.	
W82	PSS1	0.01	370.6	Yes	Yes	Small wet roadside ditch.	
W84	PSS1	0.05	2,094.6	Yes	Yes	Small mowed wetland area with roadside ditch running through it.	
W85	PSS1	0.03	1,324.1	No	Yes	Small wet ditch.	
W88	PSS1	0.07	2,850.5	Yes	Yes	Mowed PSS area with alder shrubs and *Salix* spp. shrubs.	
W9	PSS1	0.03	1,447.0	Yes	Yes	Small wet depression on top of slope.	
W91	PEM1	0.06	2,568.4	Yes	Yes	Mowed wetland adjacent to central tower building.	

19 September 2014

Jay Clement
Maine Project Office
New England District
United States Army Corps of Engineers
675 Western Avenue, #3
Manchester, Maine 04351

Re: Request for Preliminary Jurisdictional Determination for areas within the USACE New England District for Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler, Cutler, Maine

Dear Mr. Clement:

On behalf of Naval Facilities Engineering Command Mid-Atlantic (NAVFAC-MIDLANT) and Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler (NCTAMSLANT DET Cutler), Tetra Tech, Inc. (Tetra Tech) is requesting a U.S. Army Corps of Engineers (USACE) Preliminary Jurisdictional Determination (JD) for aquatic resources found, in the New England District, during wetland delineation of the entire 3,002.4-acre area at NCTAMSLANT DET Cutler (Enclosure A, Figure 1). It should be noted that the Preliminary Jurisdictional Determination for a 295-acre subset of NCTAMSLANT DET Cutler by the USACE New England District and dated 09 January 2013 (File Number: NAE-2011-02276) should be superseded by this current Request for Preliminary Jurisdictional Determination, which encompasses the entire NCTAMSLANT DET Cutler installation.

Based on the level of detail required from historic land use and site disturbance (Enclosure B, Site History and Conditions), the Routine On-Site Determination Methods, as described in the USACE Wetlands Delineation Manual (Environmental Laboratory 1987), was selected as the most appropriate method to meet the objectives of the wetland delineation. This method involved collection and review of background information, followed by an onsite survey and delineation. Pursuant to current USACE policy for identifying wetlands, the delineation was performed using the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, *Version 2.0* (USACE 2012).

Prior to conducting the wetland delineation, Tetra Tech conducted a review of existing site information including:

- 15-cm RGB aerial photographs, 2008 (NAVFAC);
- Onsite hydrography, previously mapped ditches, streams, and wetlands (NAVFAC);
- Natural Resources Conservation Service soil survey maps, hydric soil lists, and maps to determine presence and extent of hydric and upland soils;
- Q3 Flood Data derived from the Flood Insurance Rate Maps (FIRMs) published by the Federal Emergency Management Agency (FEMA), Washington County;

Tetra Tech, Inc.
451 Presumpscot Street, Portland, Maine 04103
Tel 207.358.2400 Fax 207.879.9481 www.tetratech.com

- U.S. Geological Survey 7.5 Minute Series Topographic Quadrangle maps, Machias Bay;
- NCTAMSLANT DET Cutler Final Integrated Natural Resources Management Plan; and
- U.S. Fish and Wildlife Service National Wetland Inventory (NWI) maps.

Following a review of background information, wetland scientists performed a systematic wetland delineation across the entire 3,002.4-acre NCTAMSLANT DET Cutler installation from 18 June 2012 to 30 July 2014 (Figure 1).

The USGS quadrangle indicates that the site ranges in elevation from approximately 0 to 100 feet above mean sea level (Figure 1). The NWI mapping shows that NCTAMSLANT DET Cutler predominantly consists of scrub shrub and emergent wetlands scattered throughout the study area (Figure 2). The NRCS soil survey shows that hydric soils are prevalent and widely dispersed across the site (Figure 3). The FEMA Coastal High Hazard Area (VE Zone) also is included (Figure 4), showing the direct connectivity of aquatic resources to Machias and Little Machias Bays, both navigable waterways (i.e., waters of the U.S.).

Wetland boundaries were marked with numerically-labeled flags and pins and were surveyed using a Trimble, Inc. (Sunnyvale, CA) Geo6000 and Topcon (Livermore, CA) GRS-1 Global Positioning Systems (GPS). Boundary flags were located in accordance with Trimble’s and Topcon’s specifications collecting data and post-processing for submeter accuracy. GPS data were differentially corrected using Pathfinder Office 5.30 (Trimble Inc.) and Topcon Tools 7.5 software, respectively, with publically available base station control points. A geo-referenced wetland delineation boundary suitable for overlay onto Project maps and aerial photographs was created using ArcGIS (Environmental Systems Research Institute, Inc.; Redlands, CA) mapping software (Figure 5, Sheets 1 through 79).

All perennial, intermittent, and some ephemeral (i.e., when providing aquatic resource connectivity) ditches and streams were evaluated according to the Maine Department of Environmental Protection stream definition. Streams and other ditch features that were previously mapped by NAVFAC were verified in the field using GPS and revised, if necessary, to ensure they were mapped accurately. In addition, linear features that were encountered during the field surveys but were not previously delineated were flagged and mapped using GPS. If a linear feature was determined to have an ephemeral flow regime and did not provide wetland connection, it was not mapped.

Using available data, Maine Wetlands of Special Significance (WOSS) designations, as defined in the Maine Department of Environmental Protection Natural Resource Protection Act (38 M.R.S.A. §§480-A et seq.) and the Maine Wetland Protection Rules (Chapter 310), are included for delineated wetlands on the aquatic resource maps (Figures 5a through 5o). In addition to publically available data and resource information collected onsite during the wetland delineation, data were obtained from Maine Department of Inland Fisheries and Wildlife for Tidal Wading Bird and Waterfowl Habitat and Shore Bird Roosting and Feeding Areas. It should be noted that specific vernal pool habitats and rare, threatened and endangered (RTE) species assessments were not conducted during the wetland delineation. However, a few potential vernal pool habitats and no RTE species were encountered during the 3,002.4-acre wetland delineation. Many areas had overlapping WOSS generating criteria. For simplicity and visual interpretation, WOSS are presented as a single designation instead of displaying all of the source input layers (Figure 5, Sheets 1–79). The WOSS source for each wetland polygon is detailed in Table 1 (Enclosure C – Wetland Summary).

In summary, there were a total of 1,426.9 acres of wetlands and 30,386.3 linear feet of streams delineated within the 3,002.4-acre installation area at NCTAMSLANT DET Cutler. Another 15,530.8 linear feet of ditches were determined to provide connectivity to aquatic resources within the study area. Wetlands of Special Significance comprise 339.0 of the 1,426.9 acres of delineated wetlands.

To assist the USACE with the Preliminary JD, please find enclosed Figures 1 through 5 (Enclosure A), Site History and Conditions (Enclosure B), Wetland and Waterbodies Summary Tables (Enclosure C, Table 1 and Table 2), and Wetland Determination Data Sheets (Enclosure D, 31 representative data points). Please note that the Wetland Determination Data Sheets are representative of the NWI classes and paired uplands found at the installation, and that all Wetland Determination Data Sheets, as displayed with data observation points on the aquatic resource maps in Enclosure A – Figure 5, Sheets 1–79, are available upon request.

Upon issuance of the Preliminary JD letter please have it addressed to:

Elizabeth Nashold
Commander Navy Mid-Atlantic Region
Code N-45, Regional Environmental Group
Norfolk, VA 23511-2737

And please send the Preliminary JD letter to the care of:

Thad McDonald, Natural Resources
NAVFAC MIDLANT
Naval Station Norfolk Bldg Z-144 2nd floor
9742 Maryland Avenue
Norfolk VA 23511-3095

Upon receipt of this request please have the assigned project manager contact me at (207) 358-2402 or brad.agius@tetratech.com to discuss any questions.

Respectfully submitted,
Tetra Tech

Brad P. Agius, PWS
Technical Project Manager

Enclosures:

A. Figures

Figure 1 – Site Location on USGS Quad
Figure 2 – National Wetland Inventory
Figure 3 – NRCS Soils
Figure 4 – FEMA FIRM
Figure 5 – (Figure 5, Index and Sheets 1–79) NCTAMSLANT DET Cutler Aquatic Resources

B. Site History and Conditions

C. Summary Tables

Table 1 – Wetland Resources Summary
Table 2 – Waterbodies Summary

D. Selected Wetland Determination Data Sheets (31 representative data points, 93 pages)

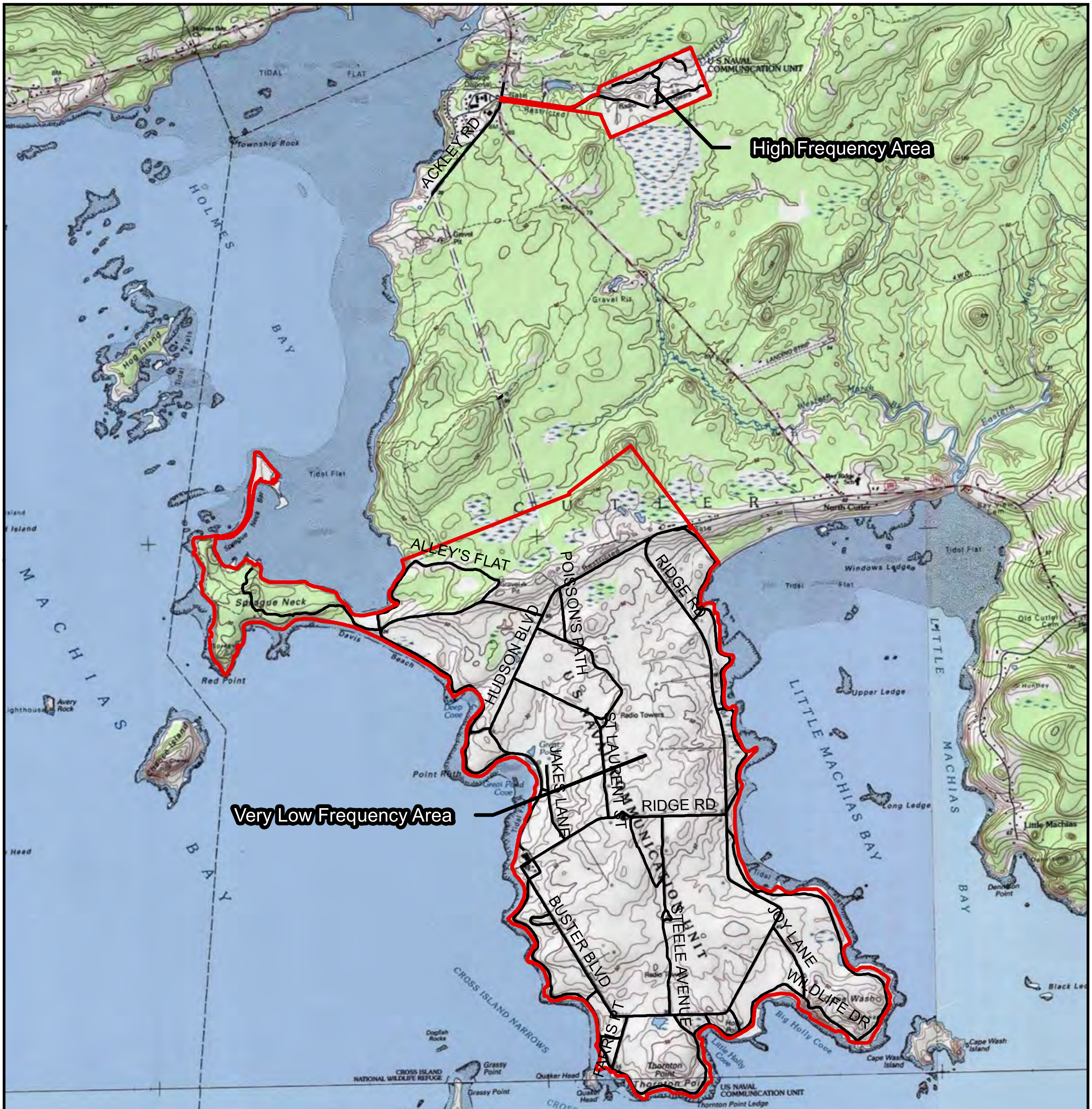
cc: T. McDonald (NAVFAC-MIDLANT)
I. Trefry (NAVFAC-PWD-ME)
J. Campo, S. Watts (Tetra Tech)

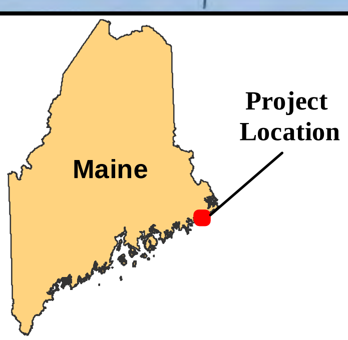
ENCLOSURES

TETRA TECH

ENCLOSURE A

Figures





Source: Navy 2012, ESRI 2011

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation Area

Roads

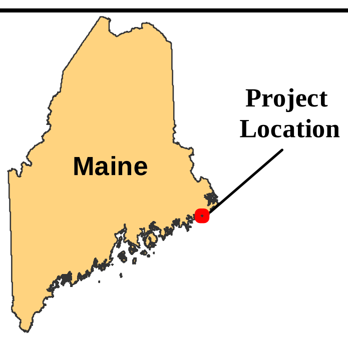
0 2,500 5,000 Feet

0 1,000 2,000 Meters

N

Figure 1. Topographic Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Legend

	Installation Area		Wetlands (NWI)
	Roads		Ponds (Navy)
	Ditches (Navy)		Streams (Navy)

0 2,500 5,000 Feet

0 500 1,000 Meters

Figure 2. NWI and Water Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012, ESRI 2011, US Fish and Wildlife Service 2011

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014

Soil Unit - Description
BW - Bucksport and Wonsqueak soils
BnB - Brayton fine sandy loam
CoB - Colton gravelly sandy loam, 3-8% slope
CoC - Colton gravelly sandy loam, 8-15% slope
DgB - Dixfield-Colonel complex
HXC - Hogback-Rawsonville-Abram complex
LaB - Lamoine silt loam
LCB - Lamoine-Buxton-Scantic complex
LmB - Lamoine-Scantic complex
LSB - Lamoine-Scantic-Colonel complex
MaC - Marlow fine sandy loam
Pg - Pits, sand and gravel
RhB - Rawsonville-Hogback complex
RmC - Rawsonville-Hogback-Abram complex
SF - Scantic-Biddeford association
SG - Sebago and Moosabec soils
Sa - Scantic silt loam
Ud - Udorthents-Urban land complex
WF - Wonsqueak and Bucksport soils
W - Water

Legend

Installation Area
Roads
Ditches (Navy)
Streams (Navy)

Soil Units
Hydric Soils
Non Hydric Soils

0 2,500 5,000 Feet
0 500 1,000 Meters

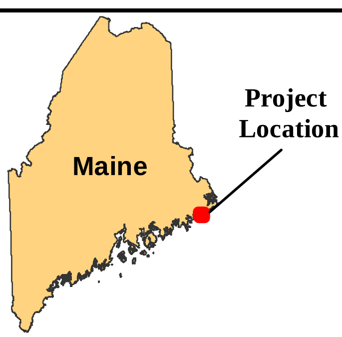
N

Figure 3. NRCS Soils Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012, ESRI 2011, USDA-NRCS Washington County Soils Map 2011

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014



Legend

Installation Area

FEMA Floodzone

VE-Coastal Area

Figure 4. FEMA Floodzone Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012, ESRI 2011, FEMA Q3 Flood Data 2002.

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

0 2,500 5,000 Feet

0 1,000 2,000 Meters

N

Date:
09/2014

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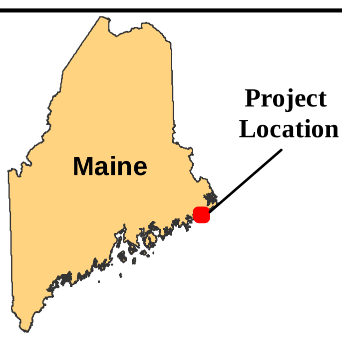


Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/Delineation Area

Map Sheets

0 2,500 5,000 Feet

0 1,000 2,000 Meters

N

Figure 5. Aquatic Resources Map Sheet Index Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

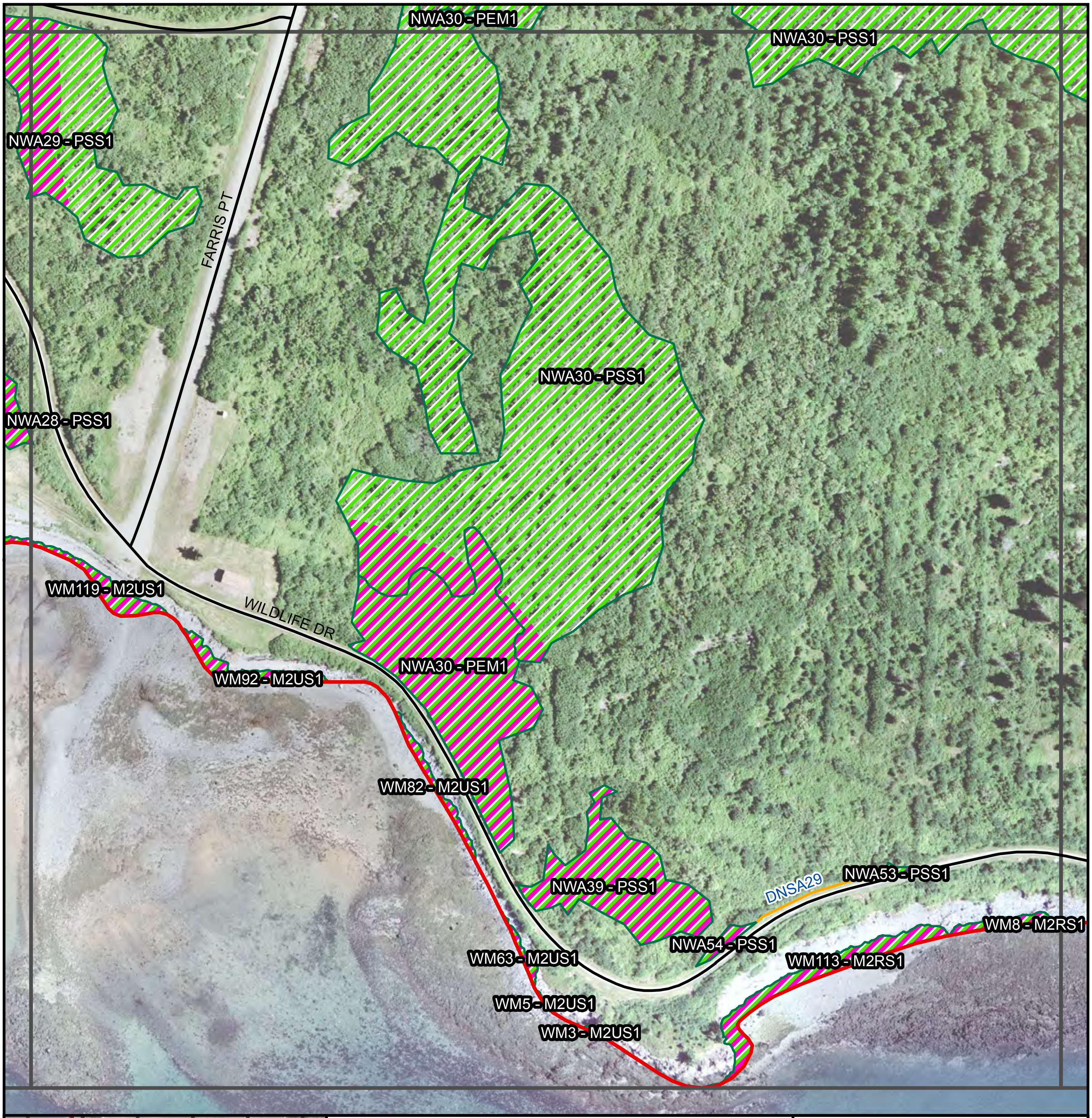
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 1
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

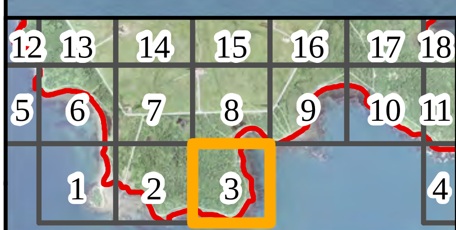
N

Figure 5. Sheet 2
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014



Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

0 50 100 Meters

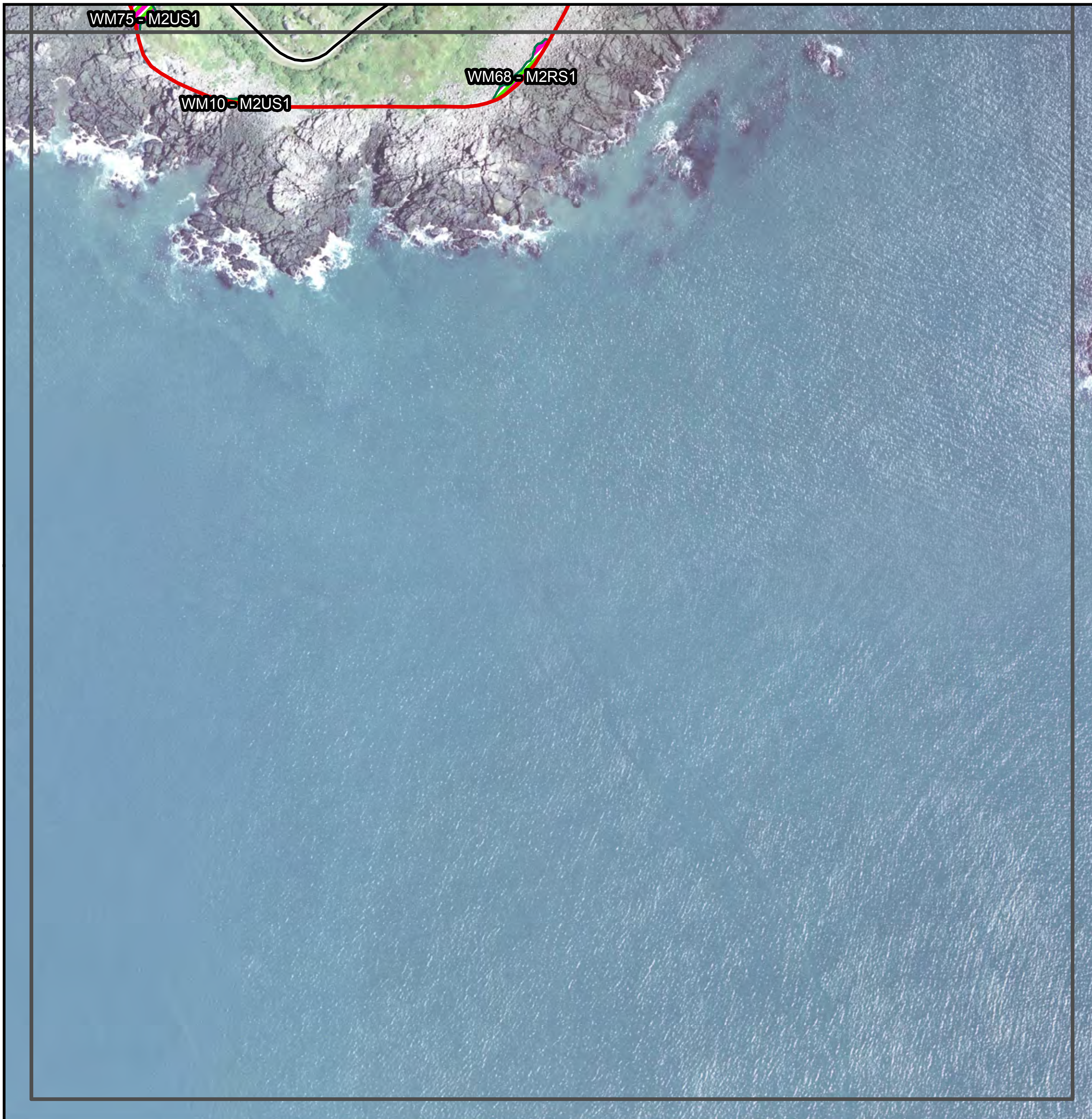
N

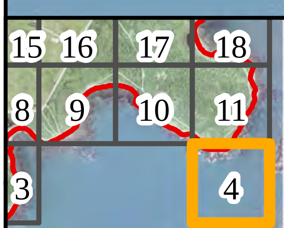
Figure 5. Sheet 3
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014





Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

Figure 5. Sheet 4
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

0 200 400 Feet

0 50 100 Meters

N

Date:
09/2014

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Legend

Installation/ Delineation Area	Wetlands
Roads	Wetlands of Special Significance
Streams (Tetra Tech)	Wetland Plots
Ditches (Tetra Tech)	Upland Plots

0 200 400 Feet

0 50 100 Meters

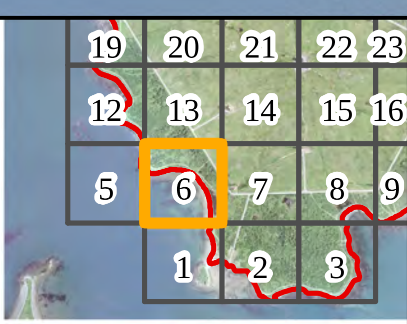
N

Figure 5. Sheet 5
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area
Roads
Streams (Tetra Tech)
Ditches (Tetra Tech)
Wetlands
Wetlands of Special Significance
Wetland Plots
Upland Plots

0 200 400 Feet
0 50 100 Meters

N

Figure 5. Sheet 6
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Date:
09/2014

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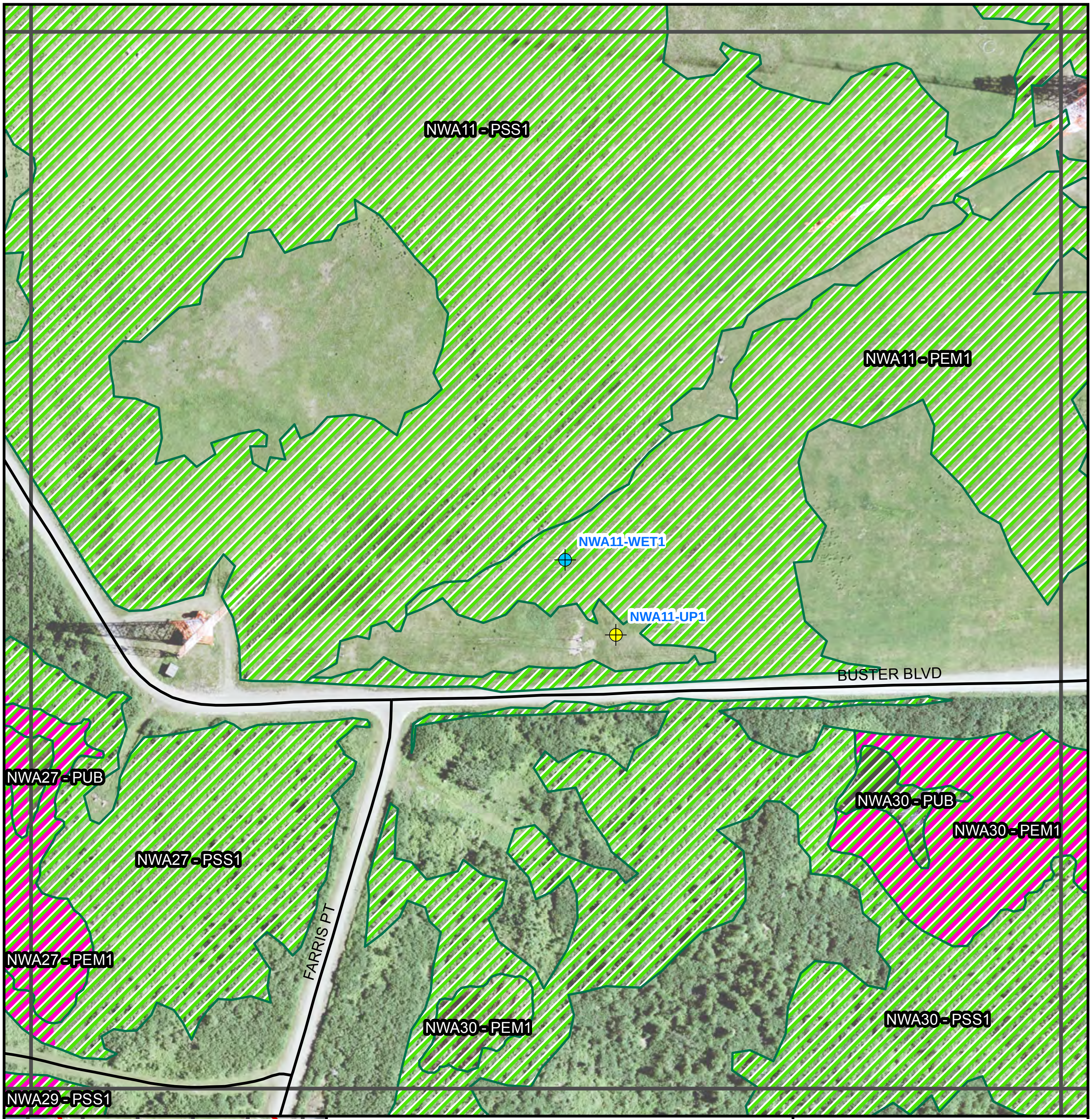

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 7
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014

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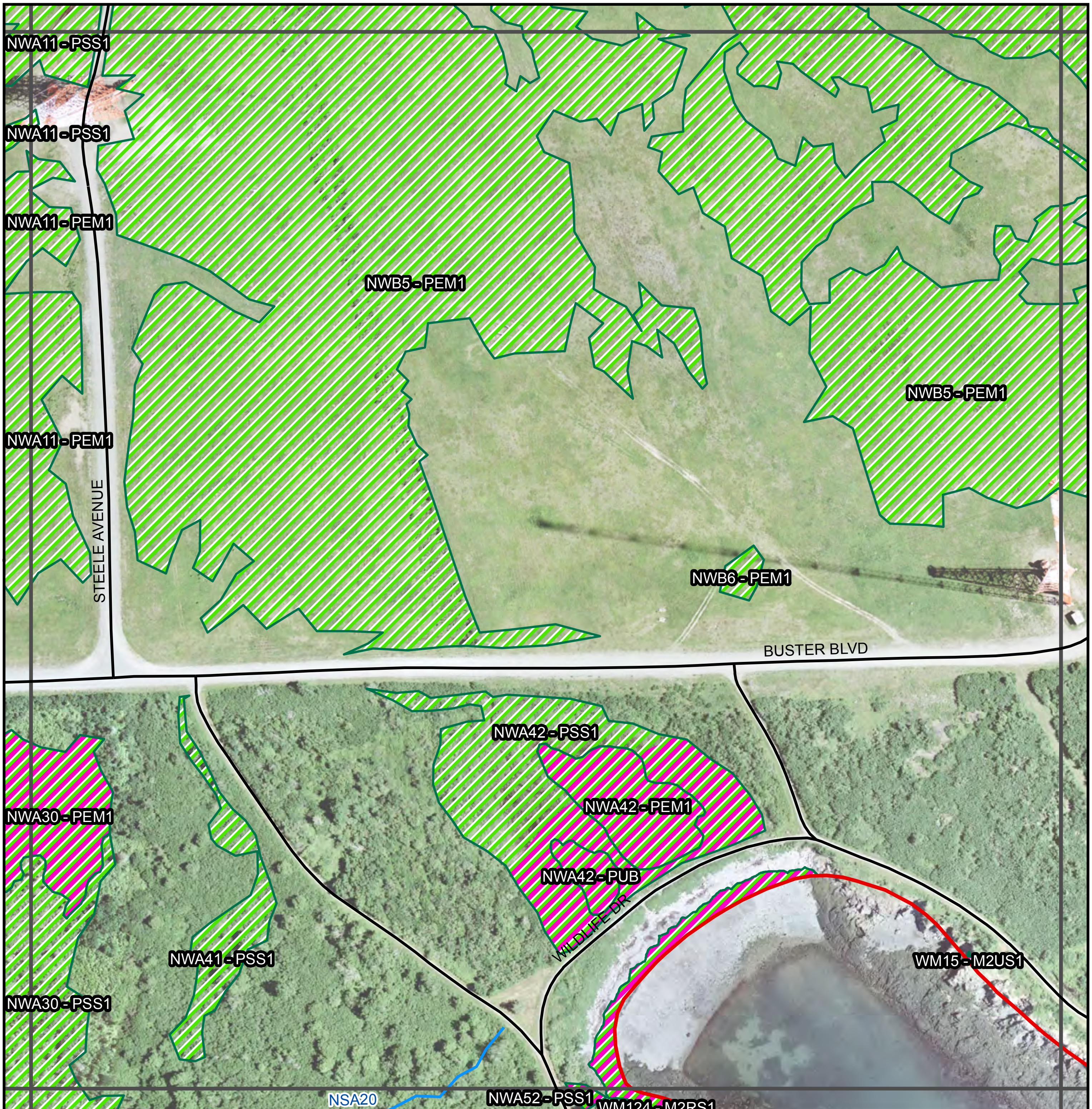


Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 8
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

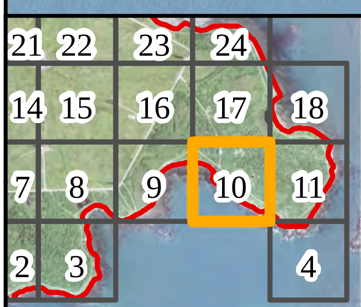
N

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Figure 5. Sheet 9
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Figure 5. Sheet 10 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

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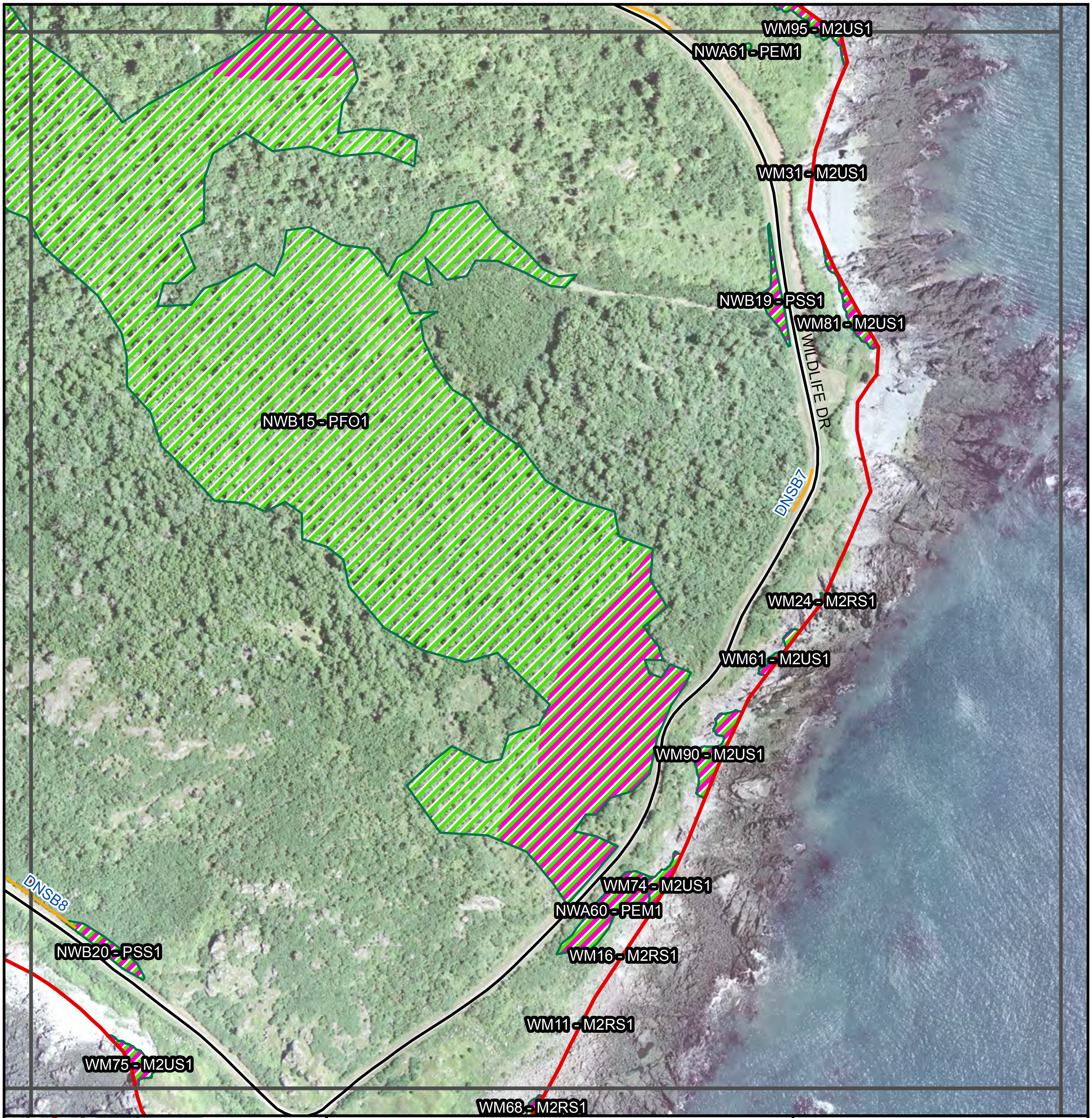

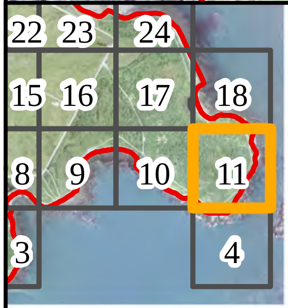

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 11 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014

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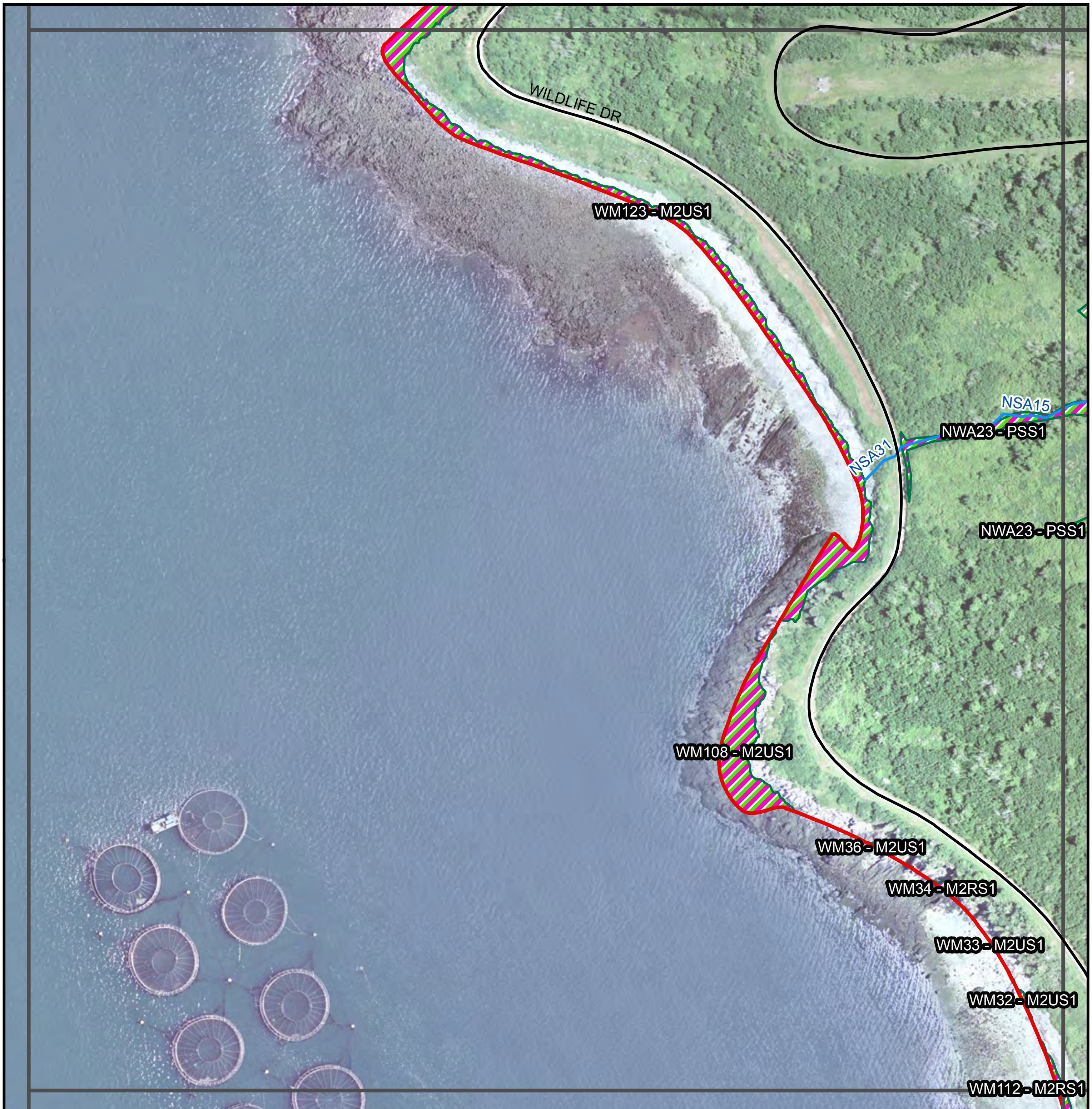

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 12 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014

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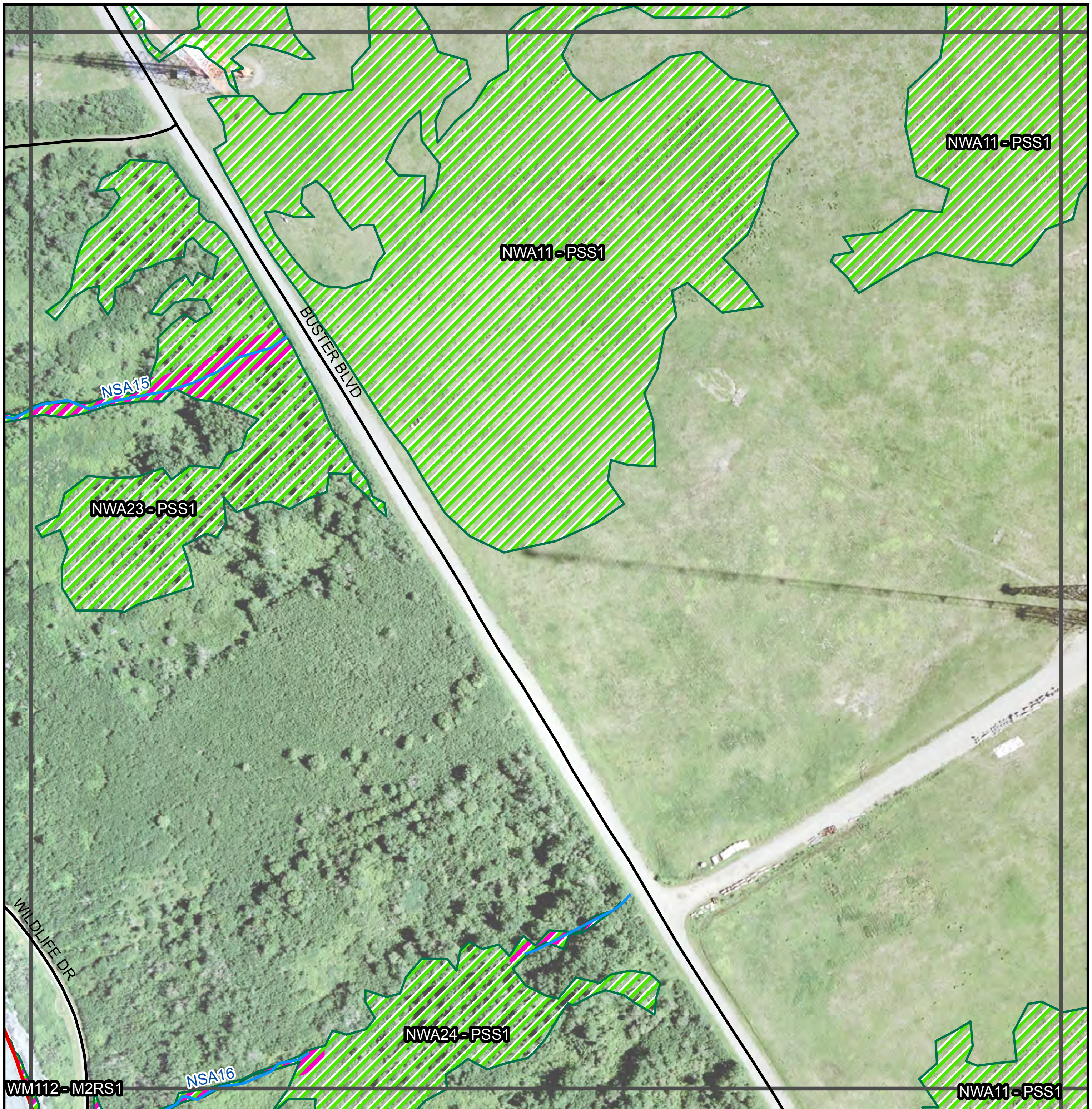

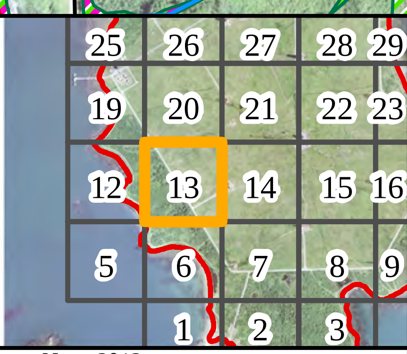

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 13 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

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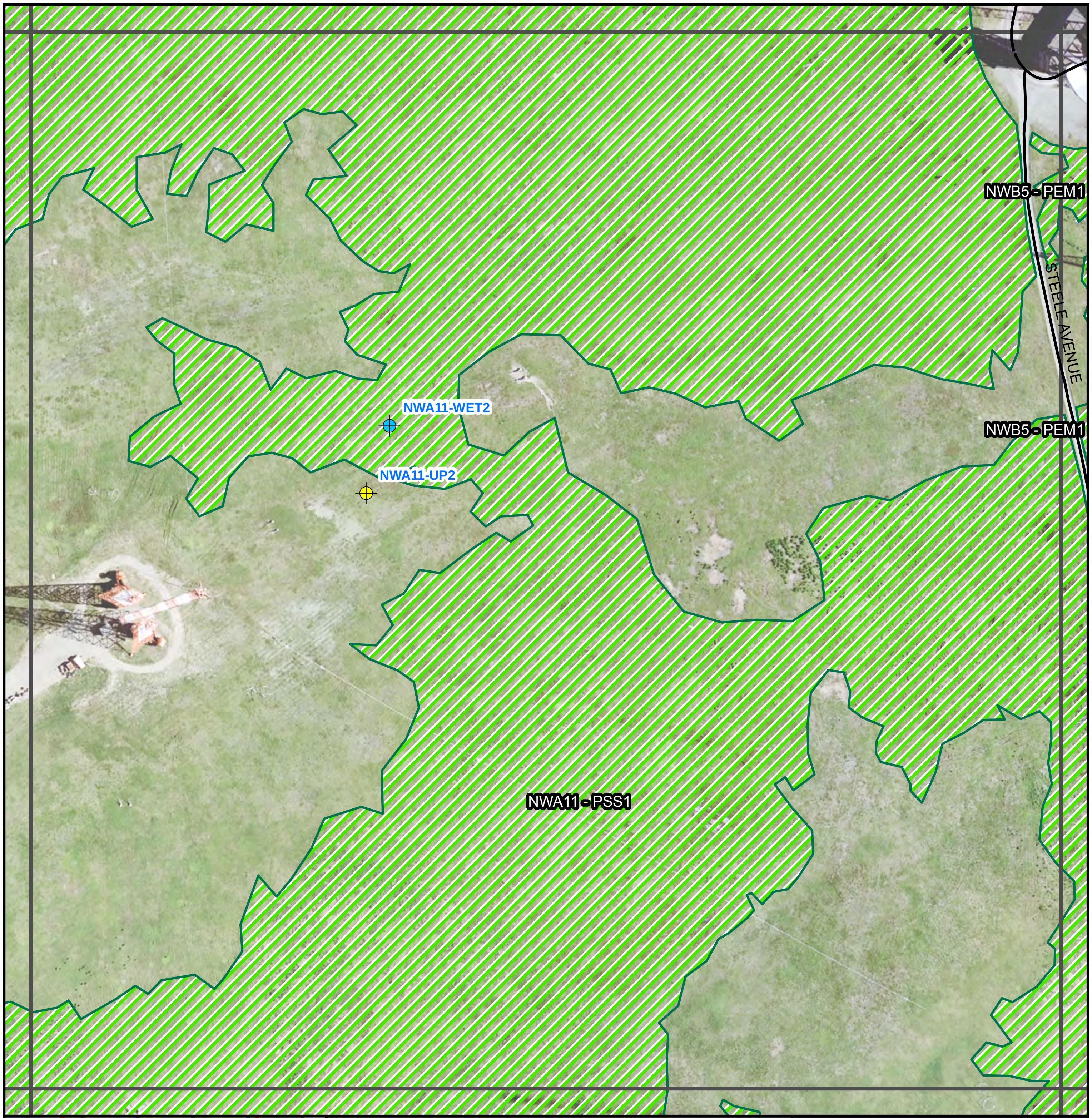


Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

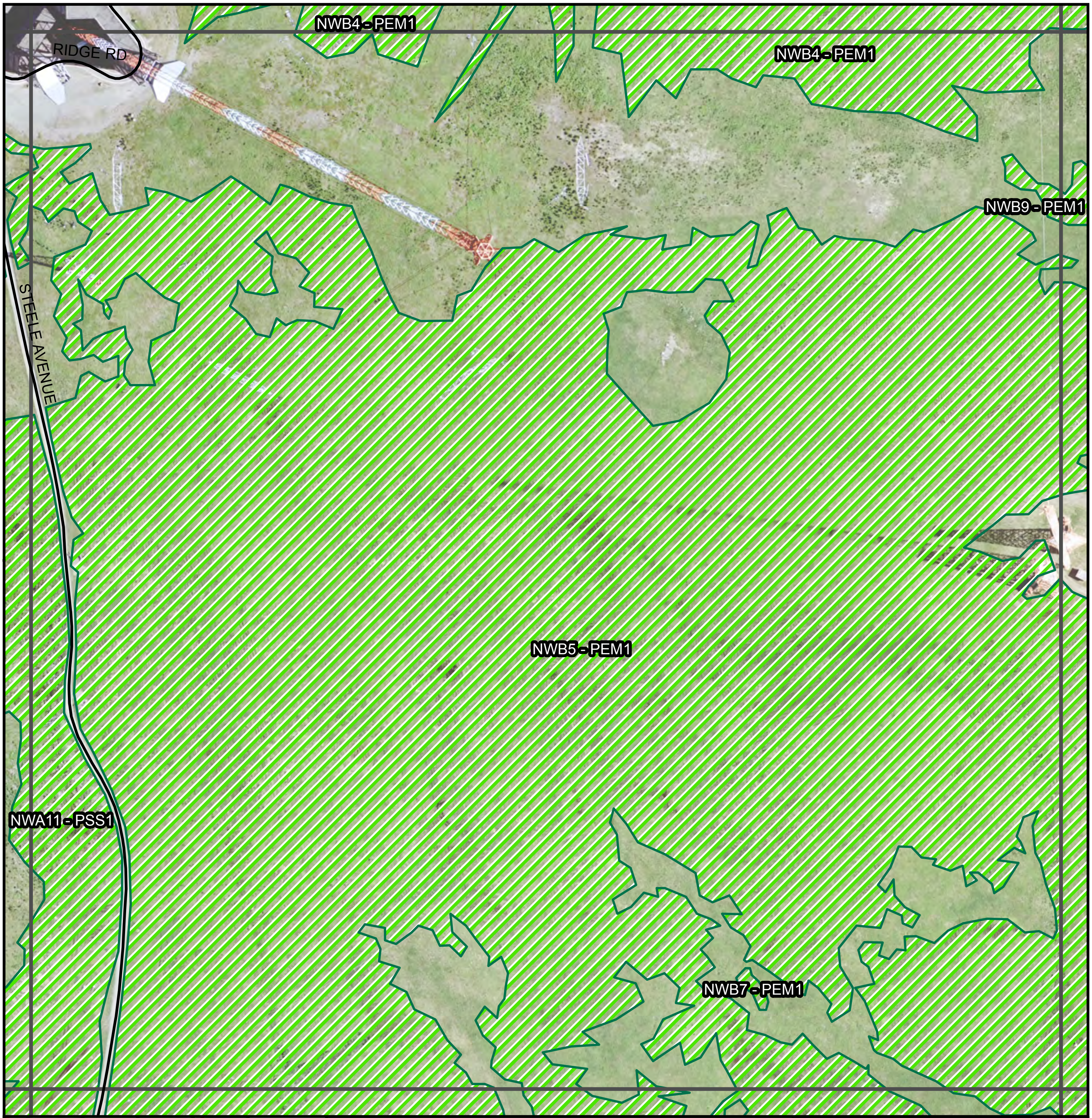
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 14
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

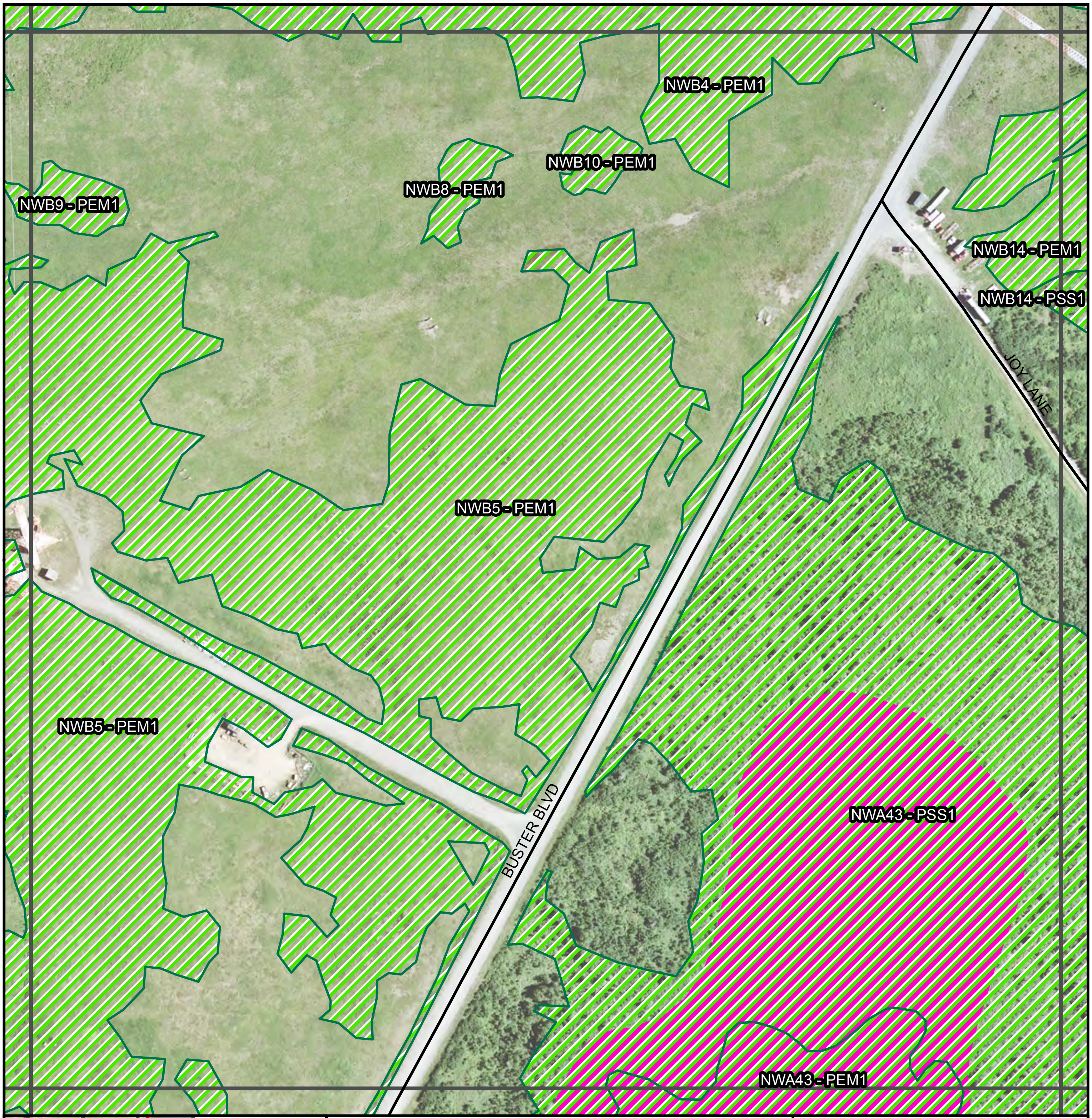
0 200 400 Feet

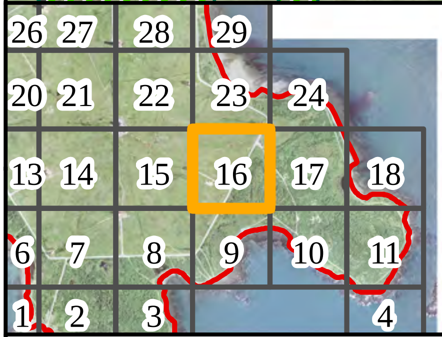
0 50 100 Meters

N

Figure 5. Sheet 15
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

N

**Figure 5. Sheet 16
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.**

Date:
09/2014

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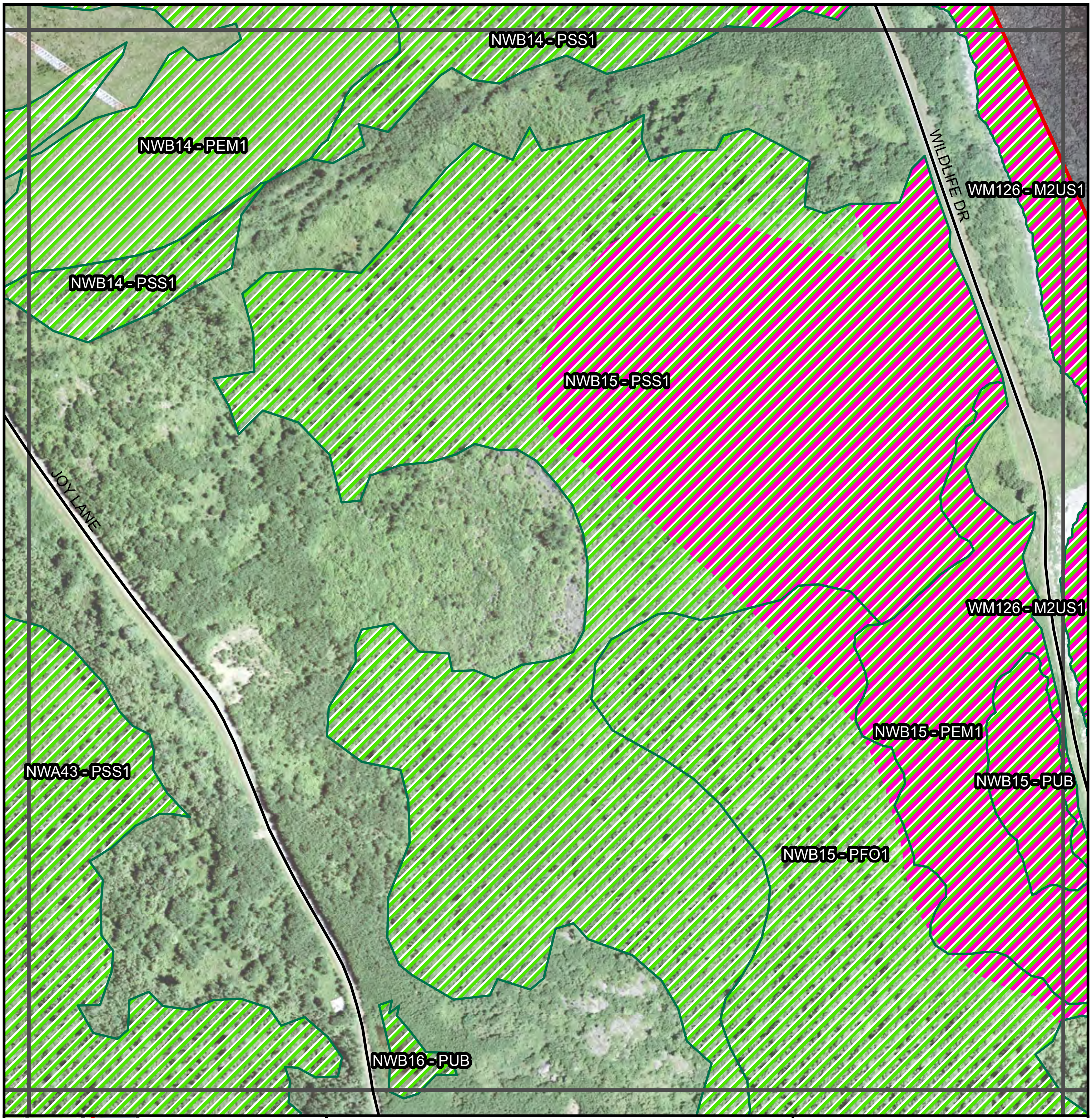


Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

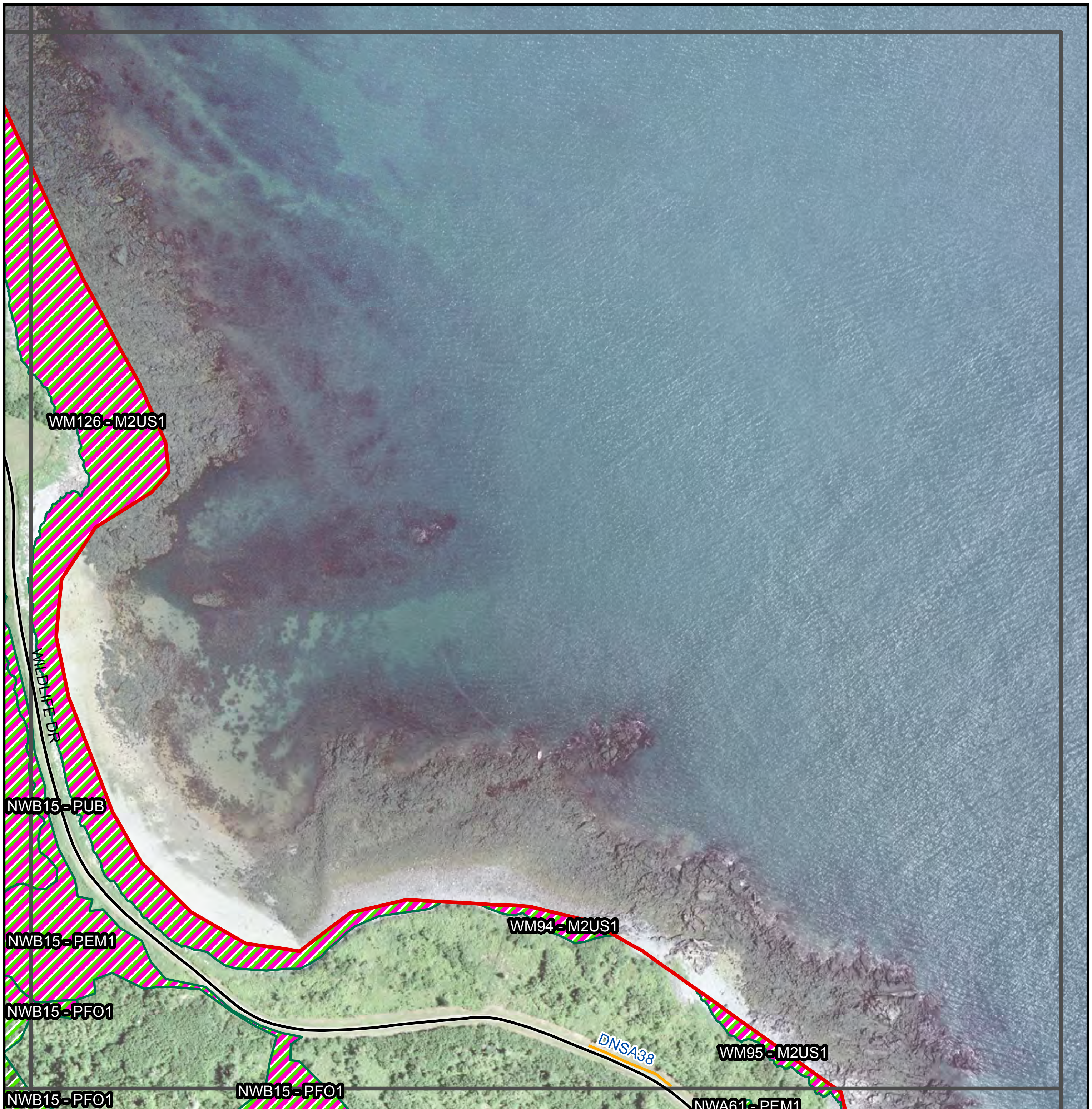
0 200 400 Feet

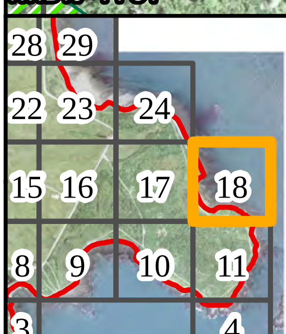
0 50 100 Meters

N

Figure 5. Sheet 17
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 18
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

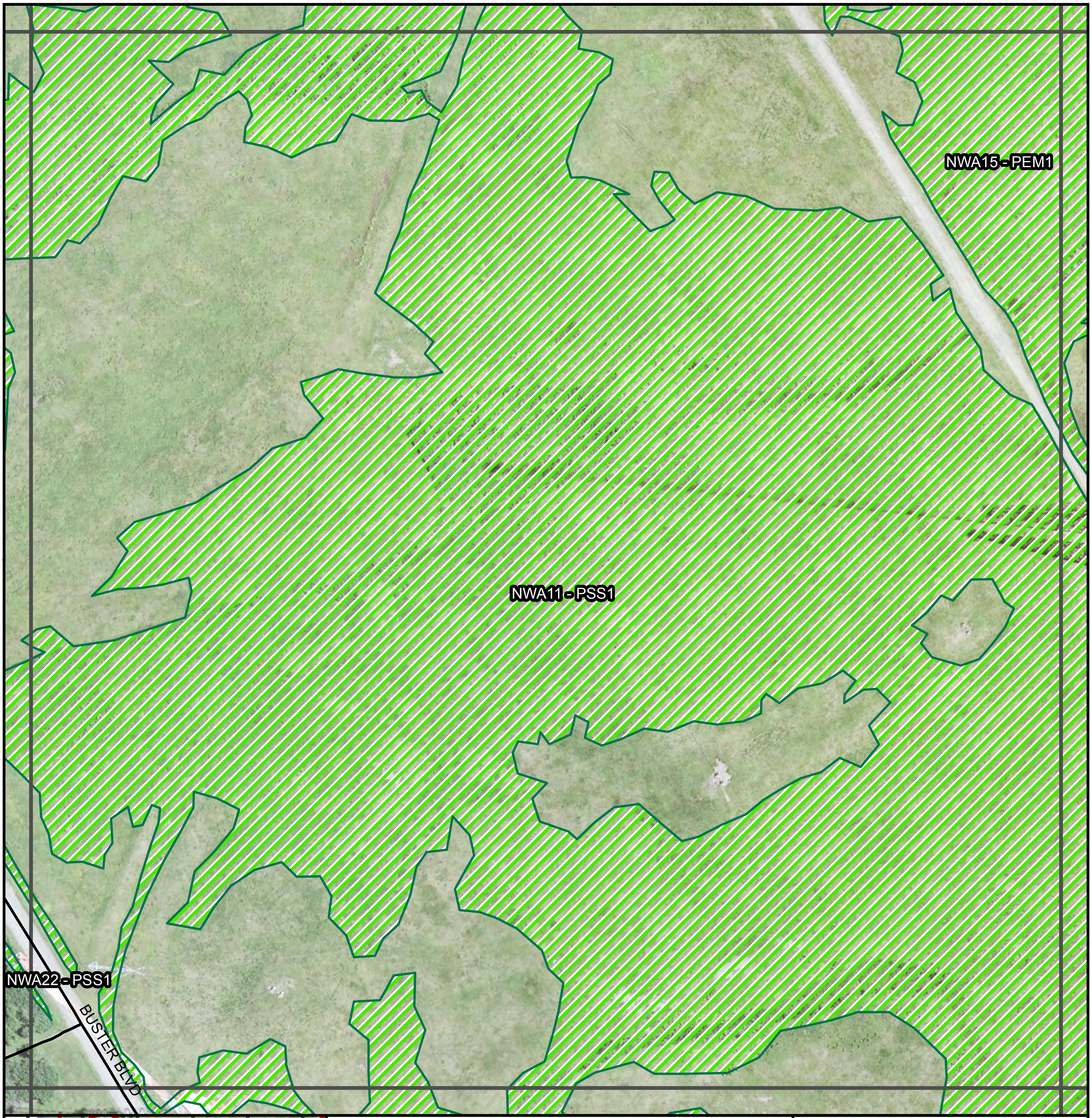
0 200 400 Feet

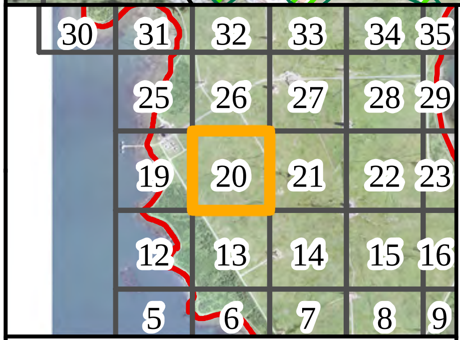
0 50 100 Meters

N

Figure 5. Sheet 19
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

Figure 5. Sheet 20
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

0 200 400 Feet

0 50 100 Meters

N

Date:
09/2014

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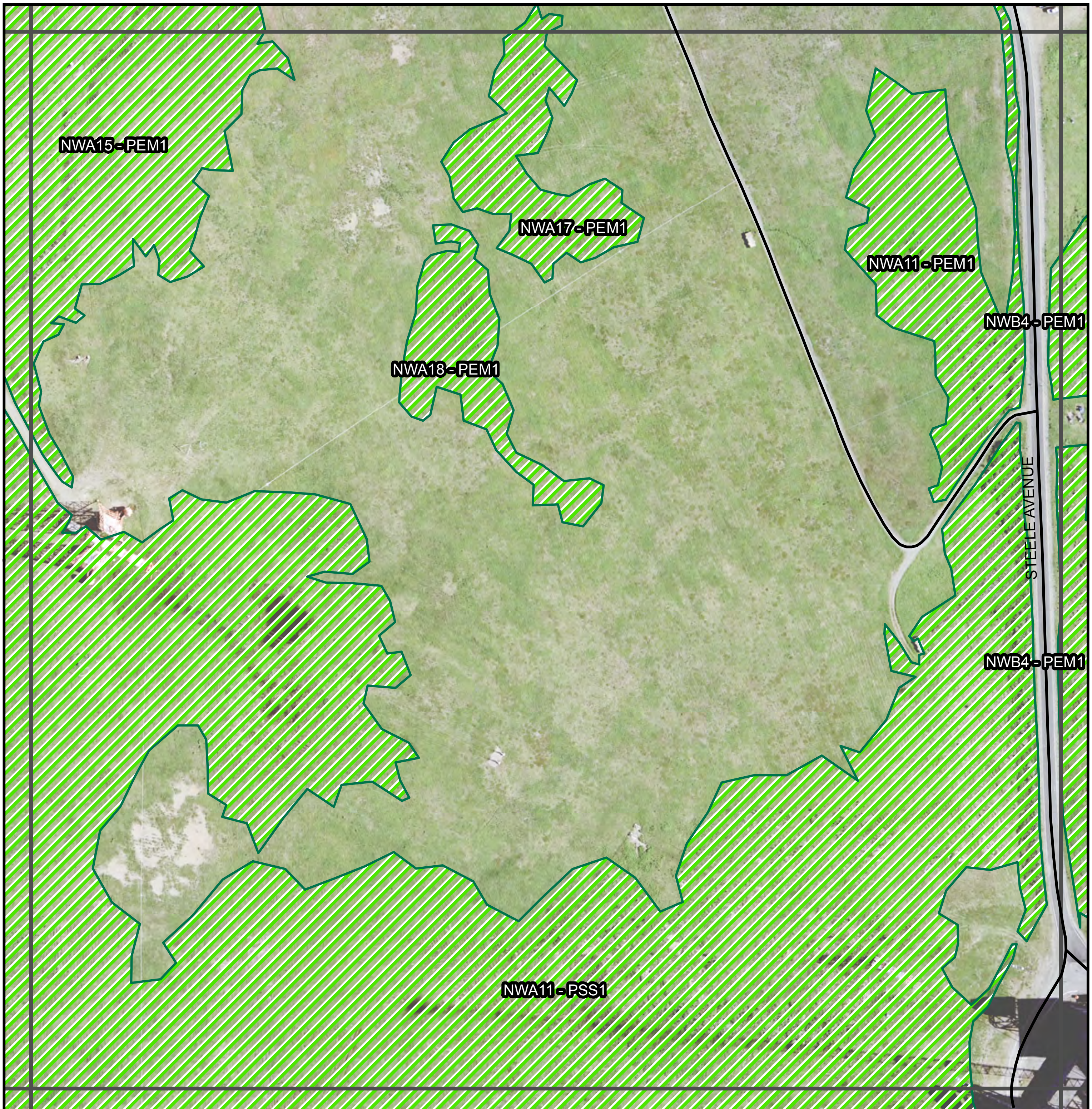


Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

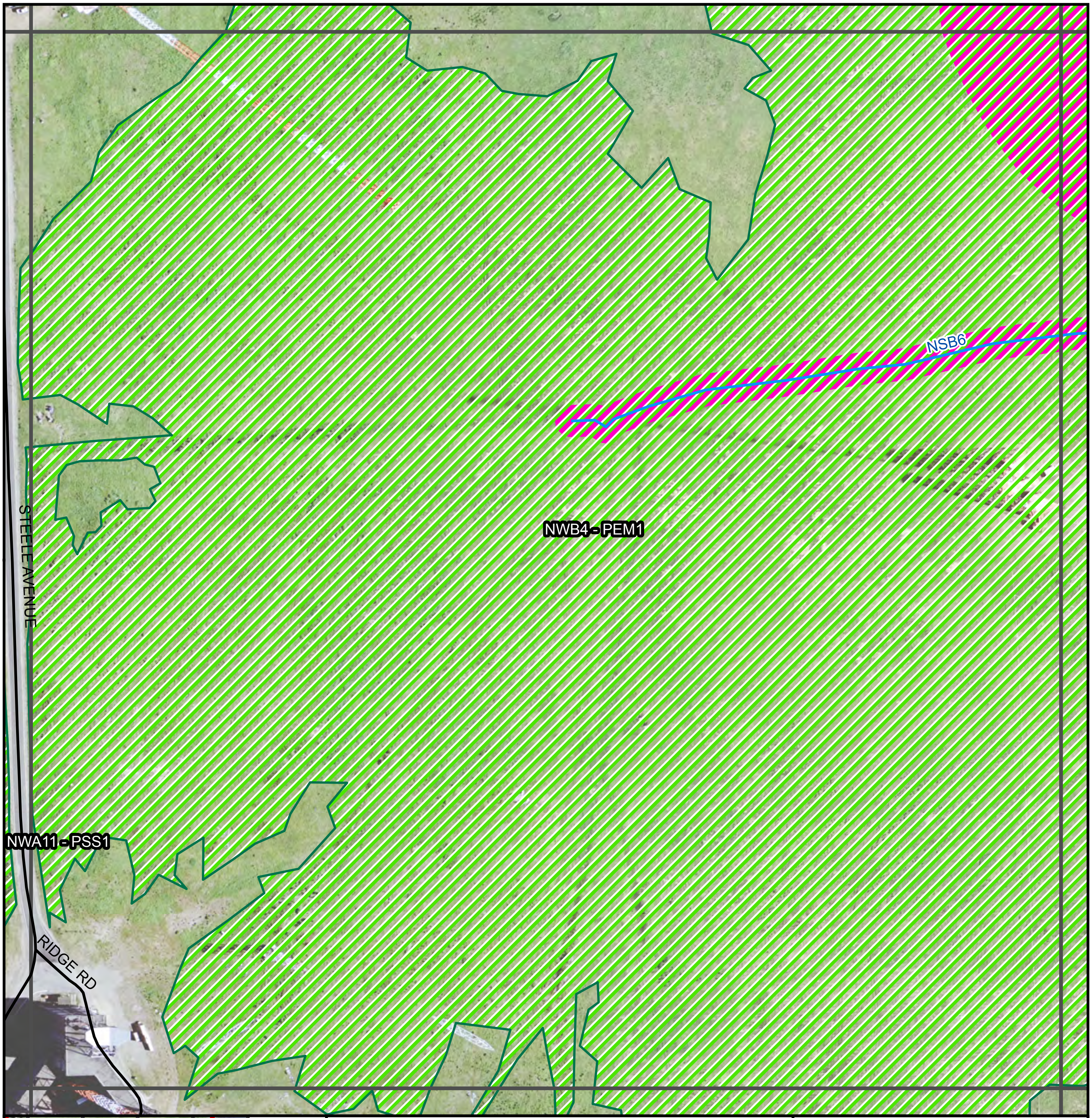
0 50 100 Meters

N

Figure 5. Sheet 21
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z: projects NAVFAC 2012 TASKS 100 NRS T23330 WE40 ME SERE CUTLER CUTLER GIS MXD FIGURES FINALS 2014 V102 Finals 2014 20140904 NJ FIGURES EDITS 20140918 T23330WE40 Fig5 WaterResources DDP.mxd



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area
Roads
Streams (Tetra Tech)
Ditches (Tetra Tech)
Wetlands
Wetlands of Special Significance
Wetland Plots
Upland Plots

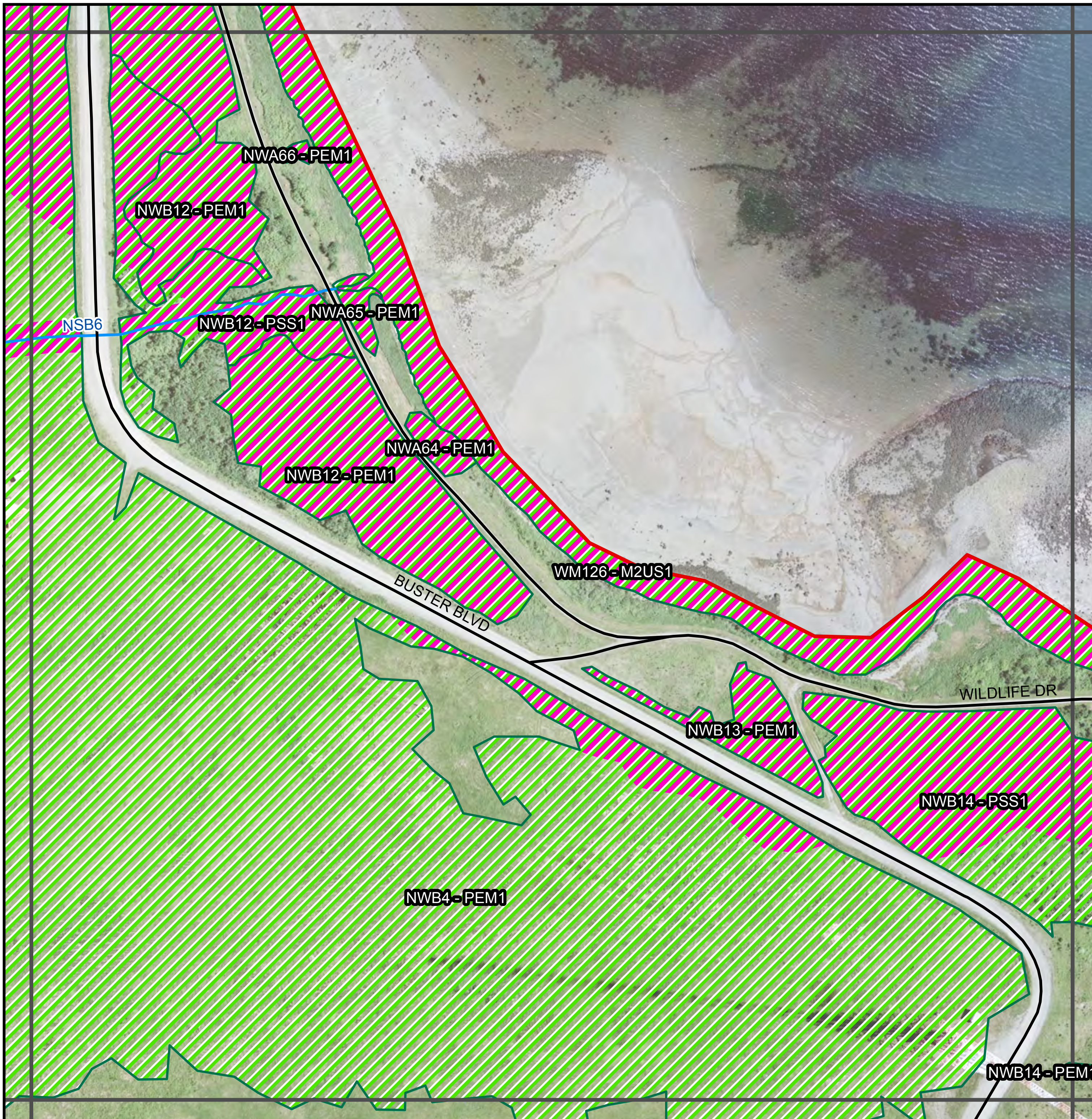
0 200 400 Feet
0 50 100 Meters

N

Figure 5. Sheet 22
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100_NRS_T23330_WE40_ME_SERE_CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS_2014_V102\Finals_2014_20140904\NJ_FIGURES_EDITS_20140918\T23330WE40_Fig5_WaterResources_DDP.mxd



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

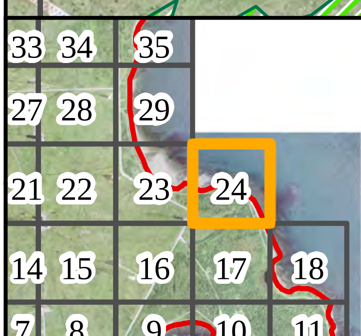
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 23 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

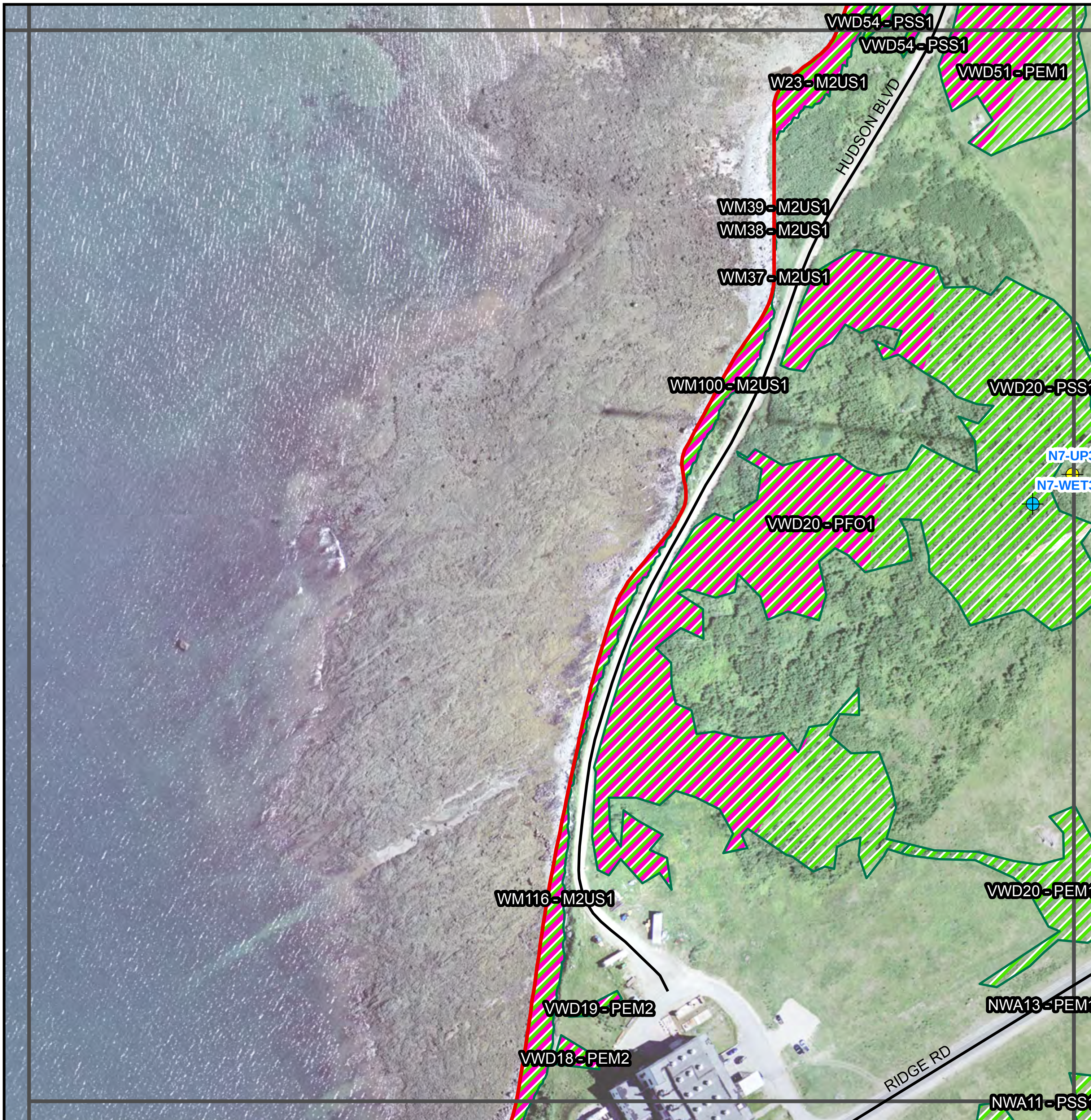
0 50 100 Meters

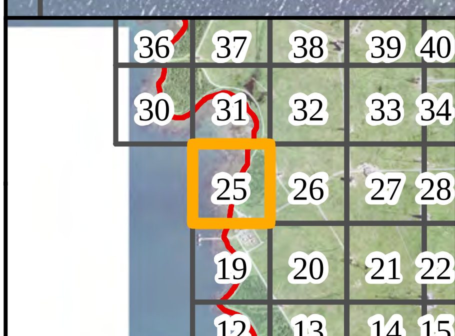
N

Figure 5. Sheet 24 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100_NRS_T23330_WE40_ME_SERE_CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS_2014_V102\Finals_2014_20140904\NJ_FIGURES_EDITS_20140918\T23330WE40_Fig5_WaterResources_DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 25
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 26 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

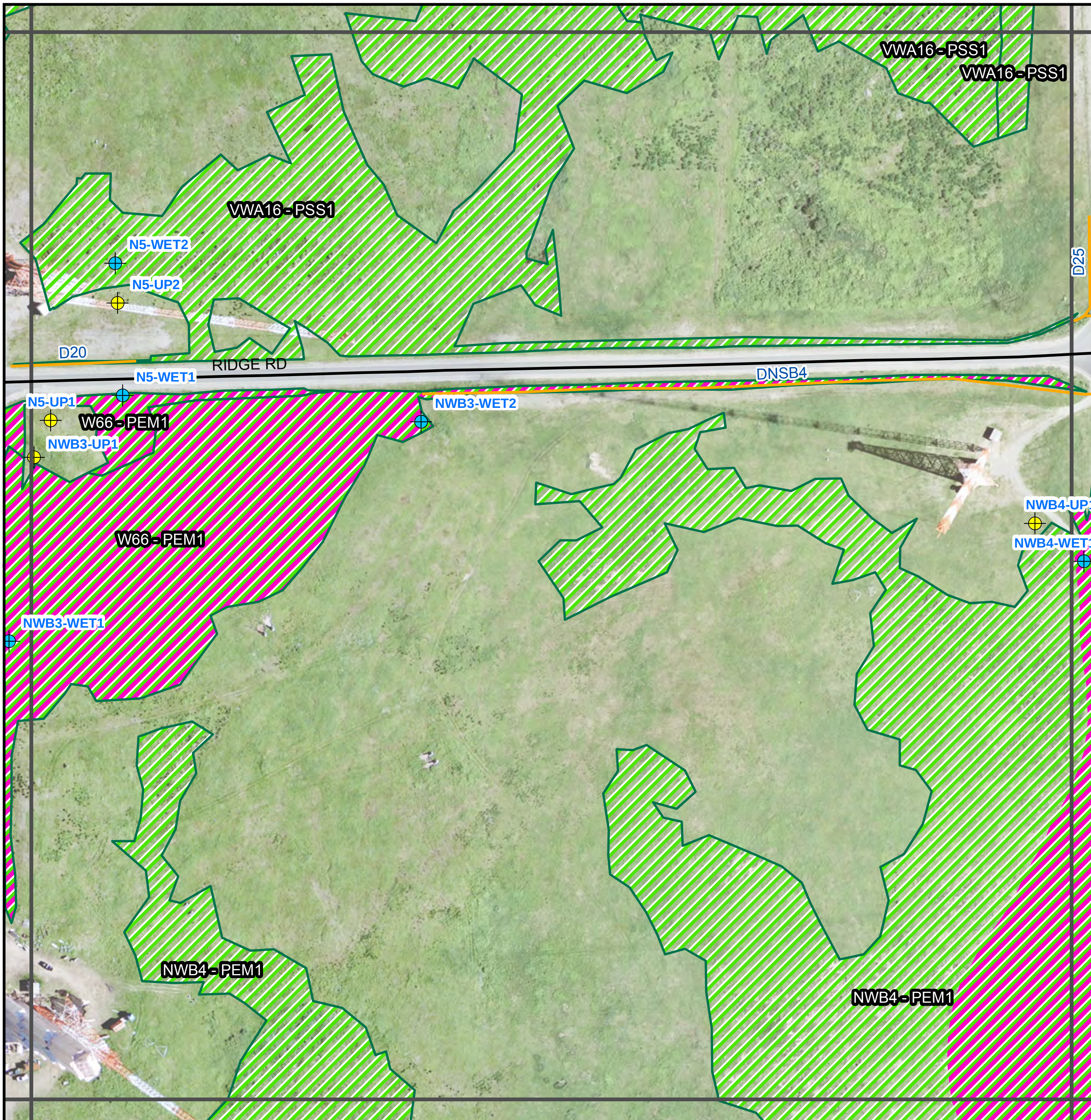
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 27
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

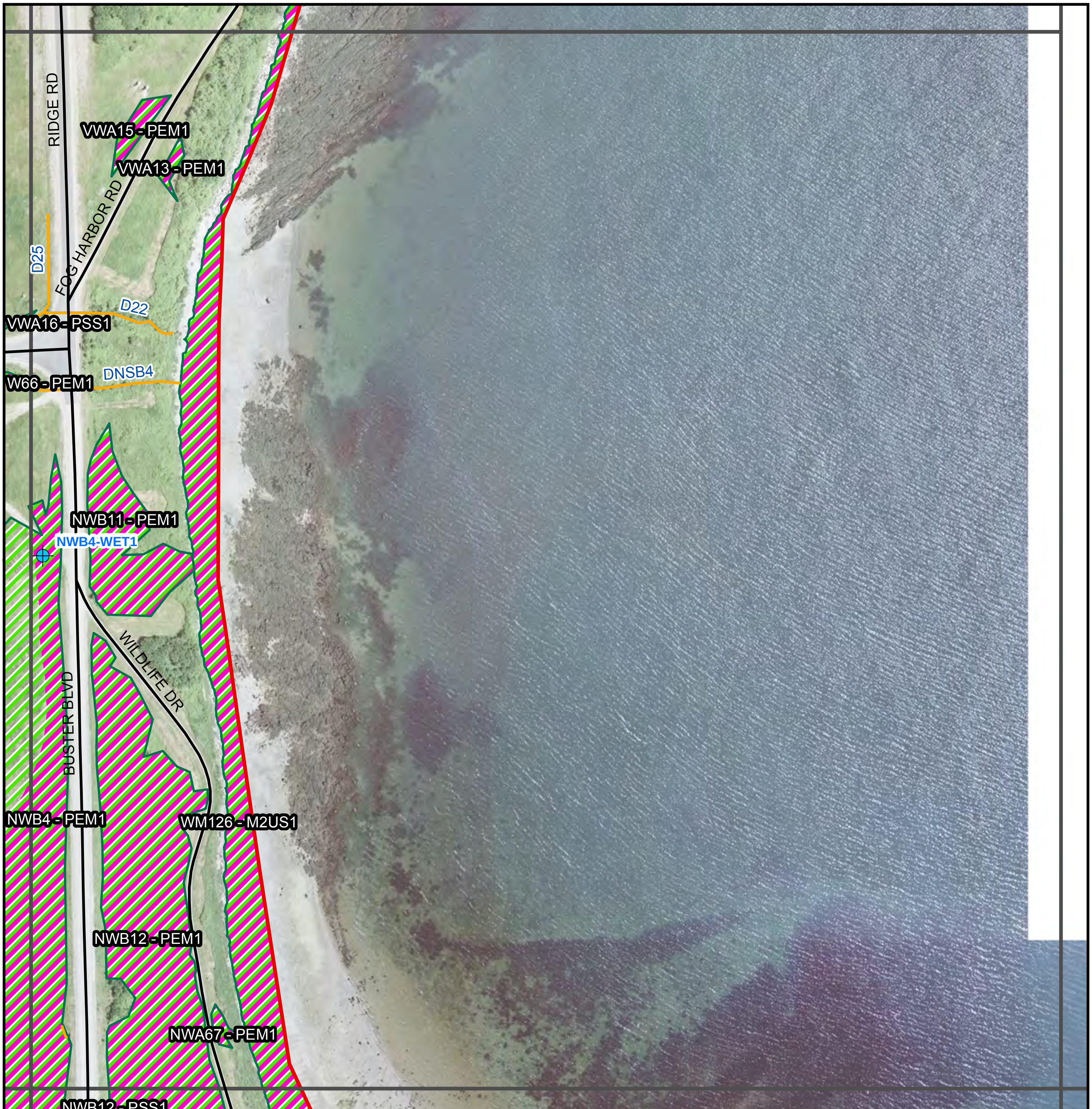
0 200 400 Feet

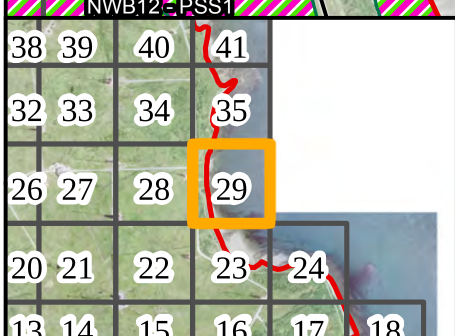
0 50 100 Meters

N

Figure 5. Sheet 28
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

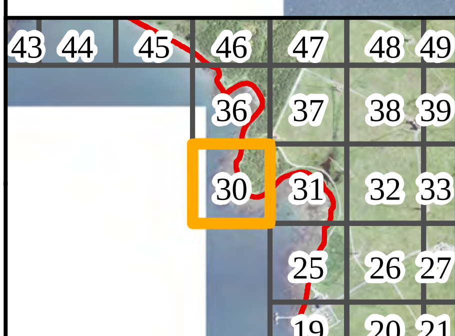
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 29 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

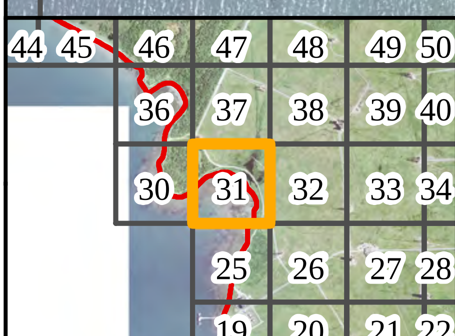
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 30
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

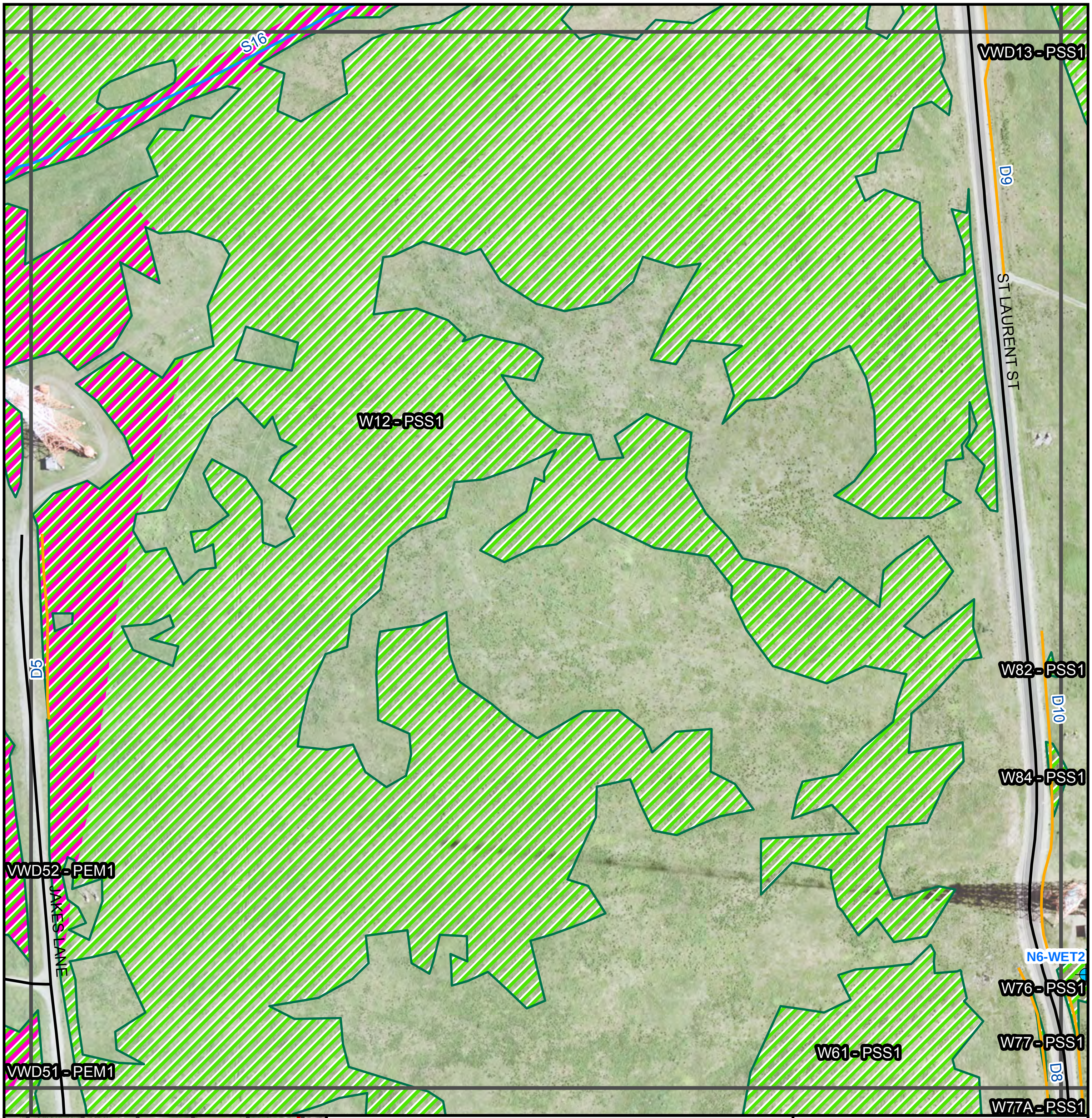
0 200 400 Feet

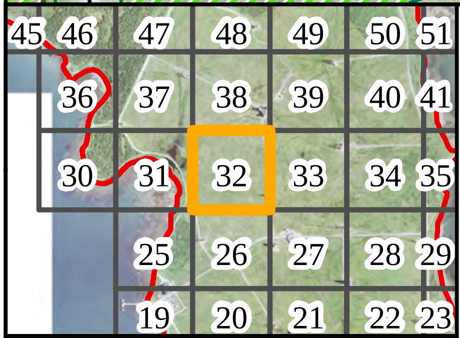
0 50 100 Meters

N

Figure 5. Sheet 31 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

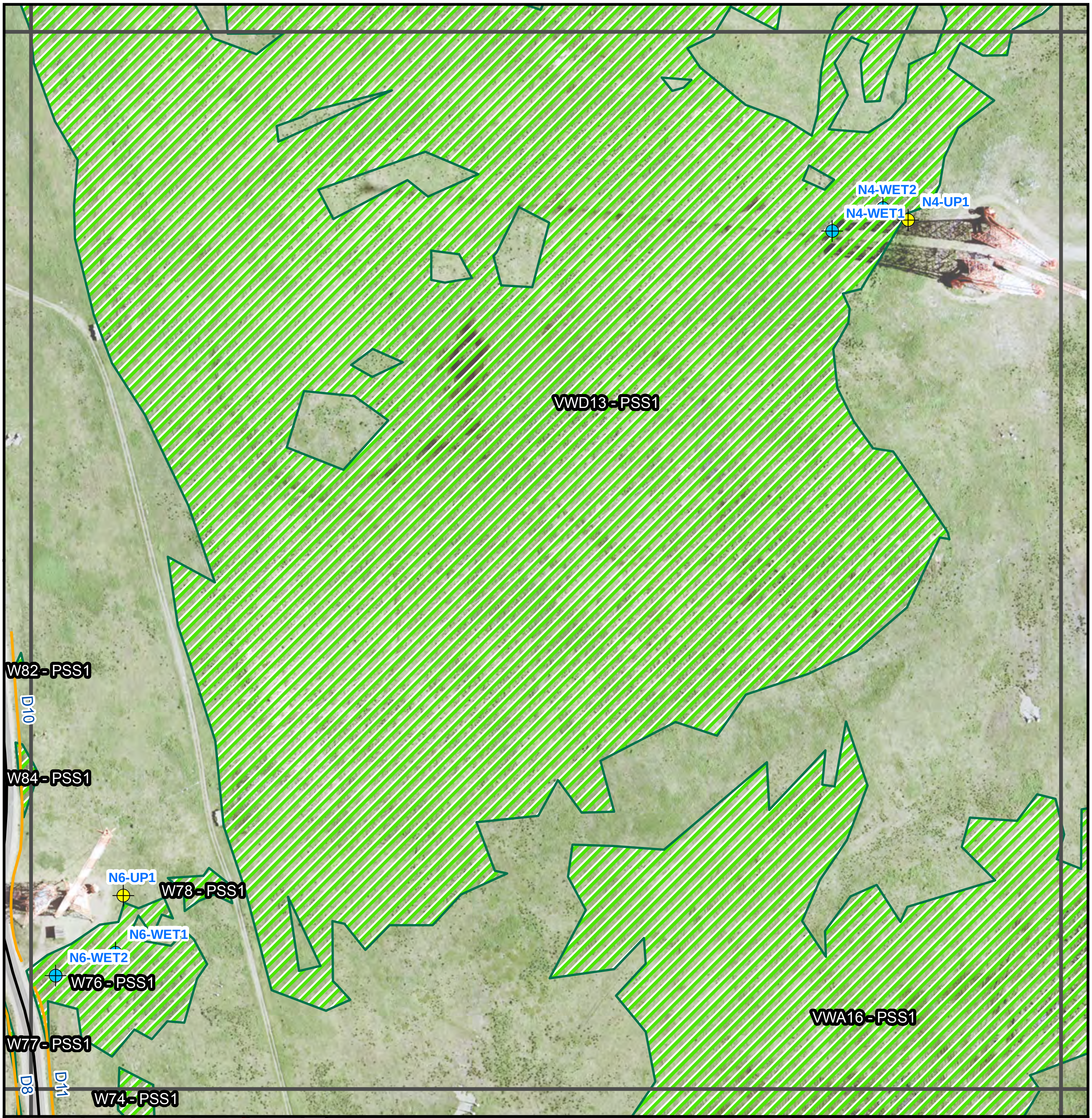
0 200 400 Feet

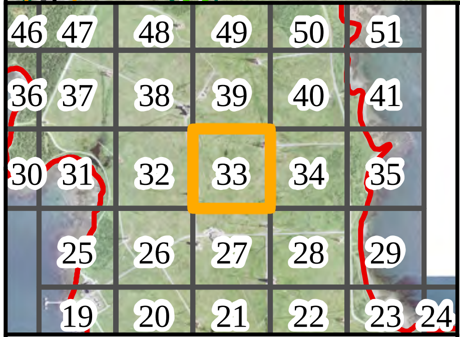
0 50 100 Meters

N

Figure 5. Sheet 32 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

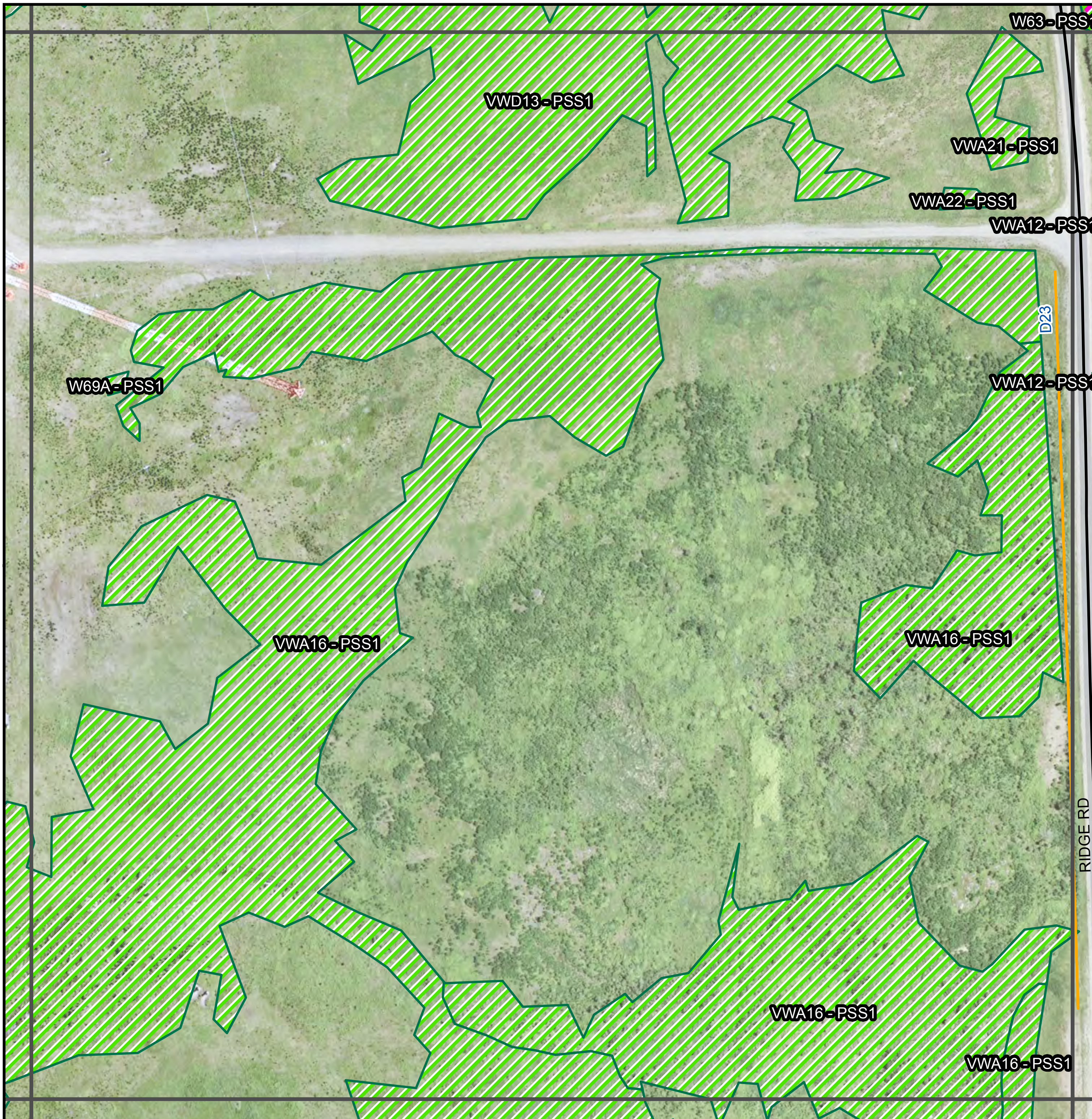
0 50 100 Meters

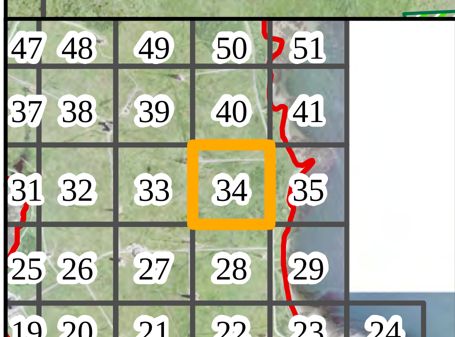
N

Figure 5. Sheet 33 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z: projects NAVFAC 2012 TASKS 100 NRS T23330 WE40 ME SERE CUTLER CUTLER GIS MXD FIGURES FINALS 2014 V102 Finals 2014 20140904 NJ FIGURES EDITS 20140918 T23330WE40 Fig5 WaterResources DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

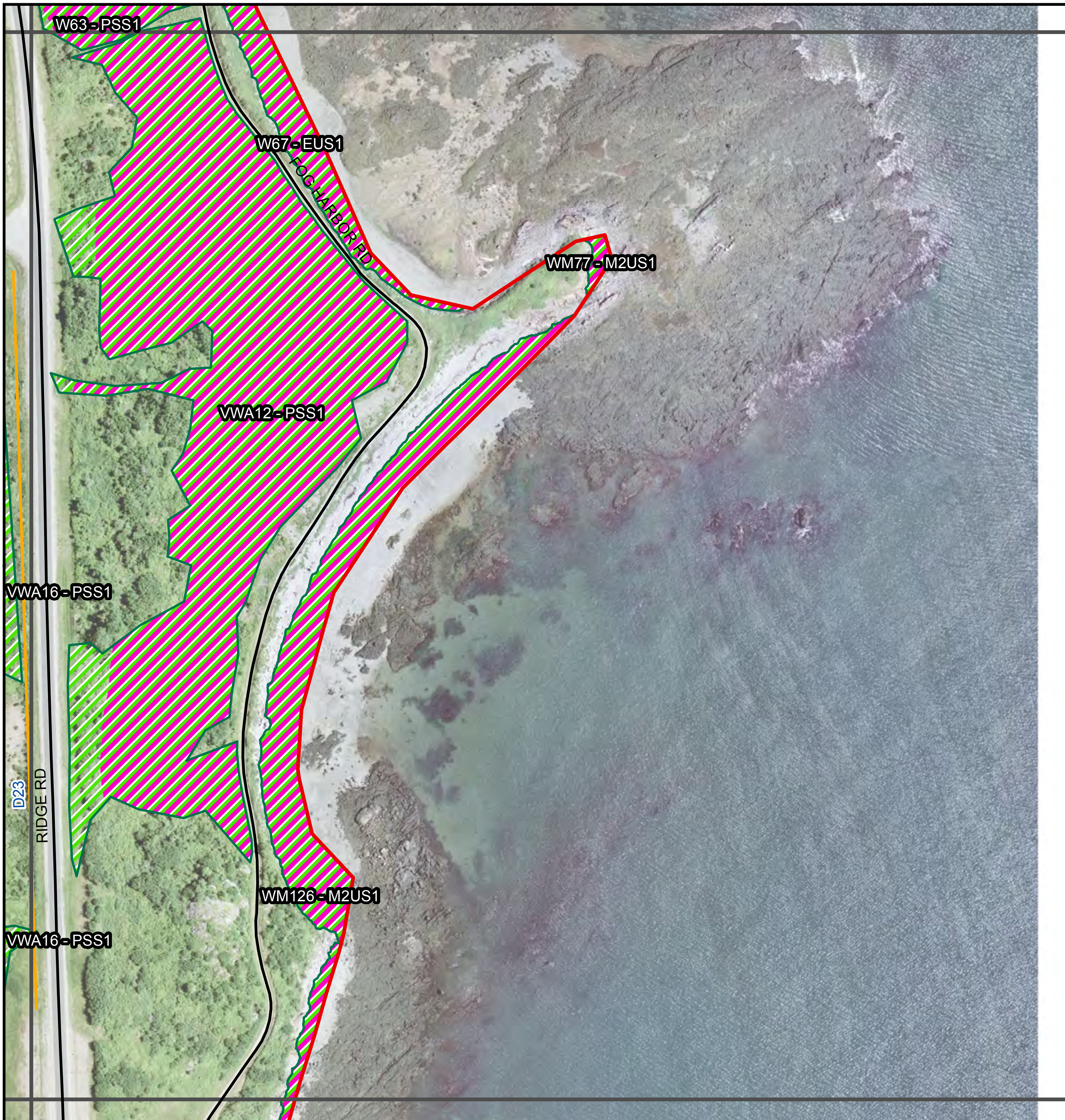
0 50 100 Meters

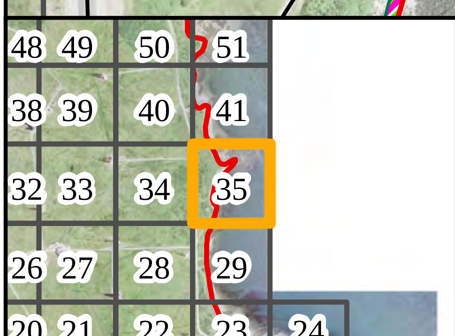
N

Figure 5. Sheet 34 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100\NRS\T23330\WE40\ME\SERE\CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS\2014\V102\Finals\2014\20140904\NJ\FIGURES\EDITS\20140918\T23330WE40\Fig5\WaterResources\DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

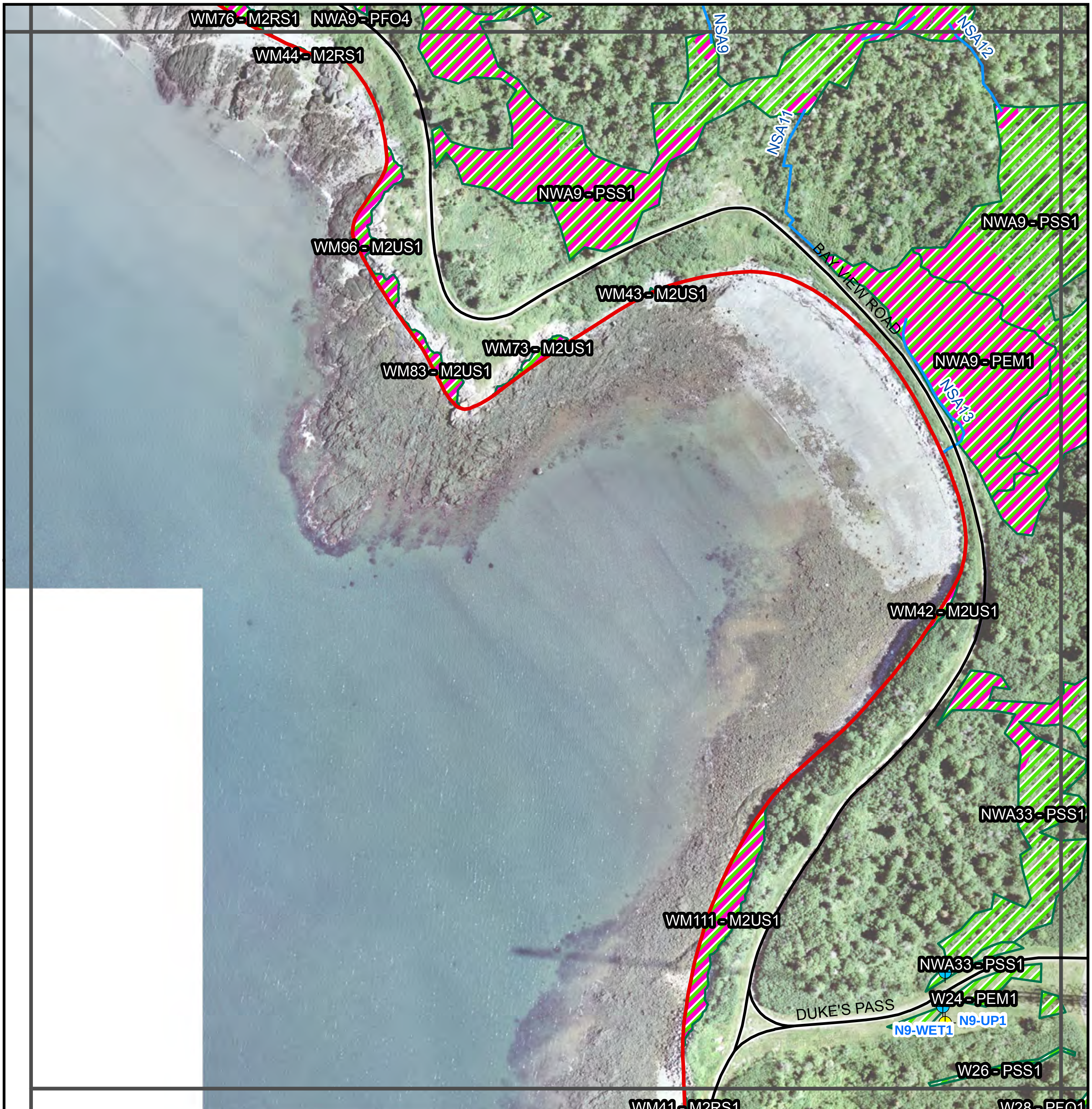
0 50 100 Meters

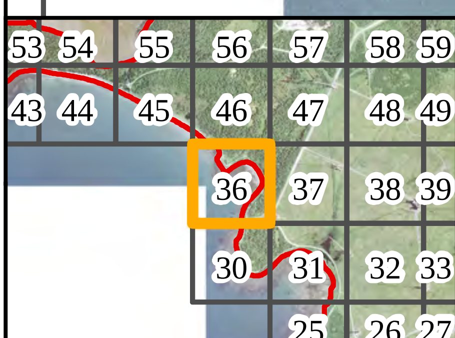
N

Figure 5. Sheet 35 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012 TASKS\100_NRS_T23330_WE40_ME_SERE_CUTLER\CUTLER GIS\MXD\FIGURES\FINALS_2014_V102 Finals_2014_20140904\NJ_FIGURES_EDITS_20140918_T23330WE40_Fig5_WaterResources_DDP.mxd





Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

Figure 5. Sheet 36 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

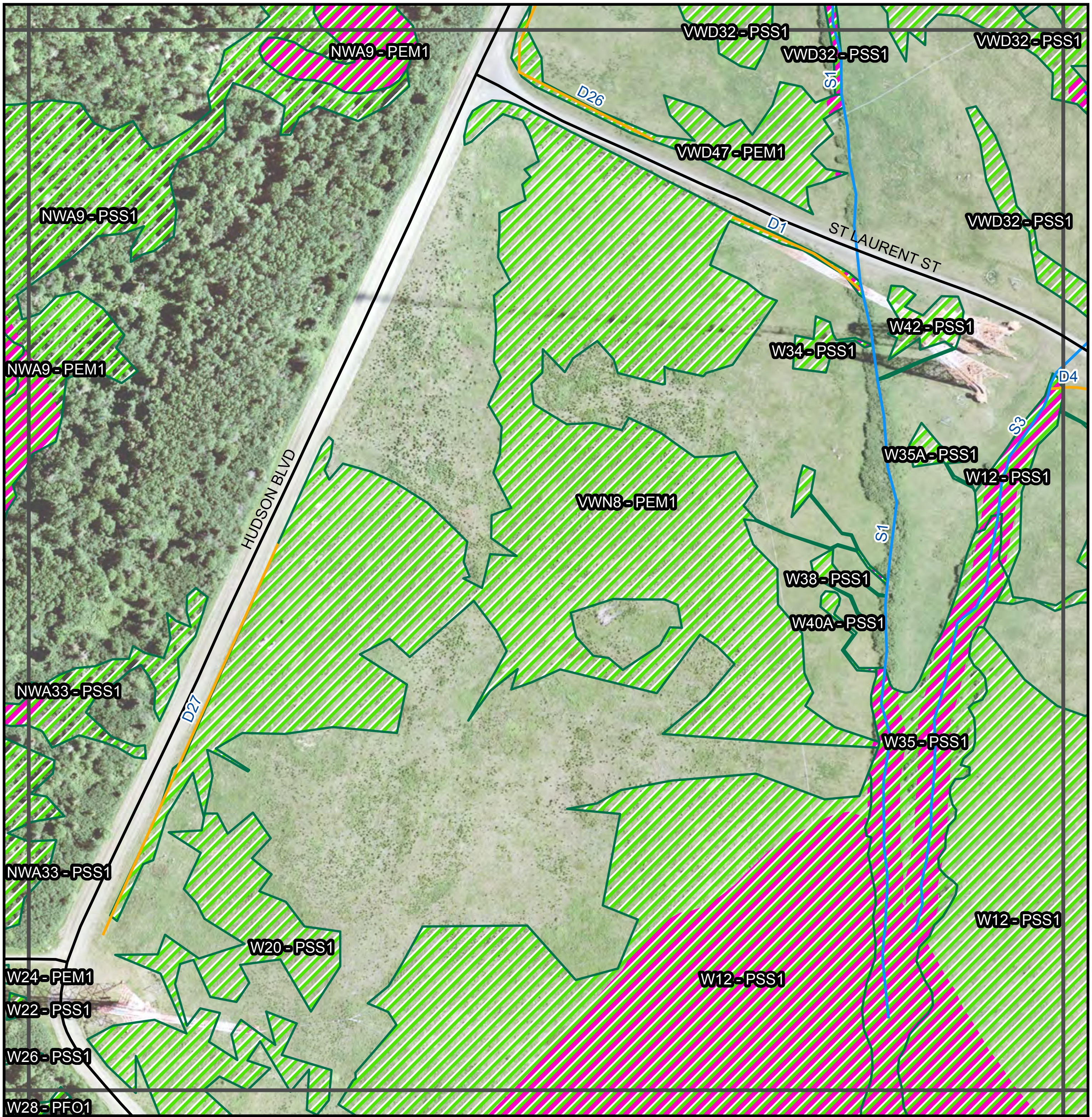
0 200 400 Feet

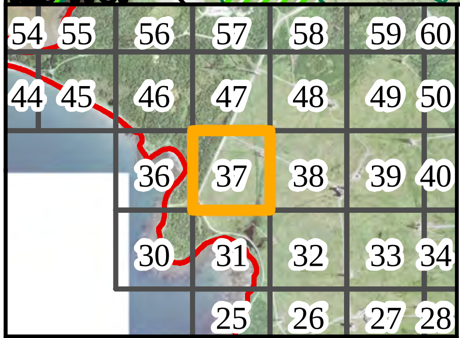
0 50 100 Meters

N

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012 TASKS\100 NRS T23330 WE40 ME SERE CUTLER\CUTLER GIS\MXD\FIGURES\FINALS 2014\V102 Finals 2014\20140904 NJ FIGURES EDITS\20140918 T23330WE40 Fig5 WaterResources DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

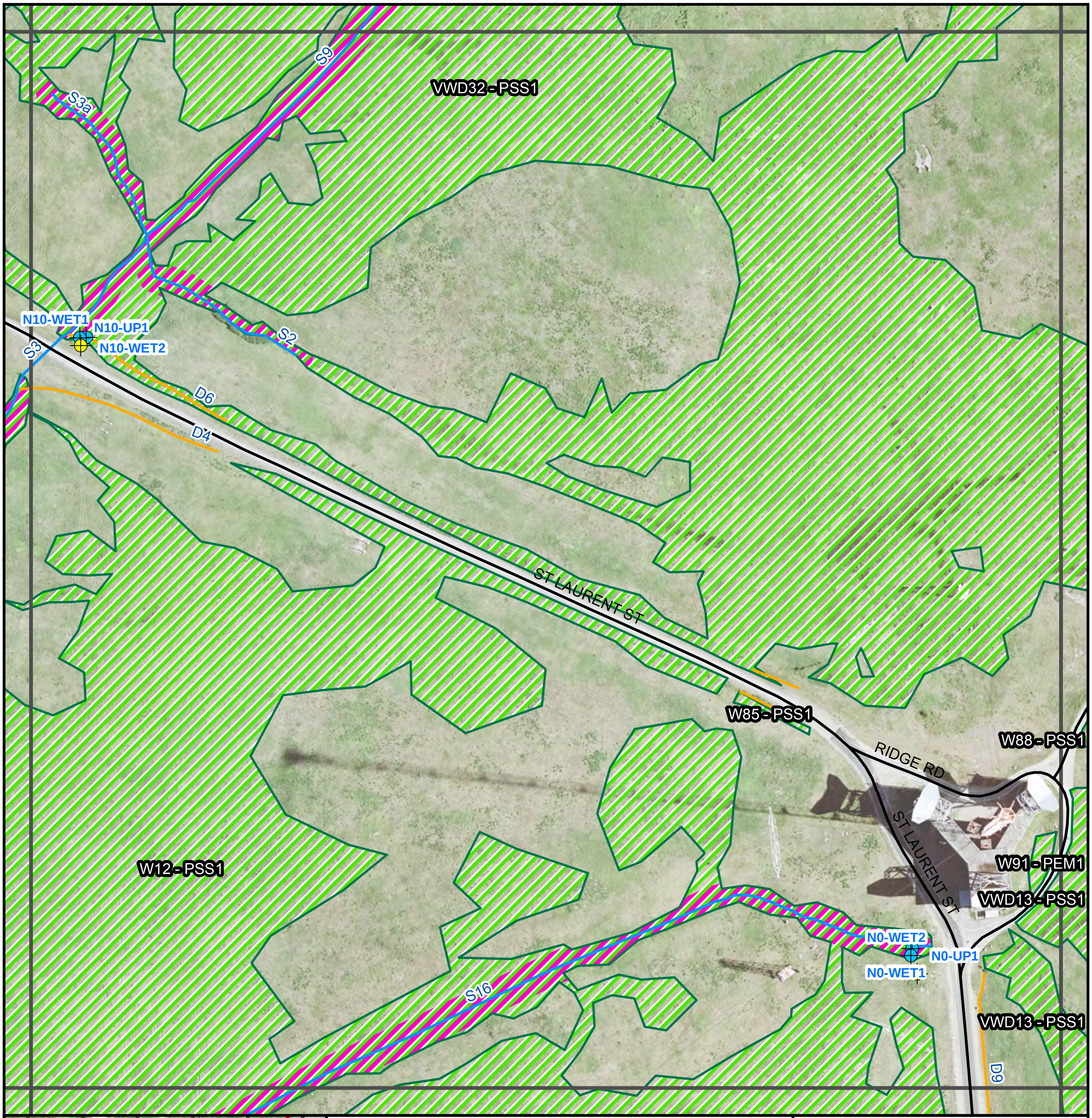
0 200 400 Feet

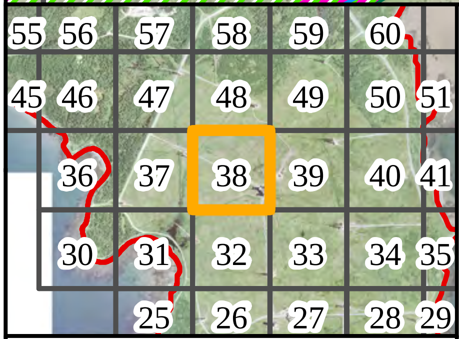
0 50 100 Meters

N

Figure 5. Sheet 37 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

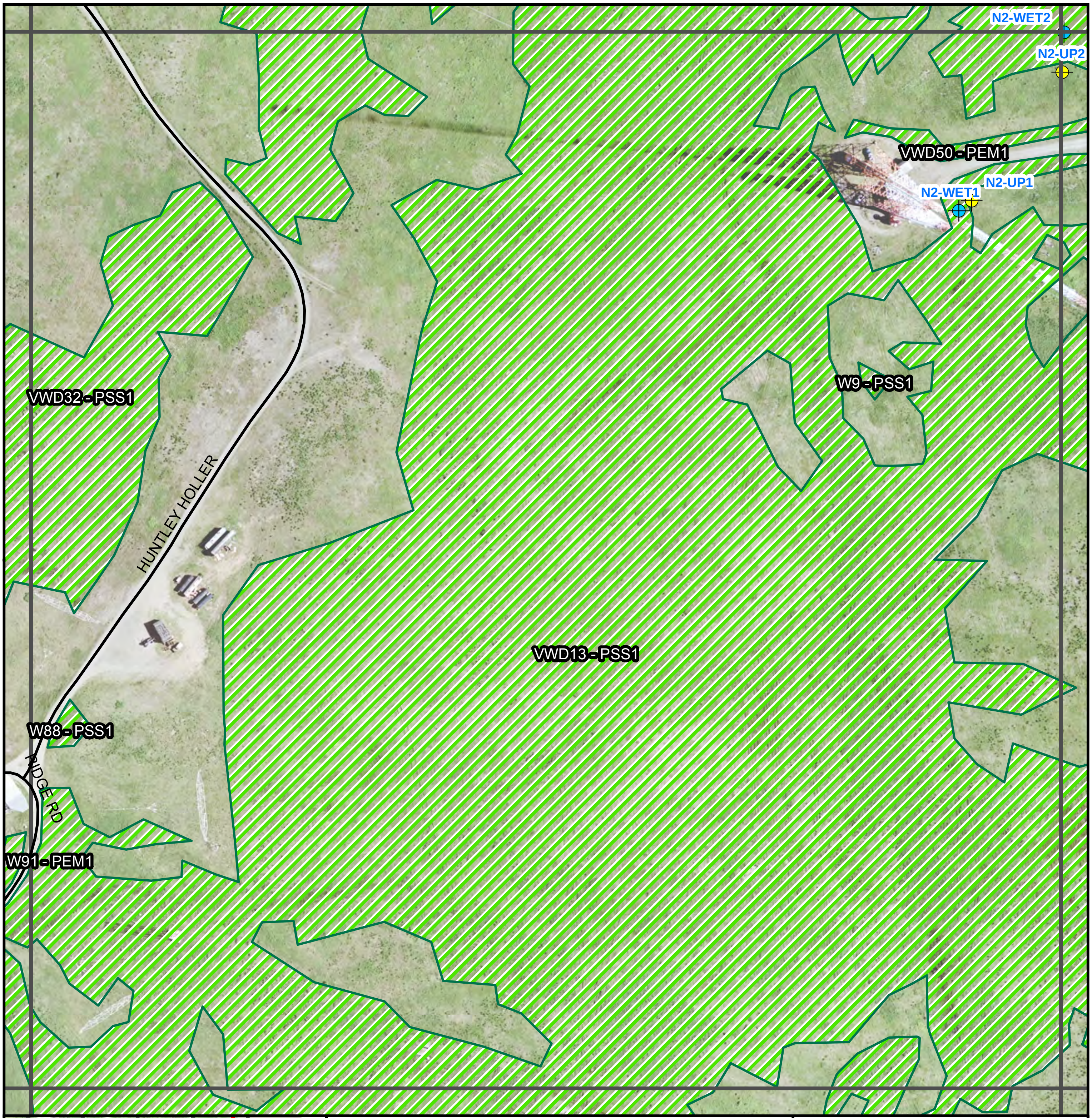
0 50 100 Meters

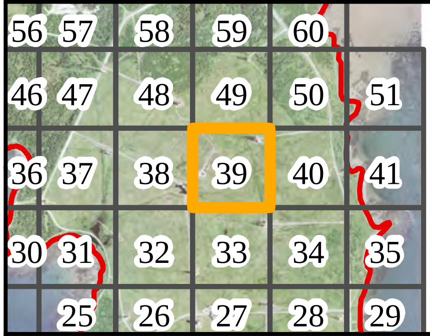
N

Figure 5. Sheet 38 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:_projects_NAVFAC_2012_TASKS_100_NRS_T23330_WE40_ME_SERE_CUTLER_CUTLER_GIS_MXD_FIGURES_FINALS_2014_V102_Finals_2014_20140904_NJ_FIGURES_EDITS_20140918_T23330WE40_Fig5_WaterResources_DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

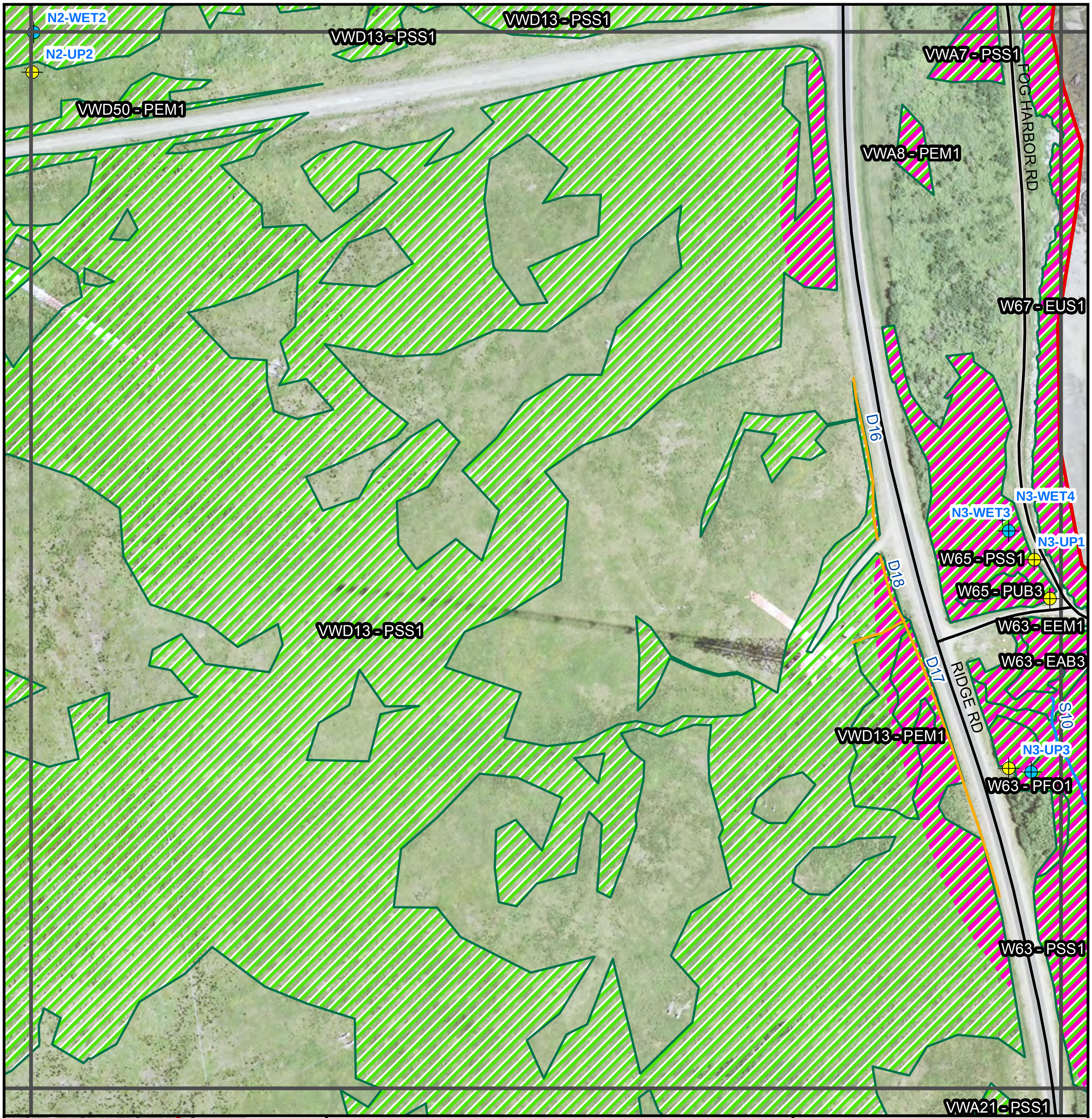
0 200 400 Feet

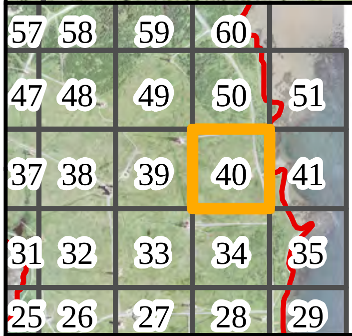
0 50 100 Meters

Figure 5. Sheet 39 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100\NRS\T23330\WE40\ME\SERE\CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS\2014\V102\Finals\2014\20140904\NJ\FIGURES\EDITS\20140918\T23330WE40\Fig5\WaterResources\DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

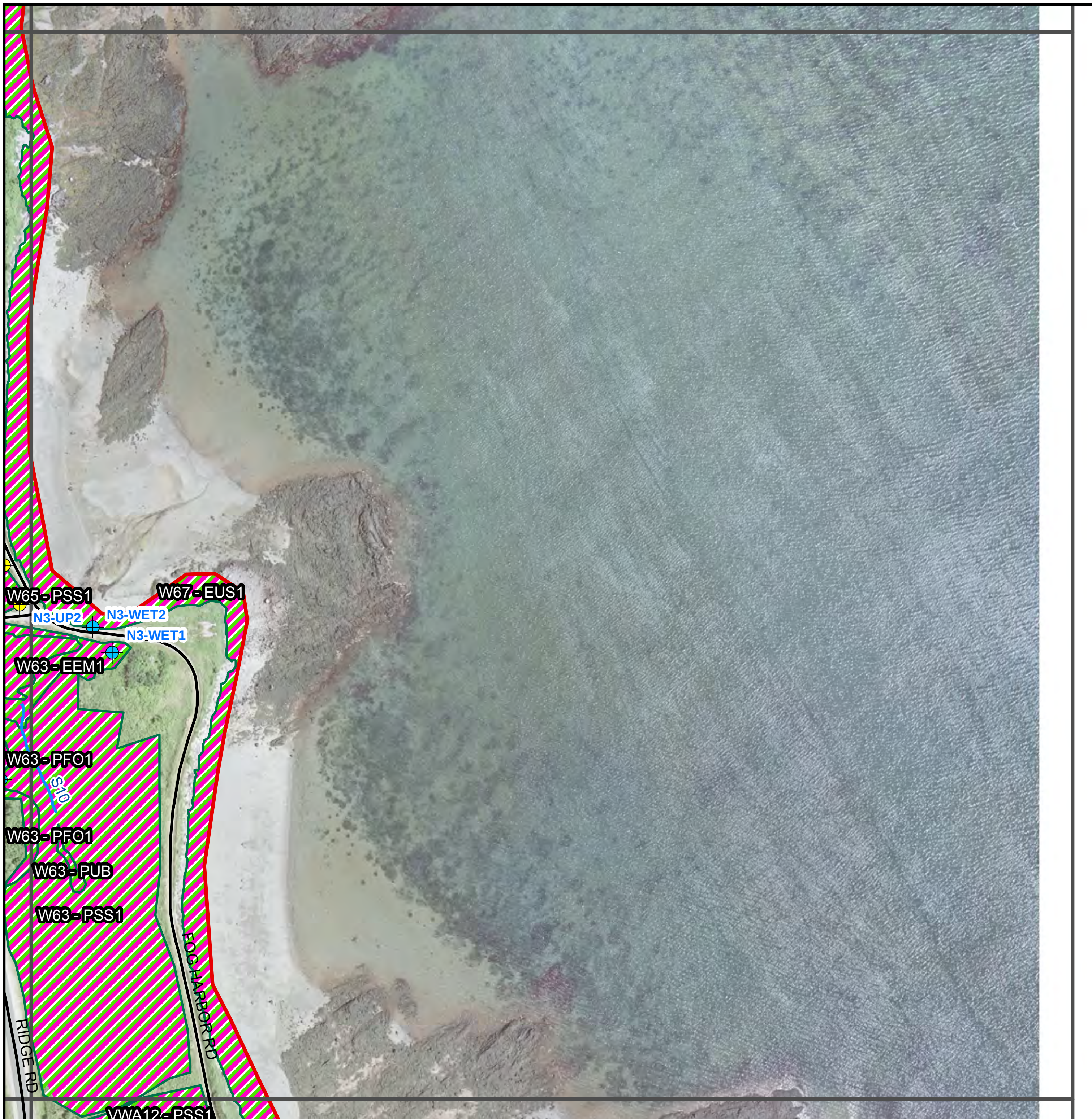
0 200 400 Feet

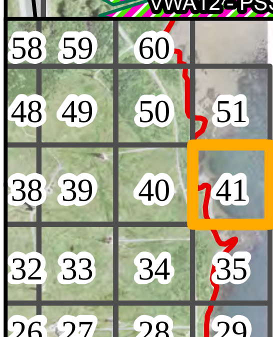
0 50 100 Meters

N

Figure 5. Sheet 40
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

Figure 5. Sheet 41 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

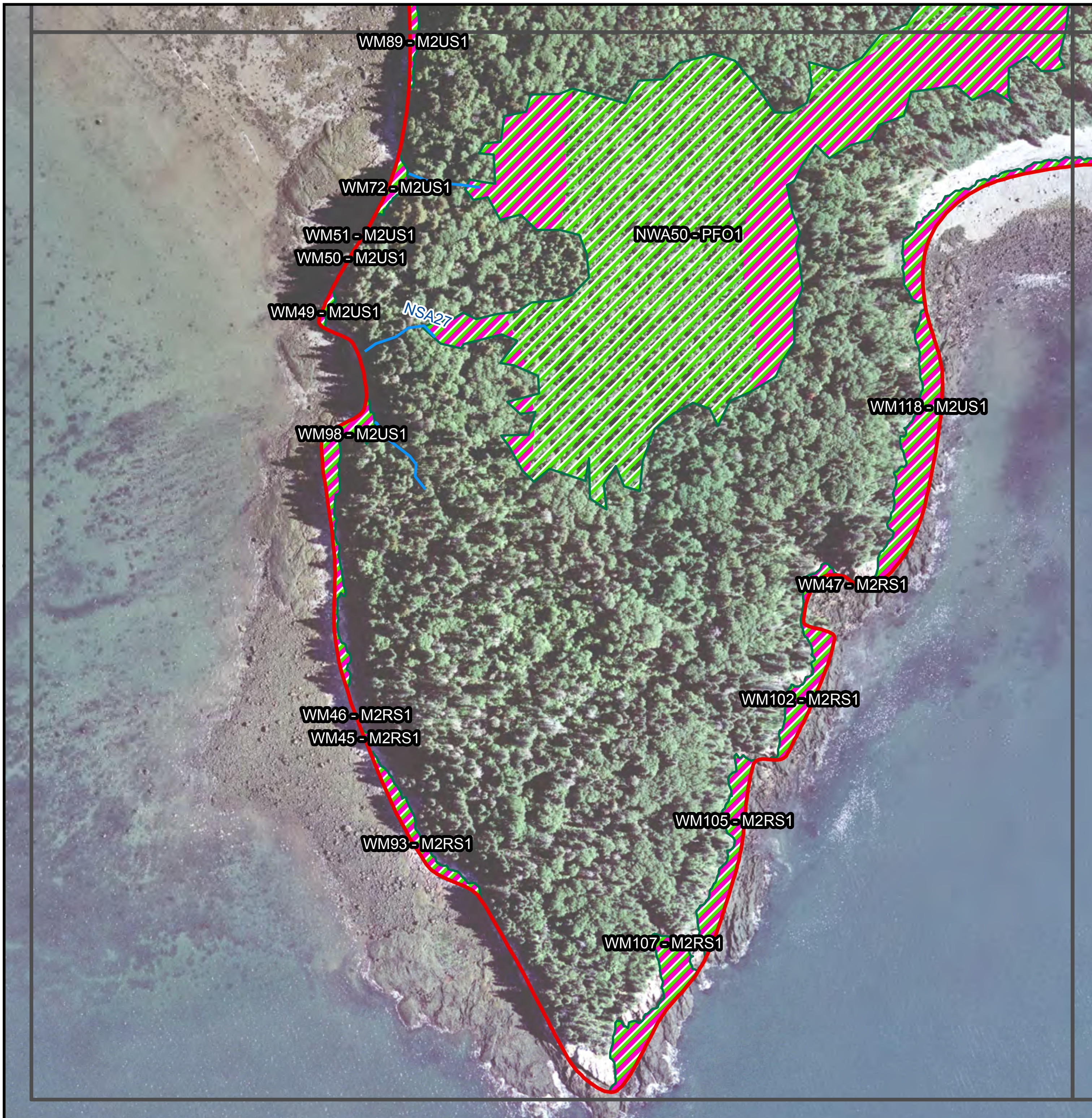
Coordinate System: WGS 84
UTM, Zone 19, North, Meters

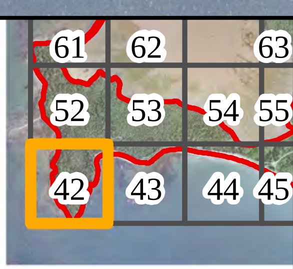
0 200 400 Feet
0 50 100 Meters

N

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100\NRS\T23330\WE40\ME\SERE\CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS\2014\V102\Finals\2014\20140904\NJ\FIGURES\EDITS\20140918\T23330WE40\Fig5\WaterResources\DDP.mxd





Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

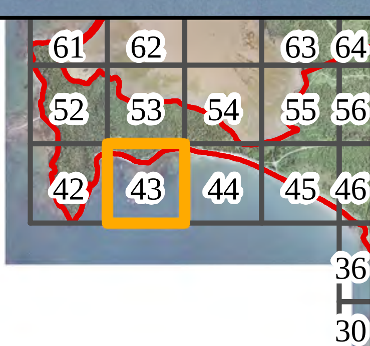
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 42 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

Figure 5. Sheet 43 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

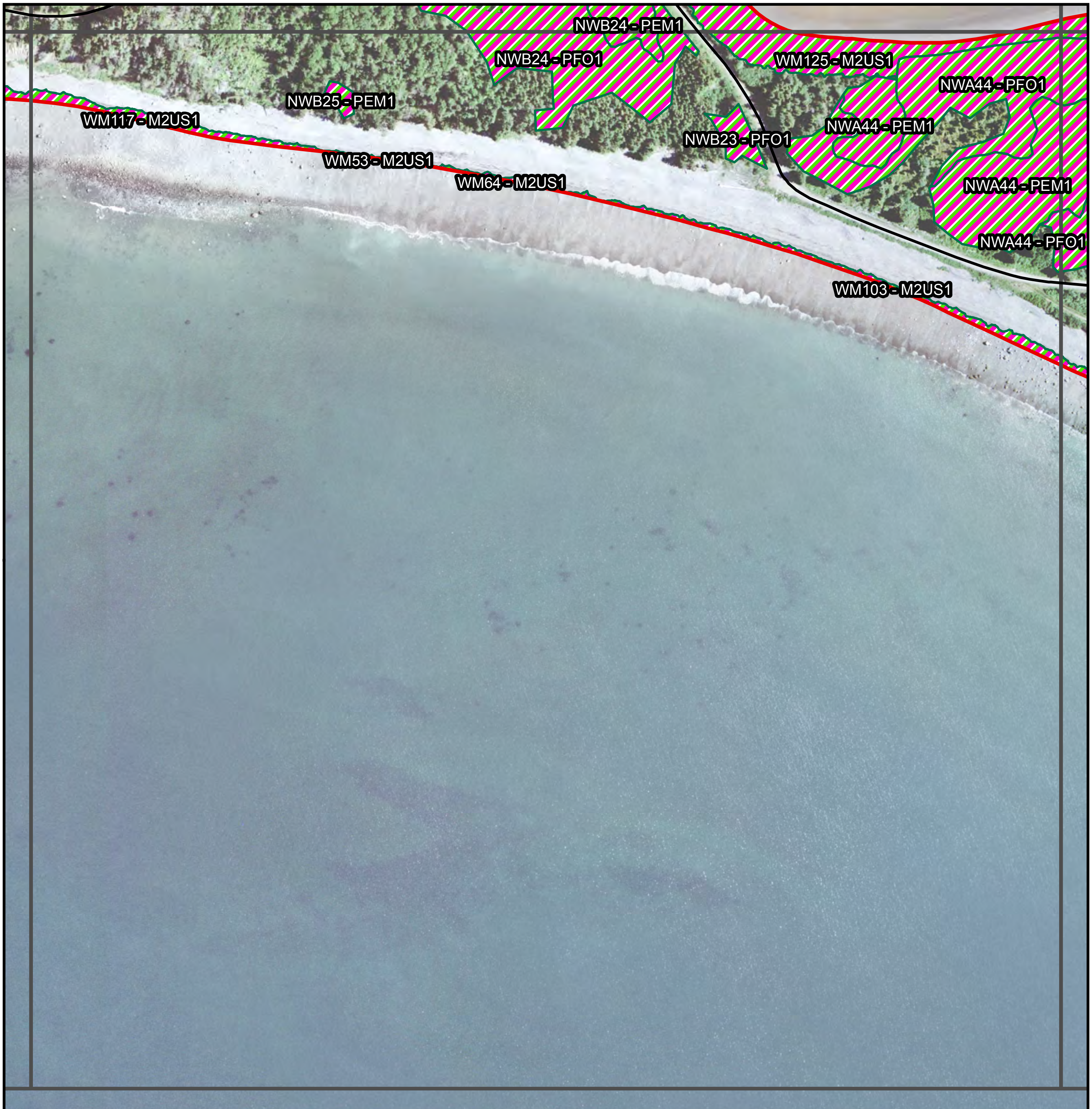
Coordinate System: WGS 84
UTM, Zone 19, North, Meters

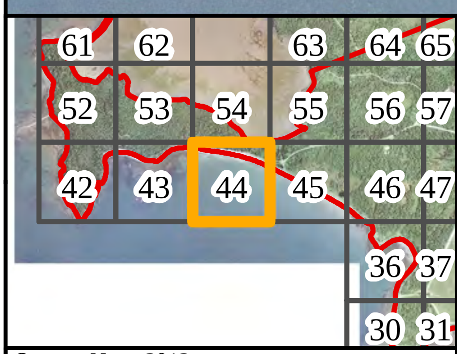
0 200 400 Feet

0 50 100 Meters

N

Date:
09/2014





Legend

Installation/ Delineation Area		Wetlands	
Roads		Wetlands of Special Significance	
Streams (Tetra Tech)		Wetland Plots	
Ditches (Tetra Tech)		Upland Plots	

0 200 400 Feet

0 50 100 Meters

N

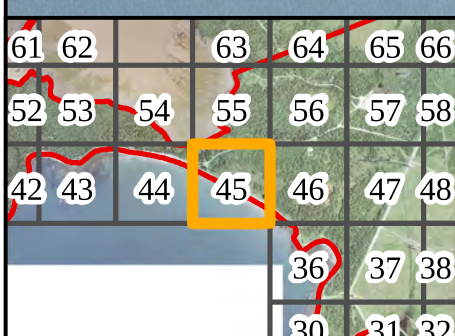
Figure 5. Sheet 44
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100_NRS\T23330_WE40_ME_SERE_CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS_2014_V102\Finals_2014_20140904\NJ_FIGURES_EDITS_20140918\T23330WE40_Fig5_WaterResources_DDP.mxd



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/
Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands
of Special
Significance

Wetland Plots

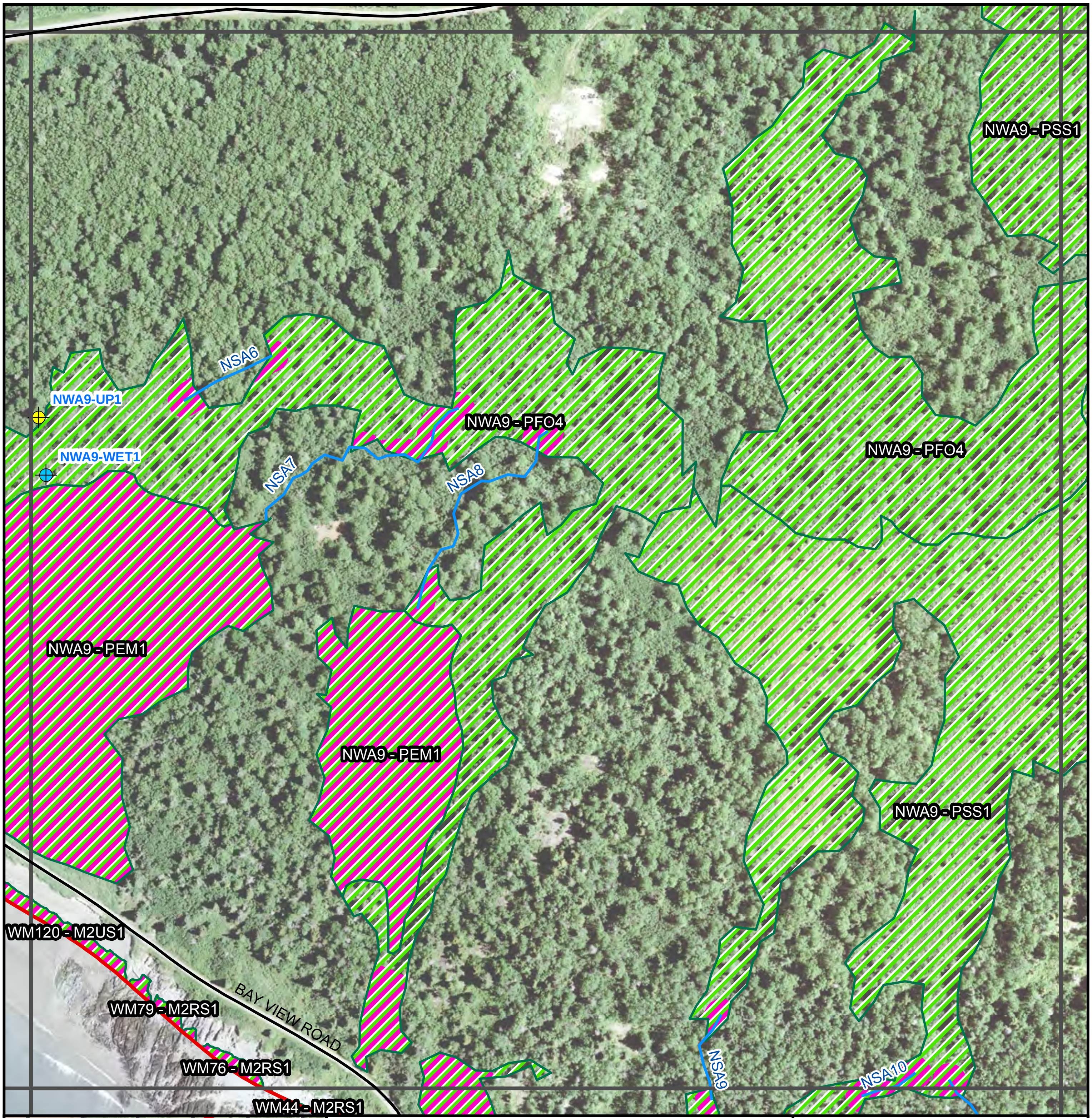
Upland Plots

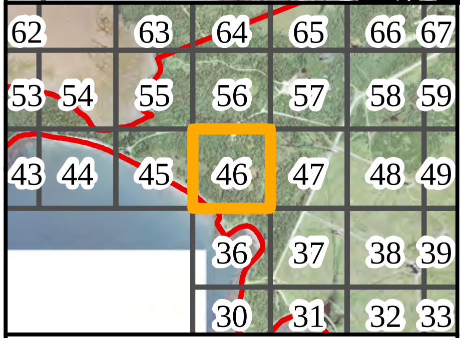
0 200 400 Feet

0 50 100 Meters

Figure 5. Sheet 45
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

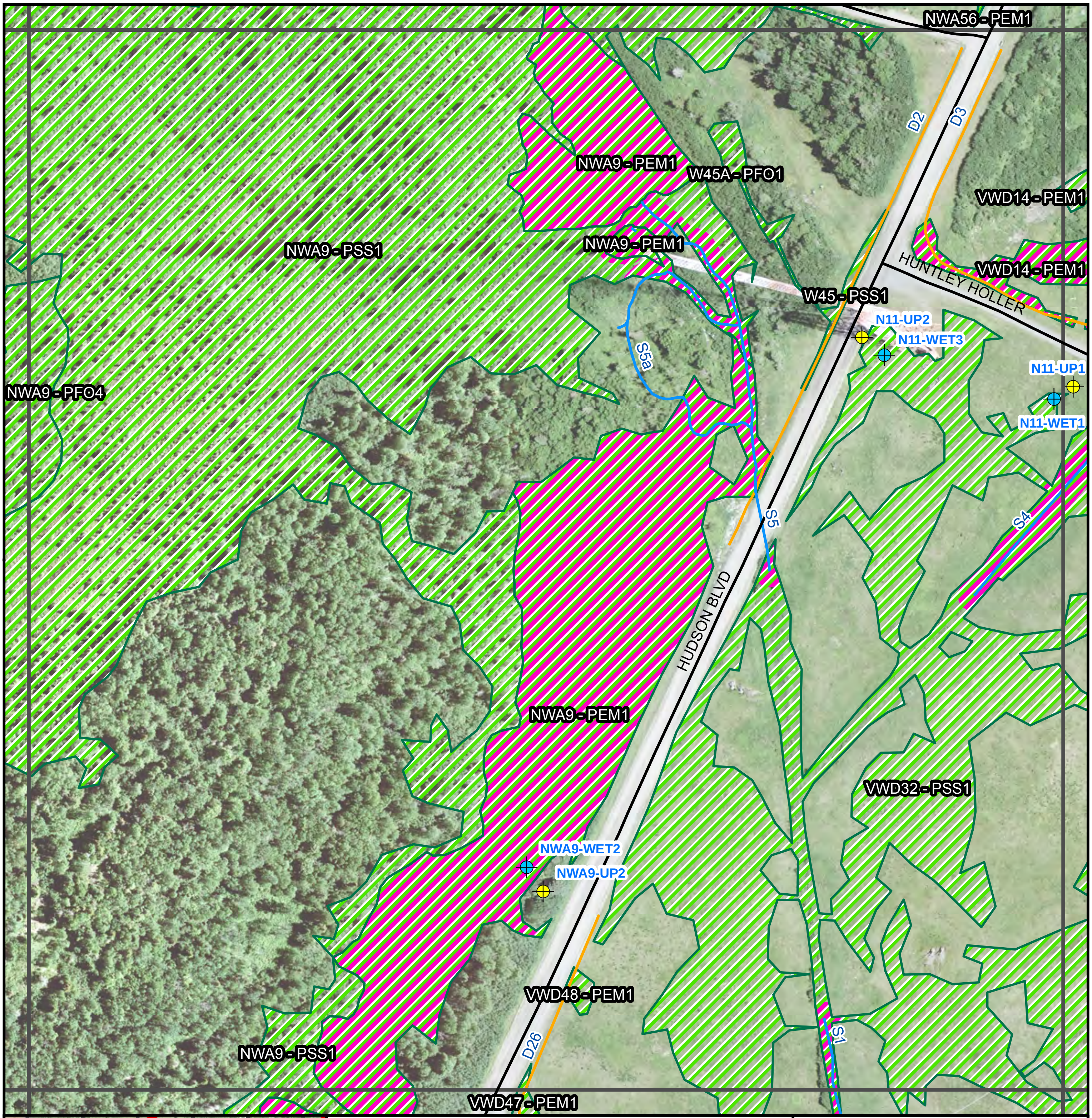
0 200 400 Feet

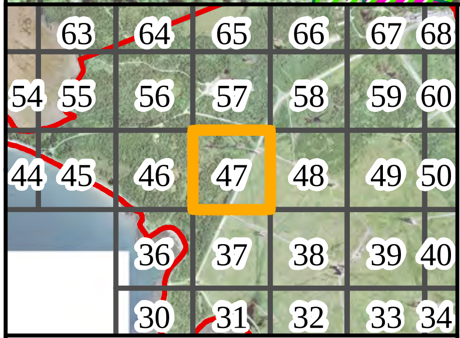
0 50 100 Meters

N

Figure 5. Sheet 46 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

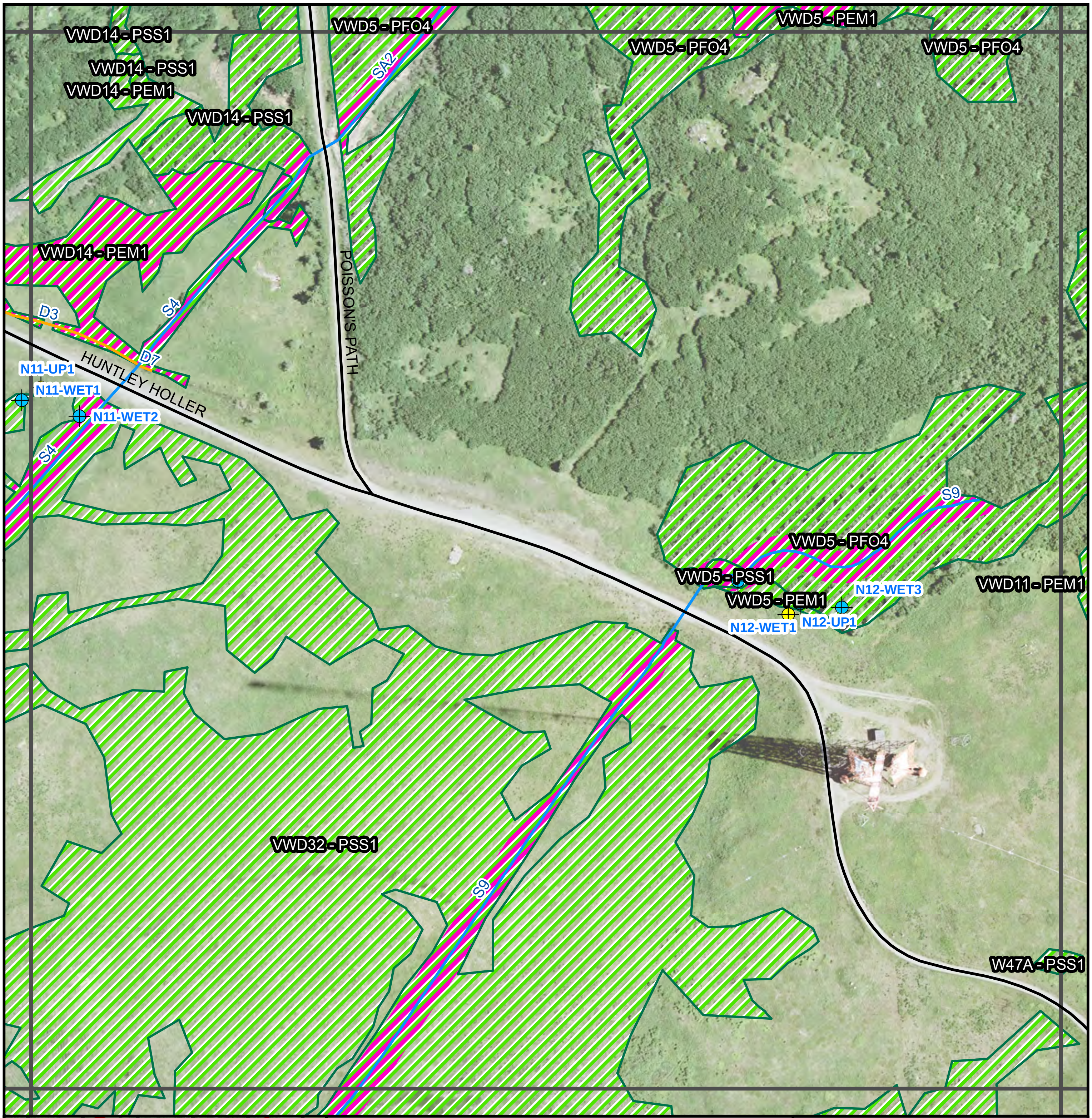
0 50 100 Meters

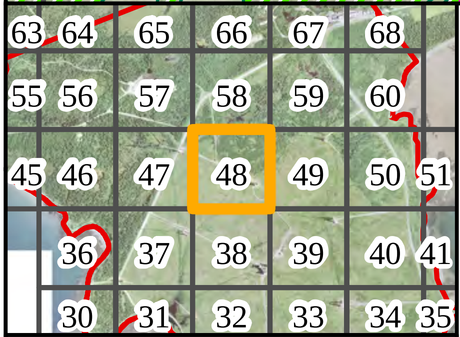
N

**Figure 5. Sheet 47
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.**

Date:
09/2014

Document Path: Z:_projects NAVFAC 2012 TASKS 100 NRS T23330 WE40 ME SERE CUTLER CUTLER GIS MXD FIGURES FINALS 2014 V102 Finals 2014 20140904 NJ FIGURES EDITS 20140918 T23330WE40 Fig5 WaterResources DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

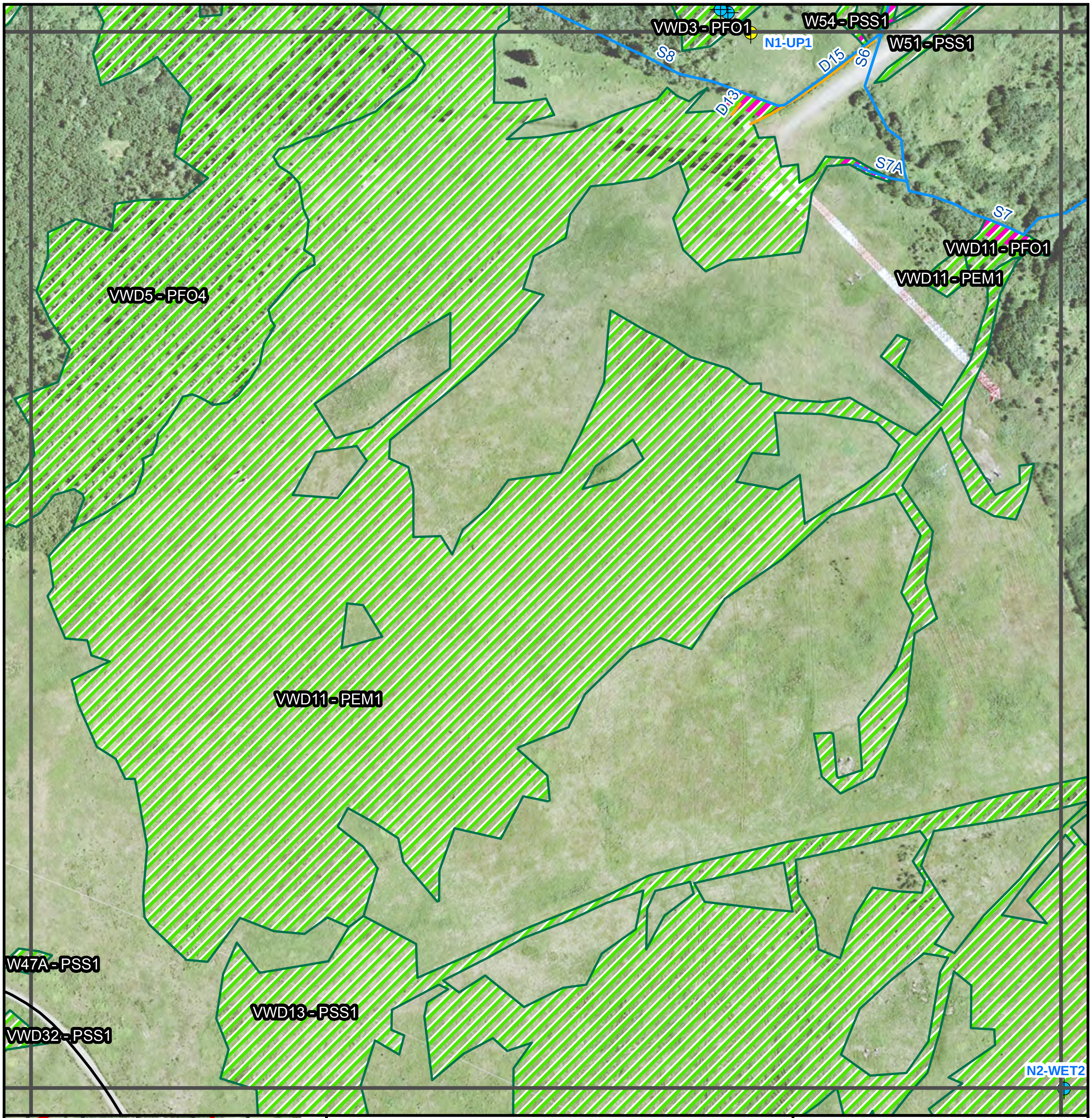
0 50 100 Meters

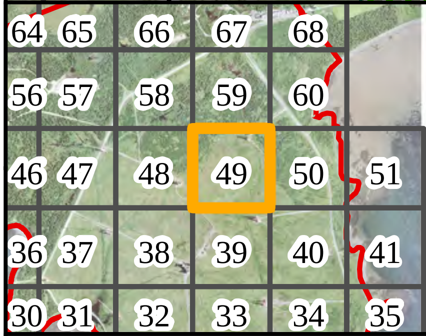
N

Figure 5. Sheet 48 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100_NRS\T23330_WE40_ME_SERE_CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS_2014_V102\Finals_2014_20140904\NJ_FIGURES_EDITS_20140918\T23330WE40_Fig5_WaterResources_DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

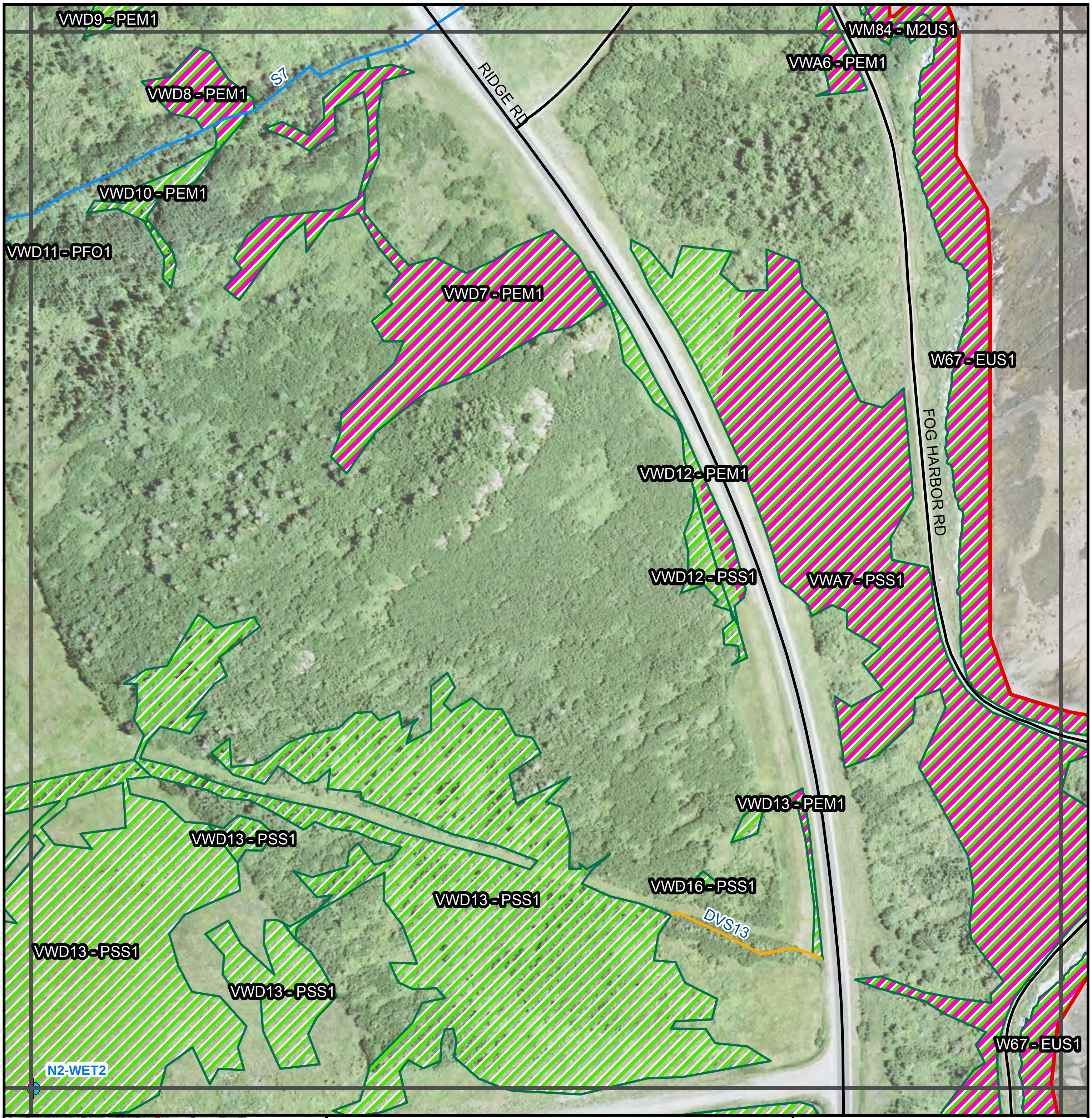
0 200 400 Feet

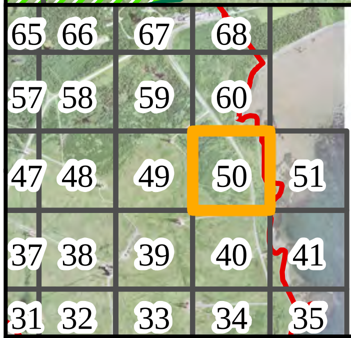
0 50 100 Meters

N

Figure 5. Sheet 49
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

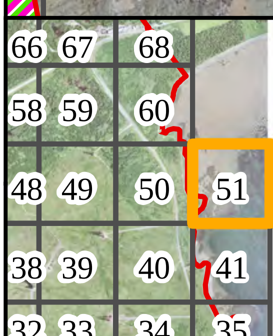
0 50 100 Meters

N

Figure 5. Sheet 50
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:_projects NAVFAC 2012 TASKS 100 NRS T23330 WE40 ME SERE CUTLER CUTLER GIS MXD FIGURES FINALS 2014 V102 Finals 2014 20140904 NJ FIGURES EDITS 20140918 T23330WE40 Fig5 WaterResources DDP.mxd



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

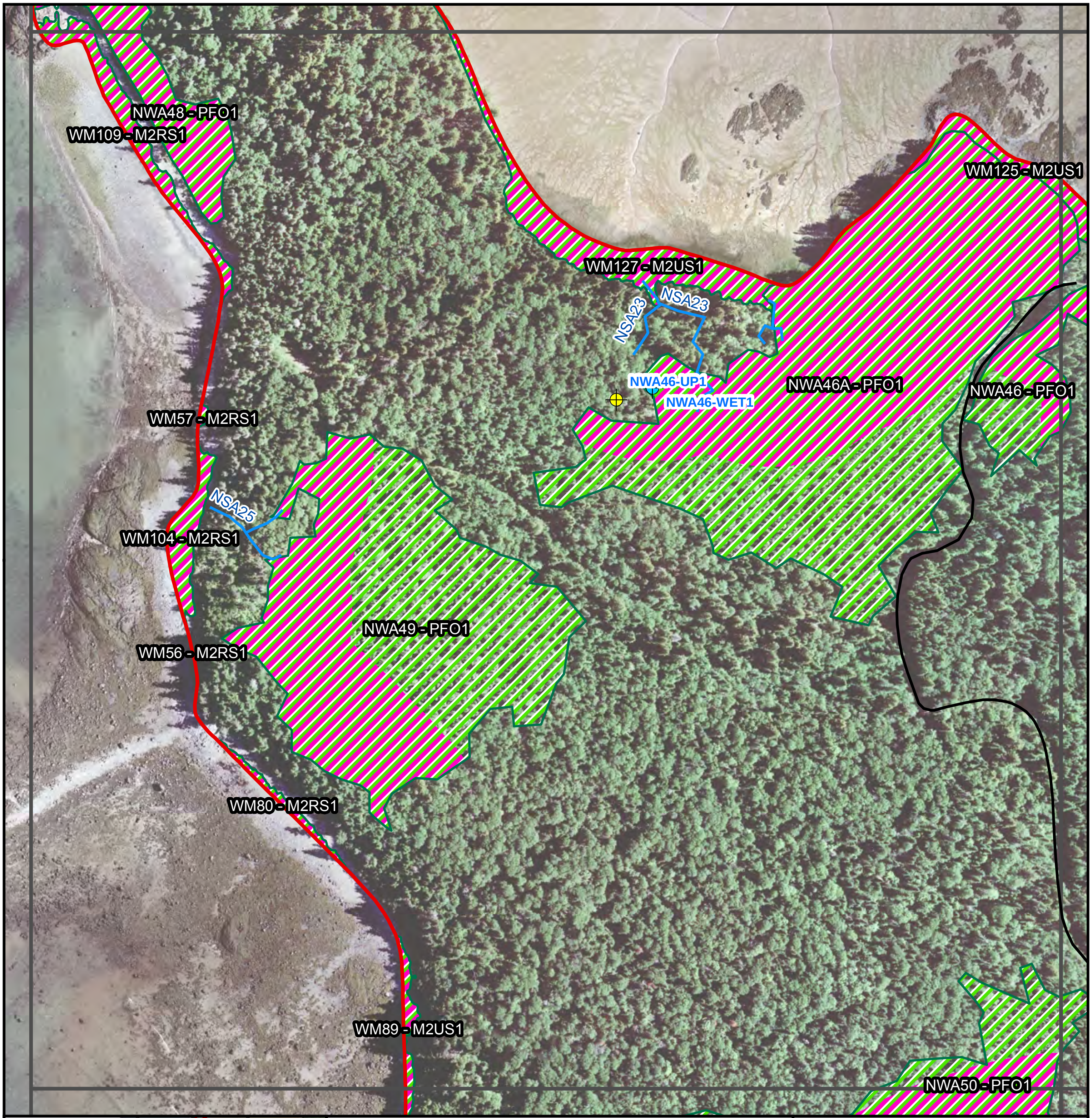
0 200 400 Feet

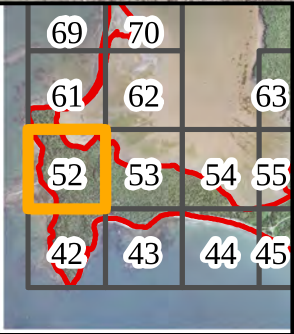
0 50 100 Meters

N

Figure 5. Sheet 51 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

0 50 100 Meters

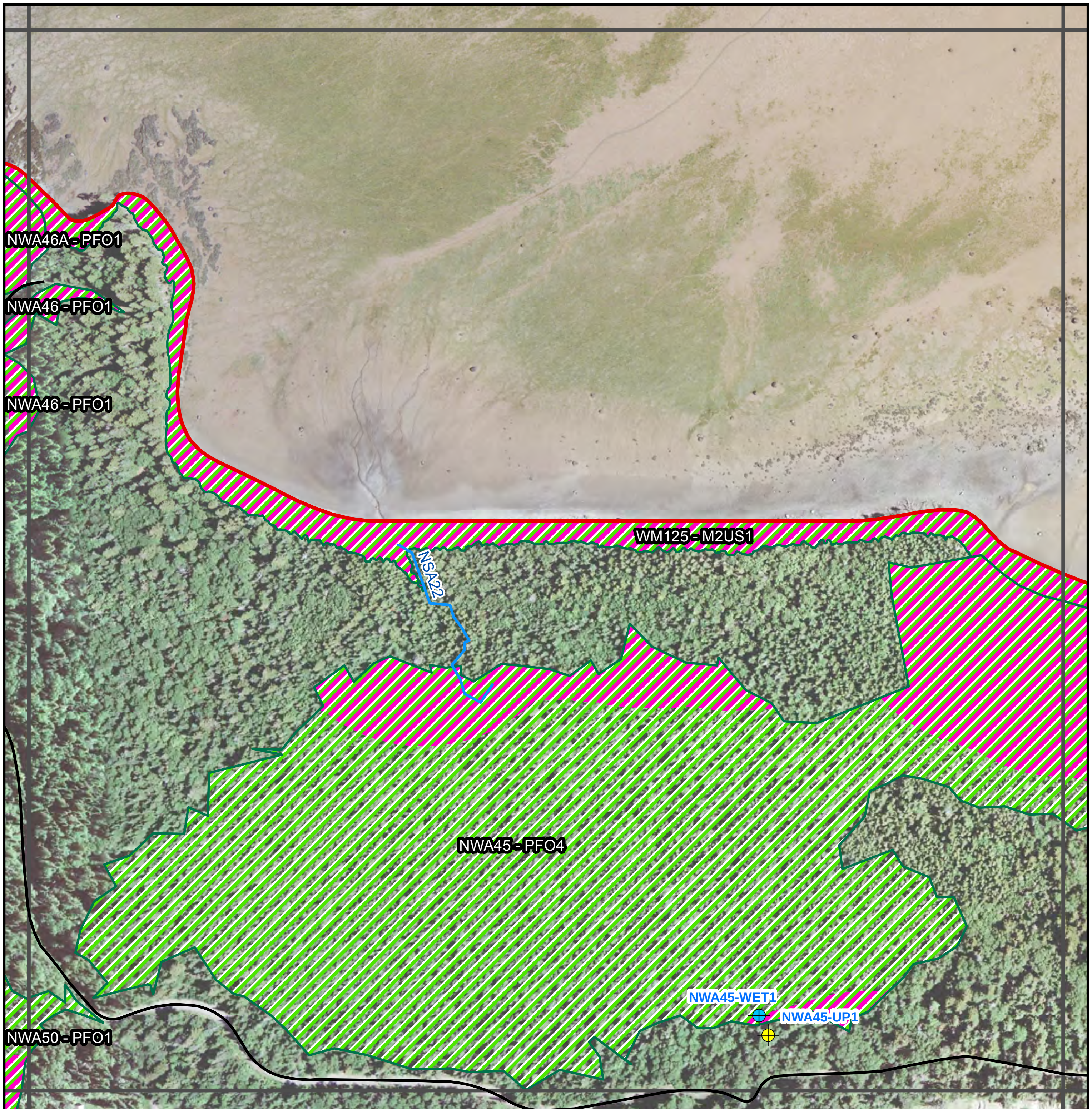
N

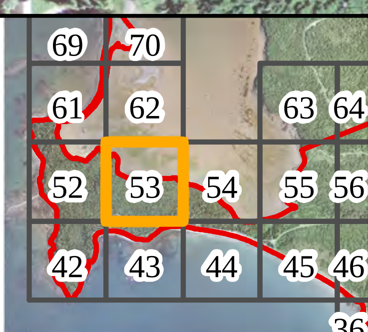
Figure 5. Sheet 52 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

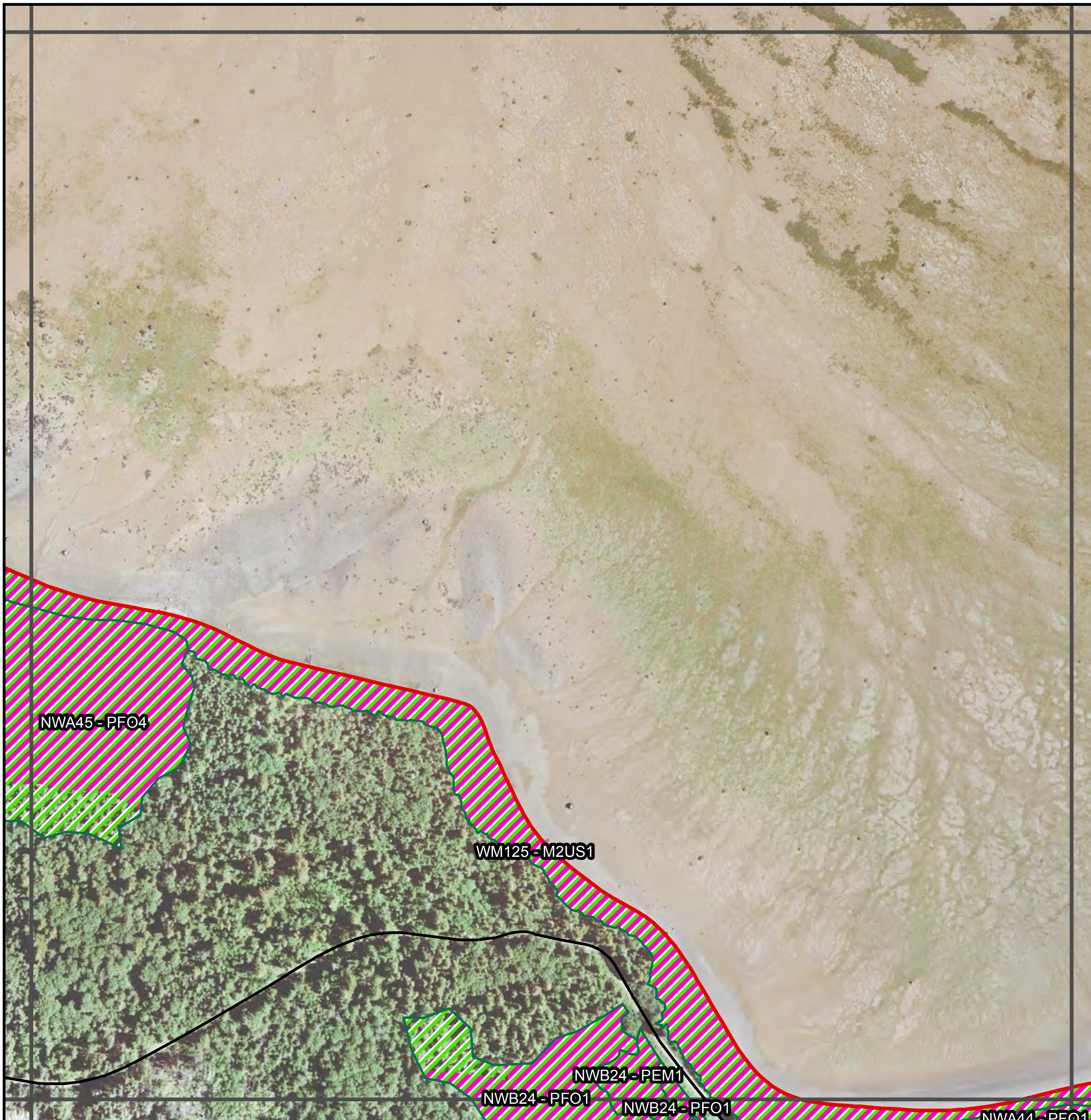
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 53 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

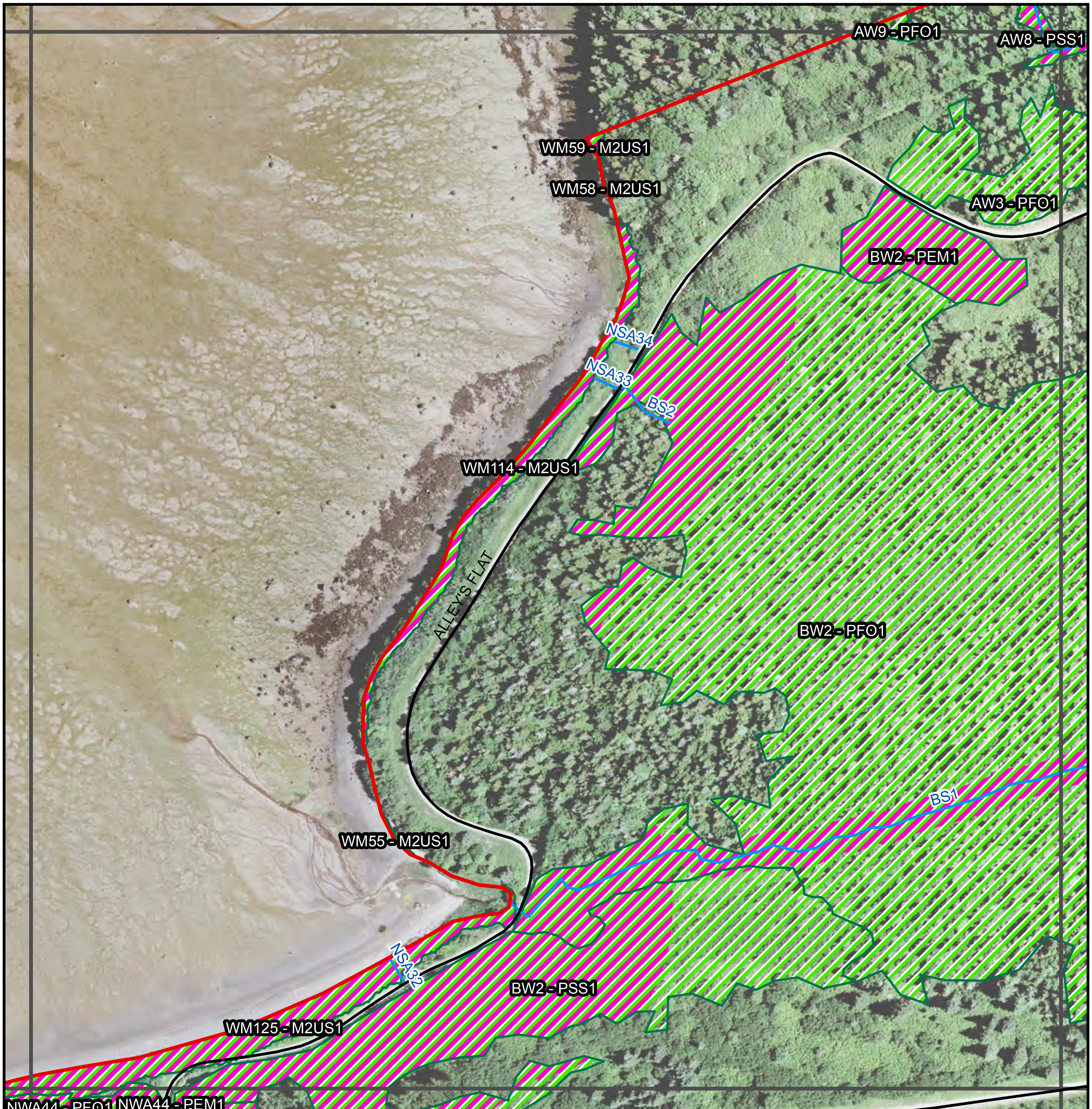
0 50 100 Meters

N

Figure 5. Sheet 54 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100\NRS\T23330\WE40\ME\SERE\CUTLER\GIS\MXD\FIGURES\FINALS\2014\V102\Finals\2014\20140904\NJ\FIGURES\EDITS\20140918\T23330WE40_Fig5_WaterResources_DDP.mxd



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

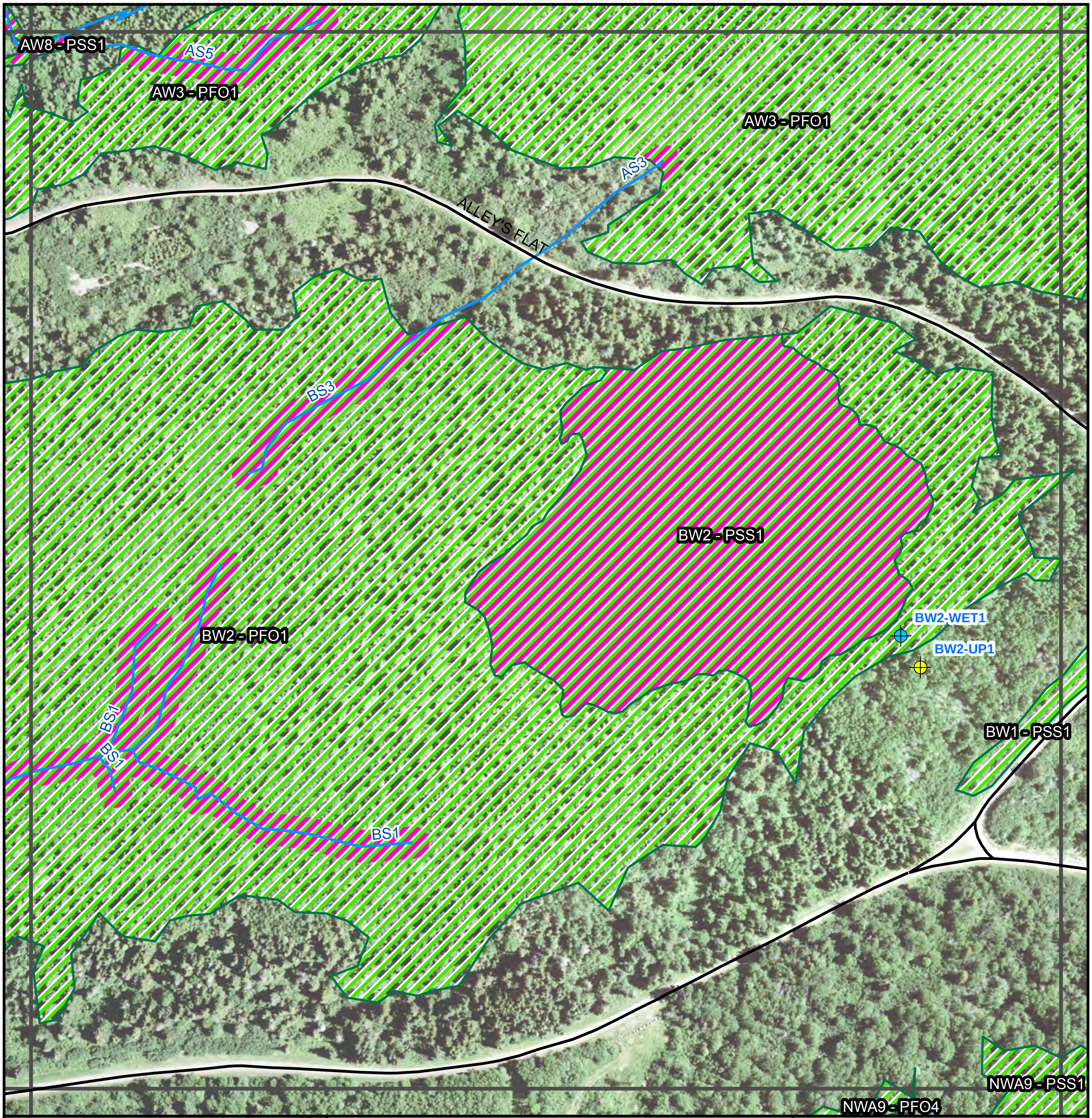
0 200 400 Feet

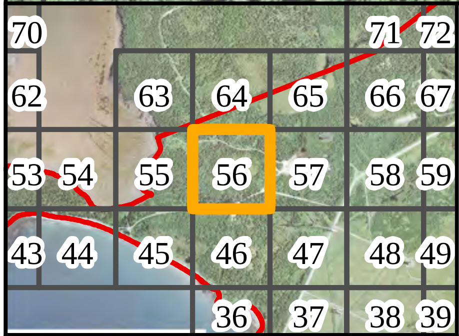
0 50 100 Meters

N

Figure 5. Sheet 55 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

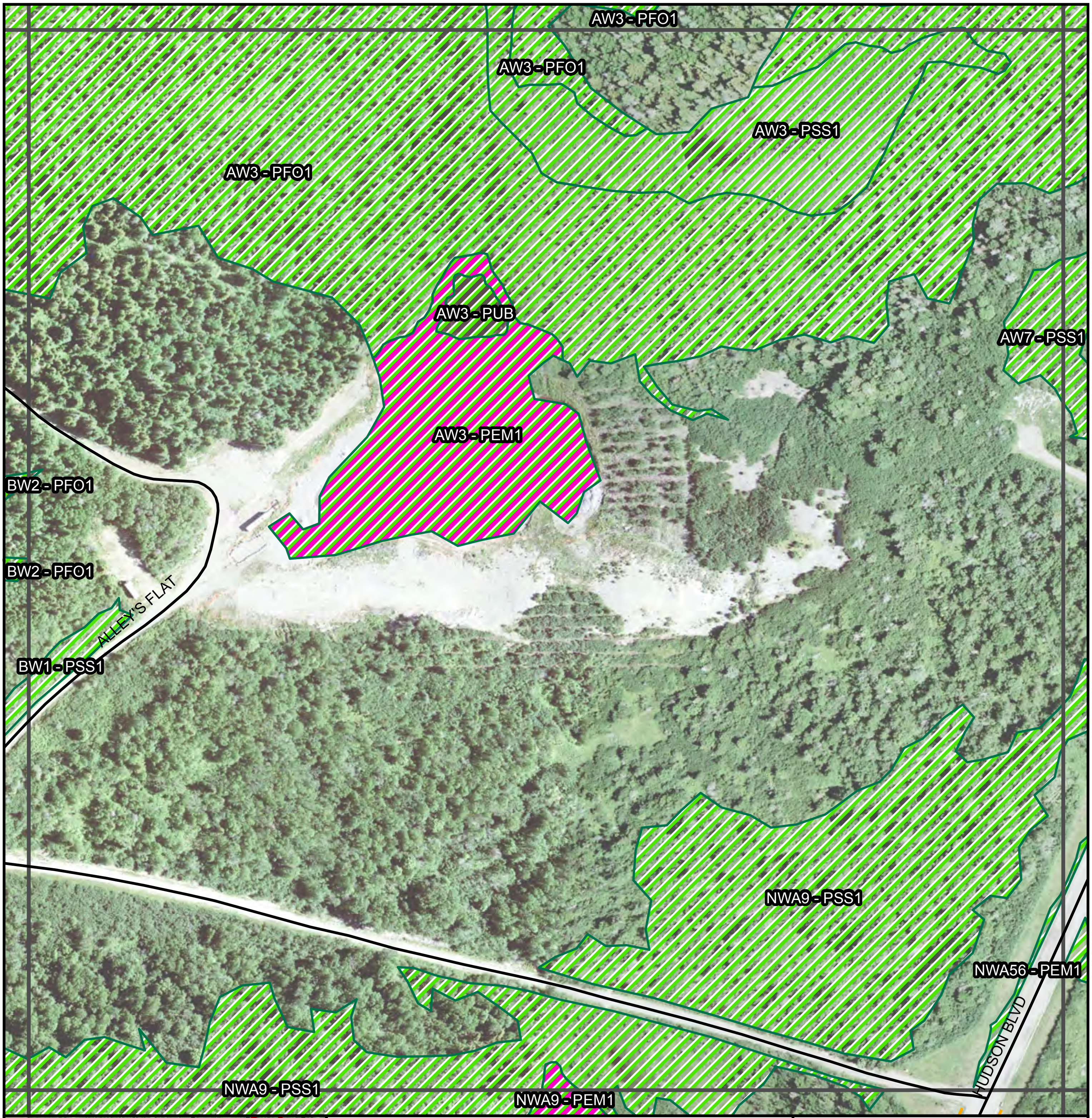
0 200 400 Feet

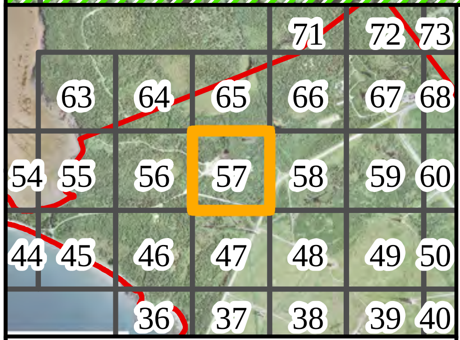
0 50 100 Meters

N

Figure 5. Sheet 56 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

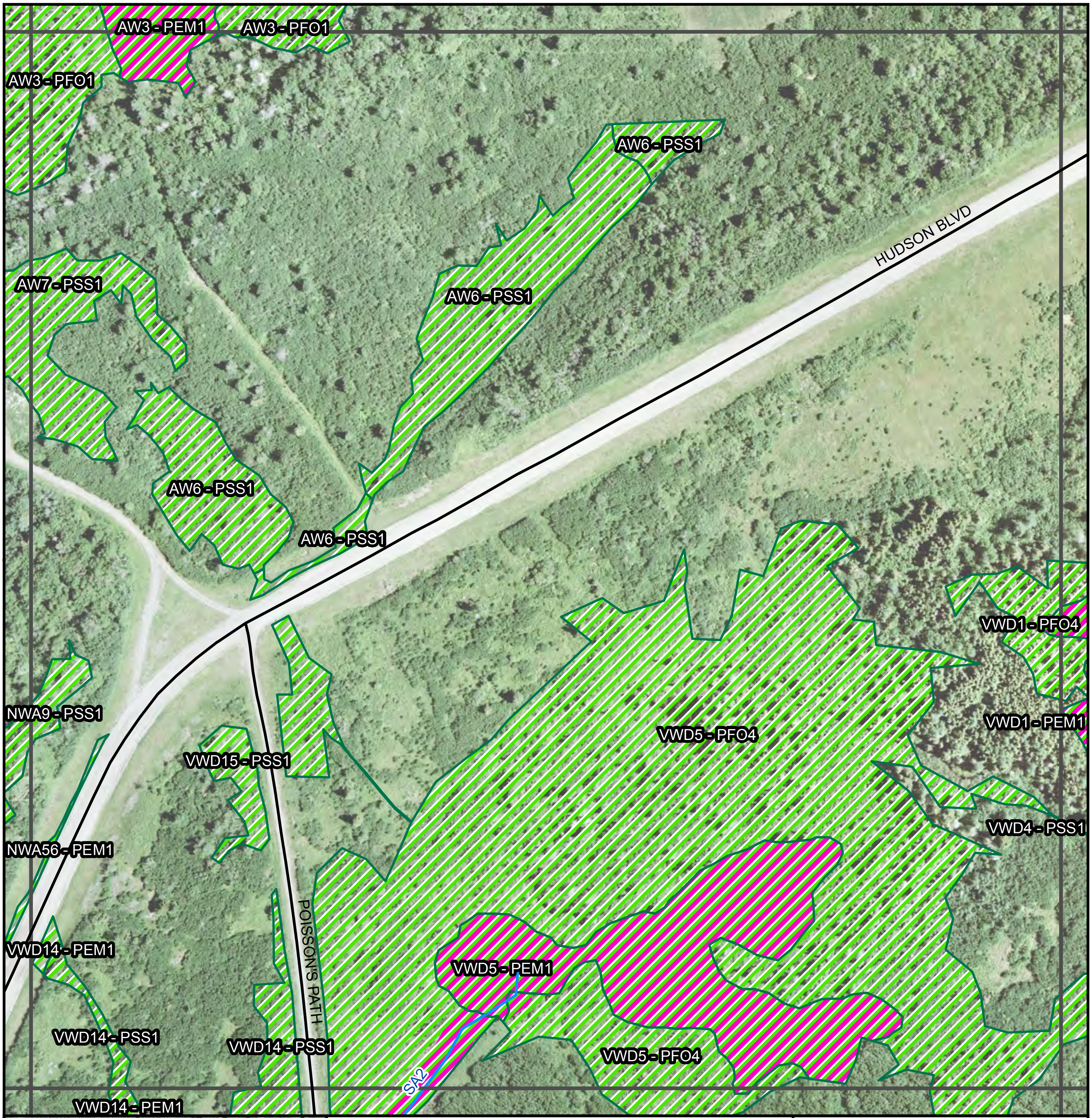
0 50 100 Meters

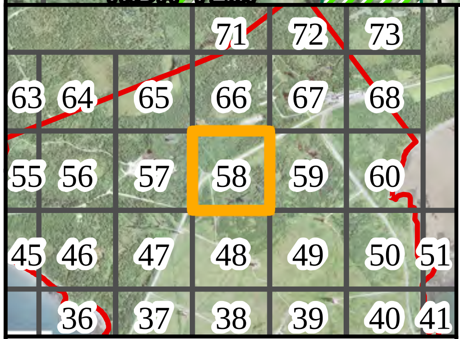
N

Figure 5. Sheet 57 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100_NRS_T23330_WE40_ME_SERE_CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS\2014_V102\Finals_2014_20140904\NJ_FIGURES_EDITS_20140918\T23330WE40_Fig5_WaterResources_DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

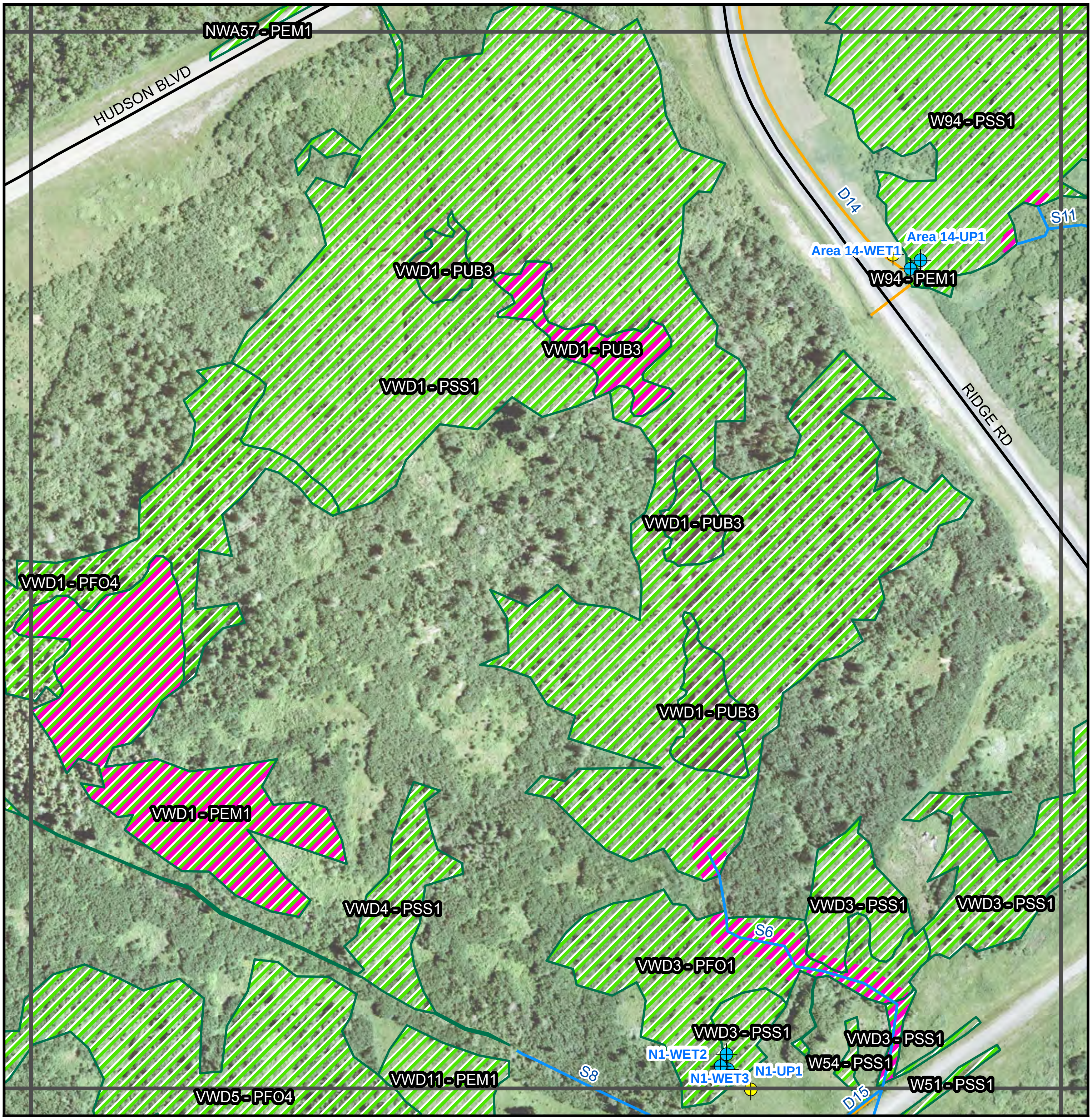
0 200 400 Feet

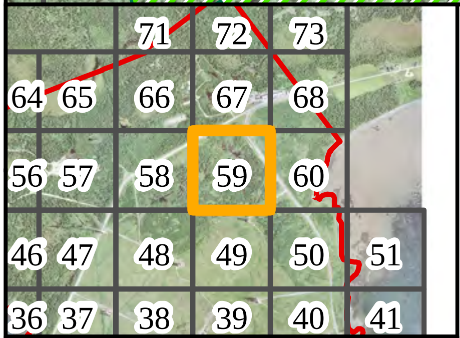
0 50 100 Meters

N

Figure 5. Sheet 58
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

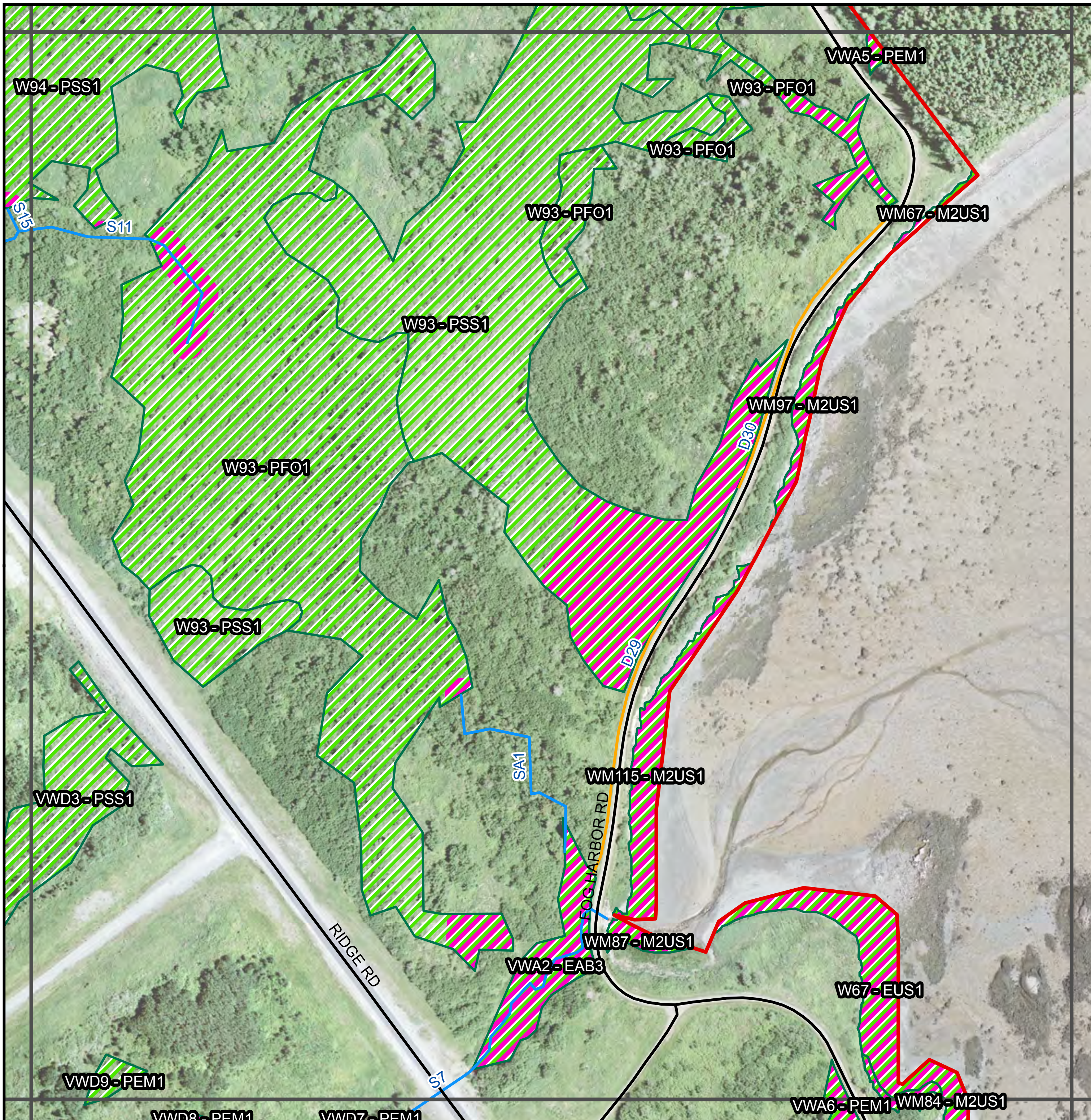
0 200 400 Feet

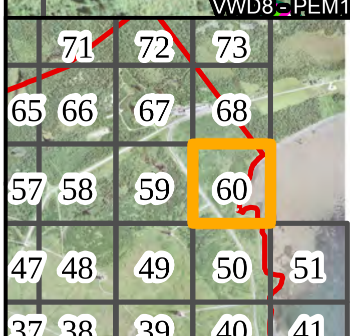
0 50 100 Meters

N

Figure 5. Sheet 59 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 60 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

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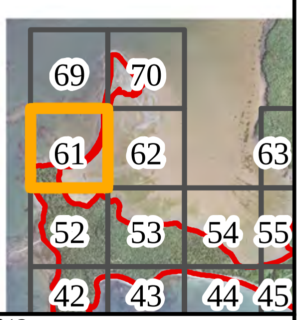


Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

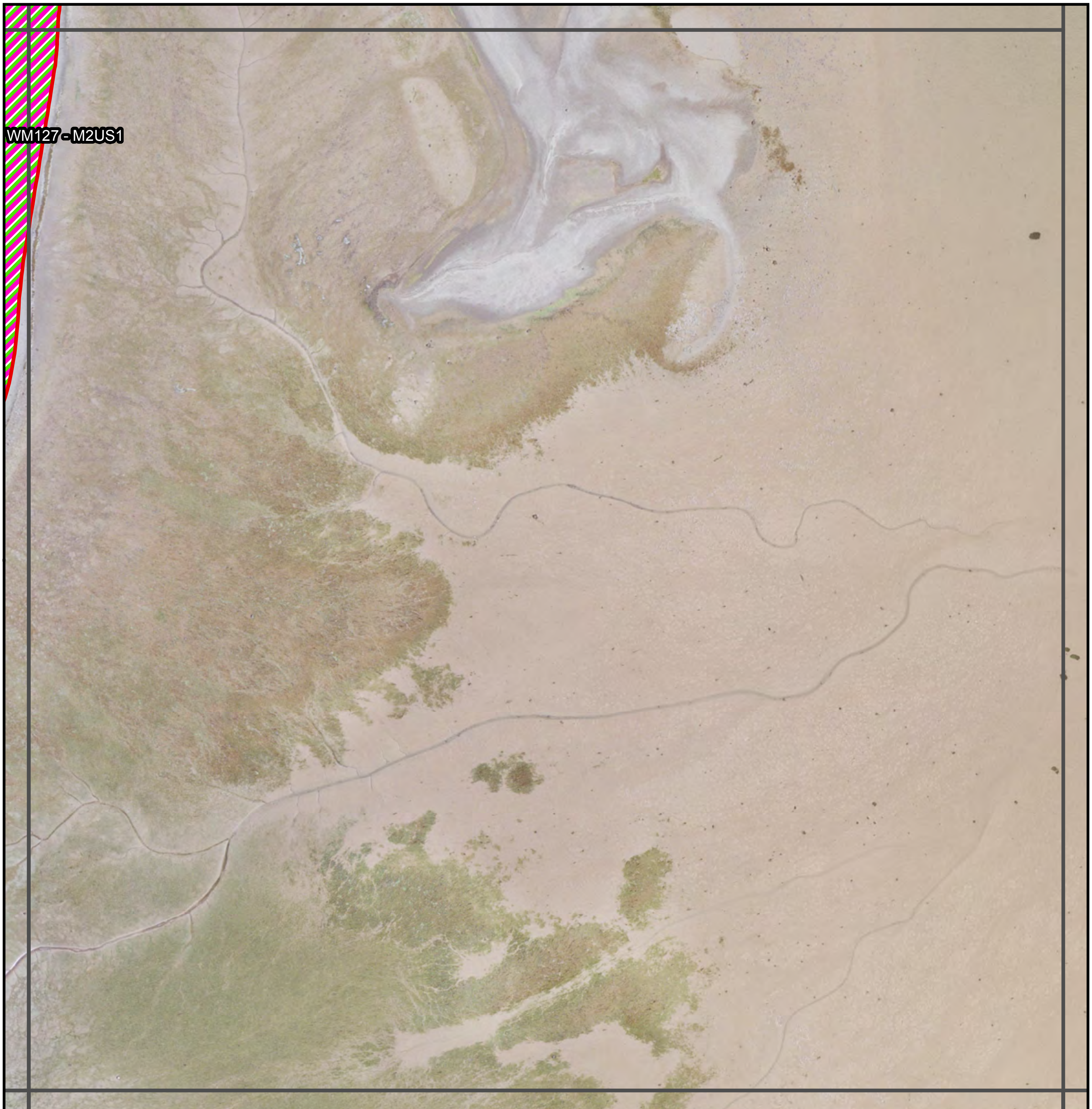
0 200 400 Feet

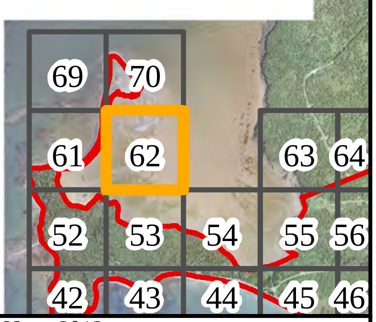
0 50 100 Meters

N

Figure 5. Sheet 61 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

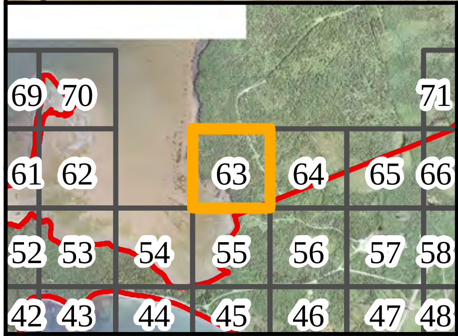
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 62
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

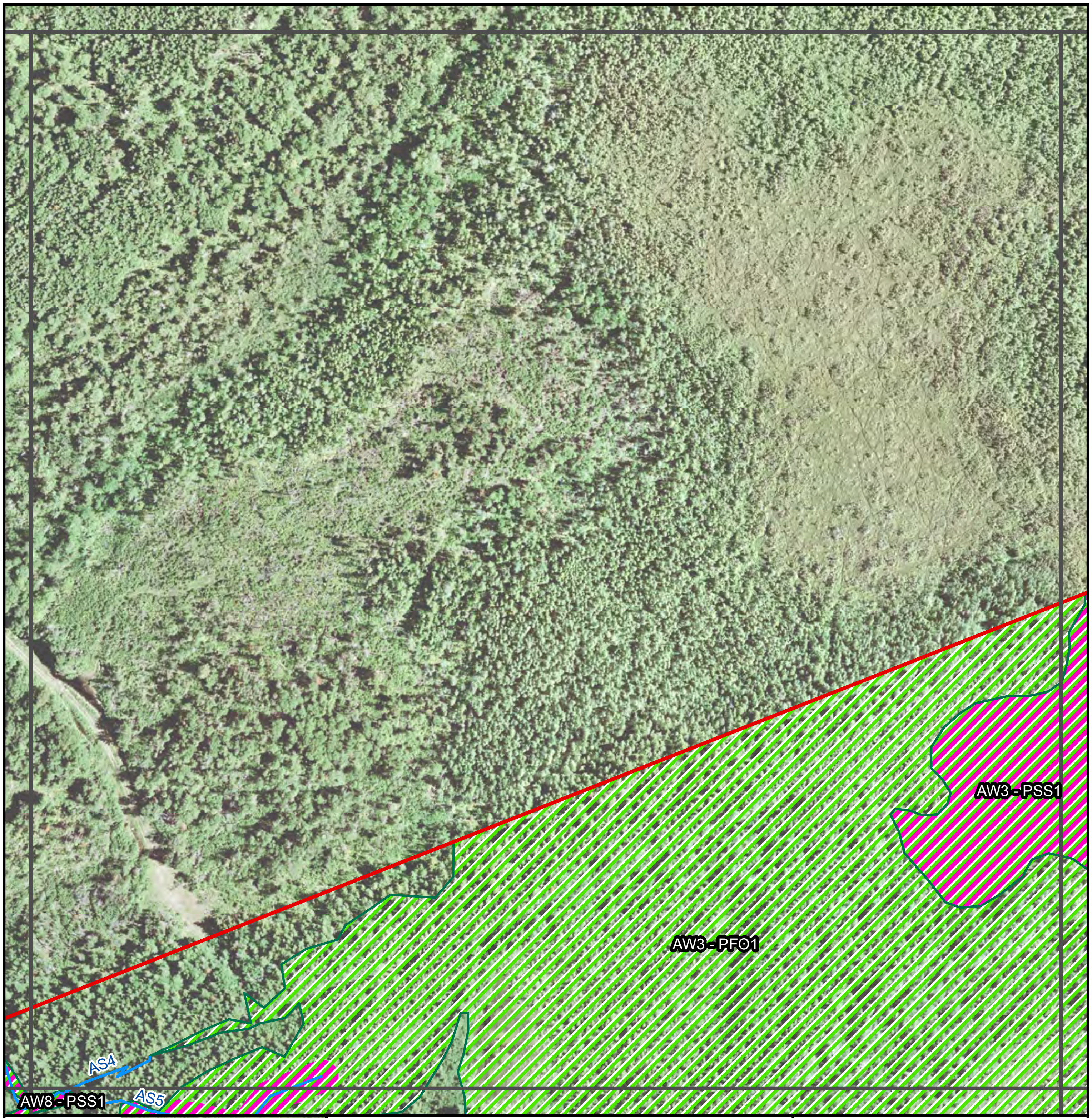
0 50 100 Meters

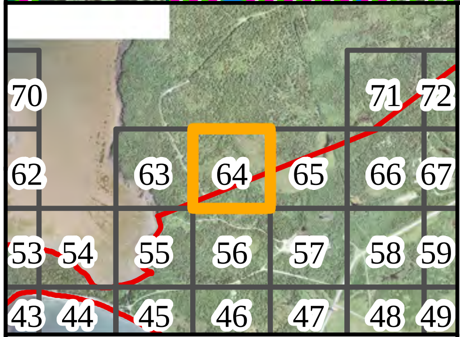
N

Figure 5. Sheet 63 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z: projects NAVFAC 2012 TASKS 100 NRS T23330 WE40 ME SERE CUTLER CUTLER GIS MXD FIGURES FINALS 2014 V102 Finals 2014 20140904 NJ FIGURES EDITS 20140918 T23330WE40 Fig5 WaterResources DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

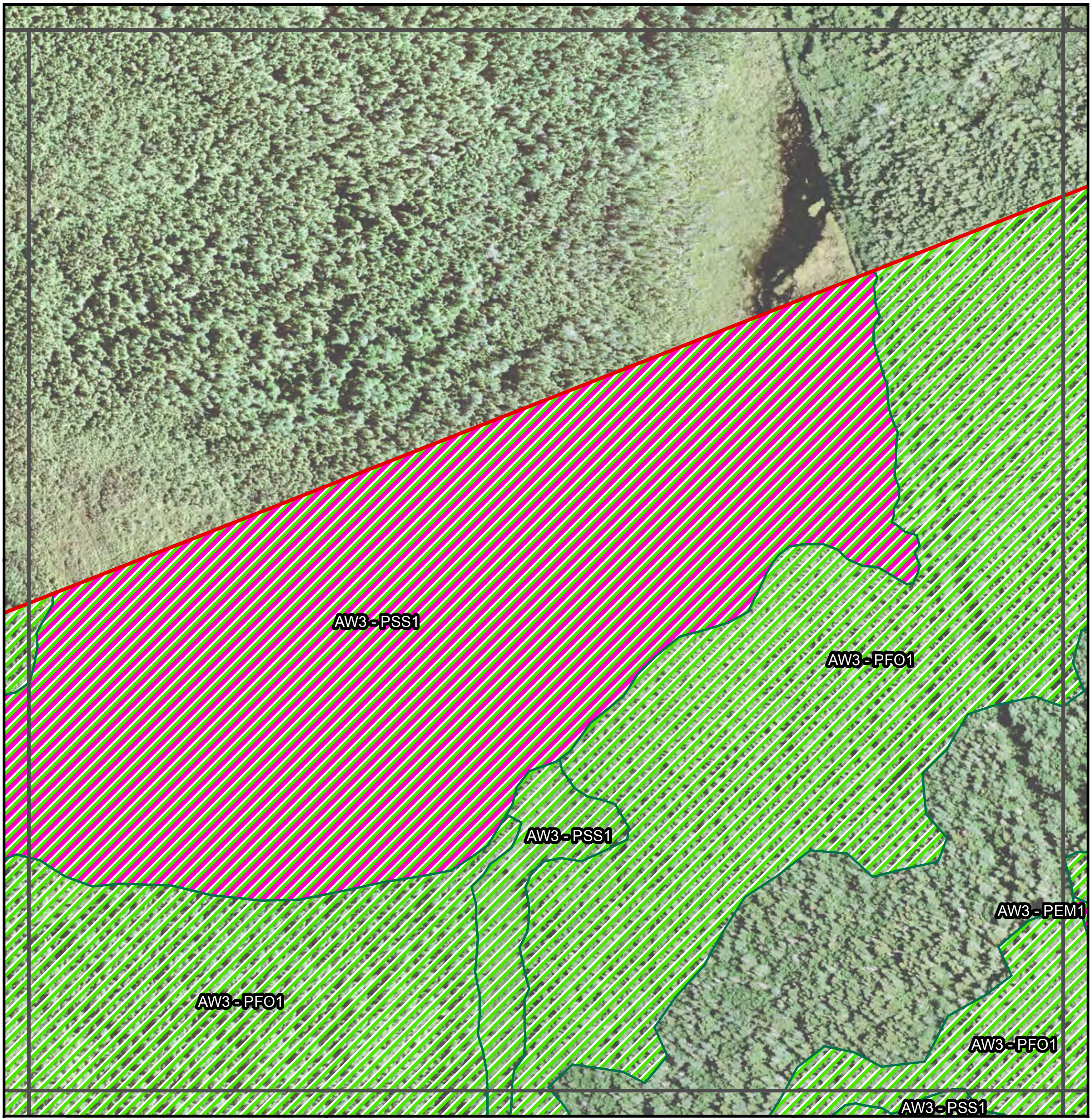
0 50 100 Meters

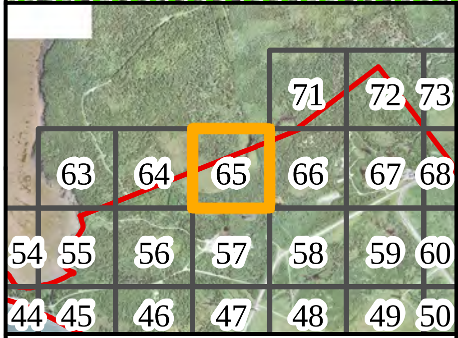
N

Figure 5. Sheet 64
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z: projects NAVFAC 2012 TASKS 100 NRS T23330 WE40 ME SERE CUTLER CUTLER GIS MXD FIGURES FINALS 2014 V102 Finals 2014 20140904 NJ FIGURES EDITS 20140918 T23330WE40 Fig5 WaterResources DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

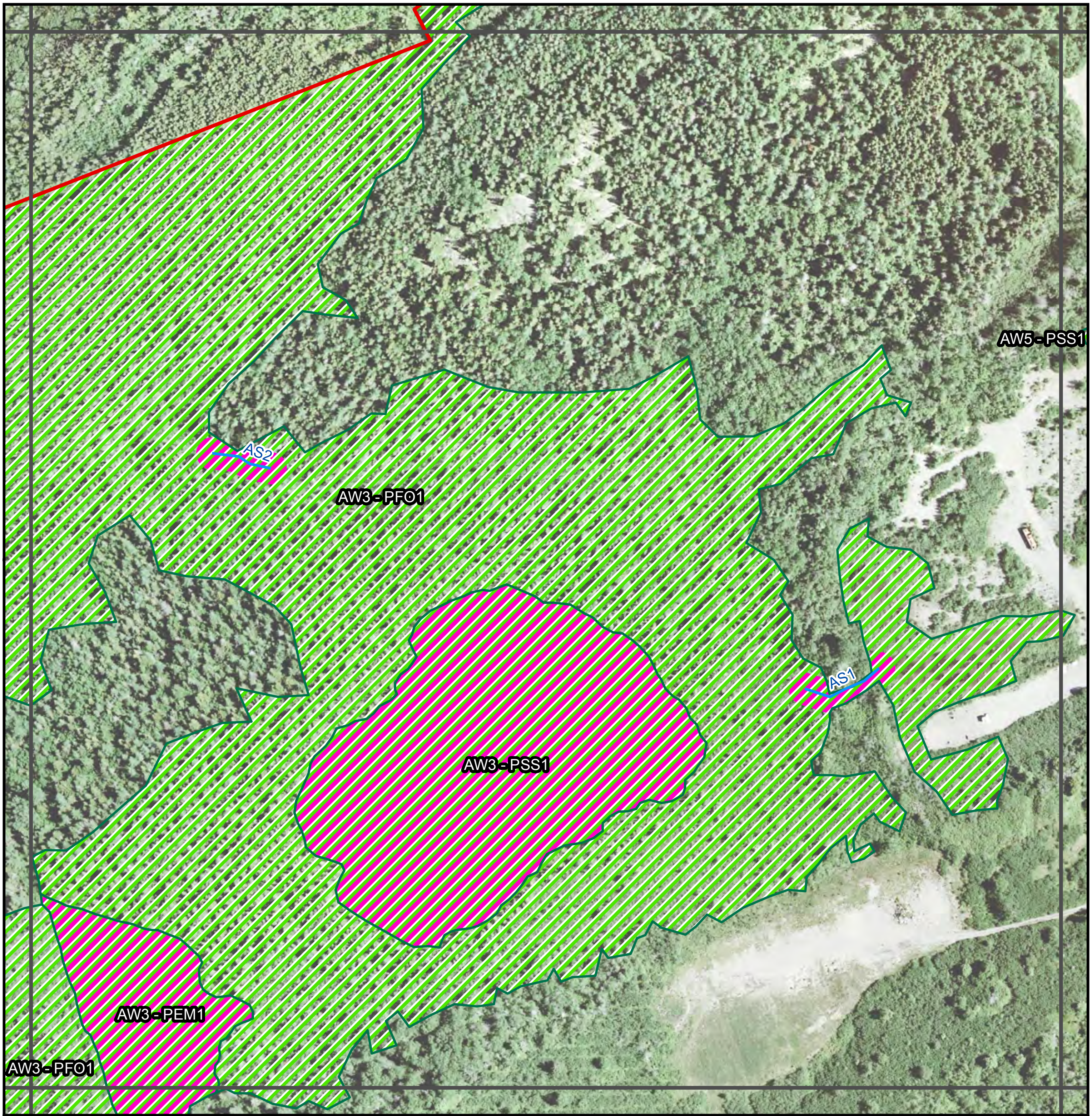
0 200 400 Feet

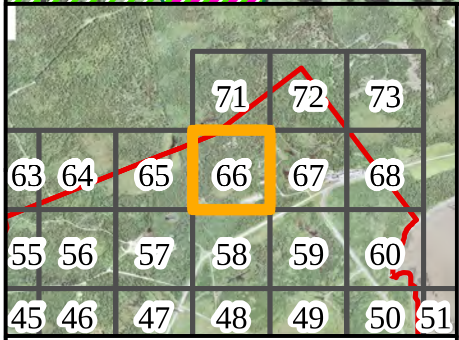
0 50 100 Meters

N

Figure 5. Sheet 65 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

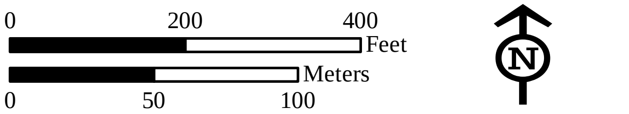
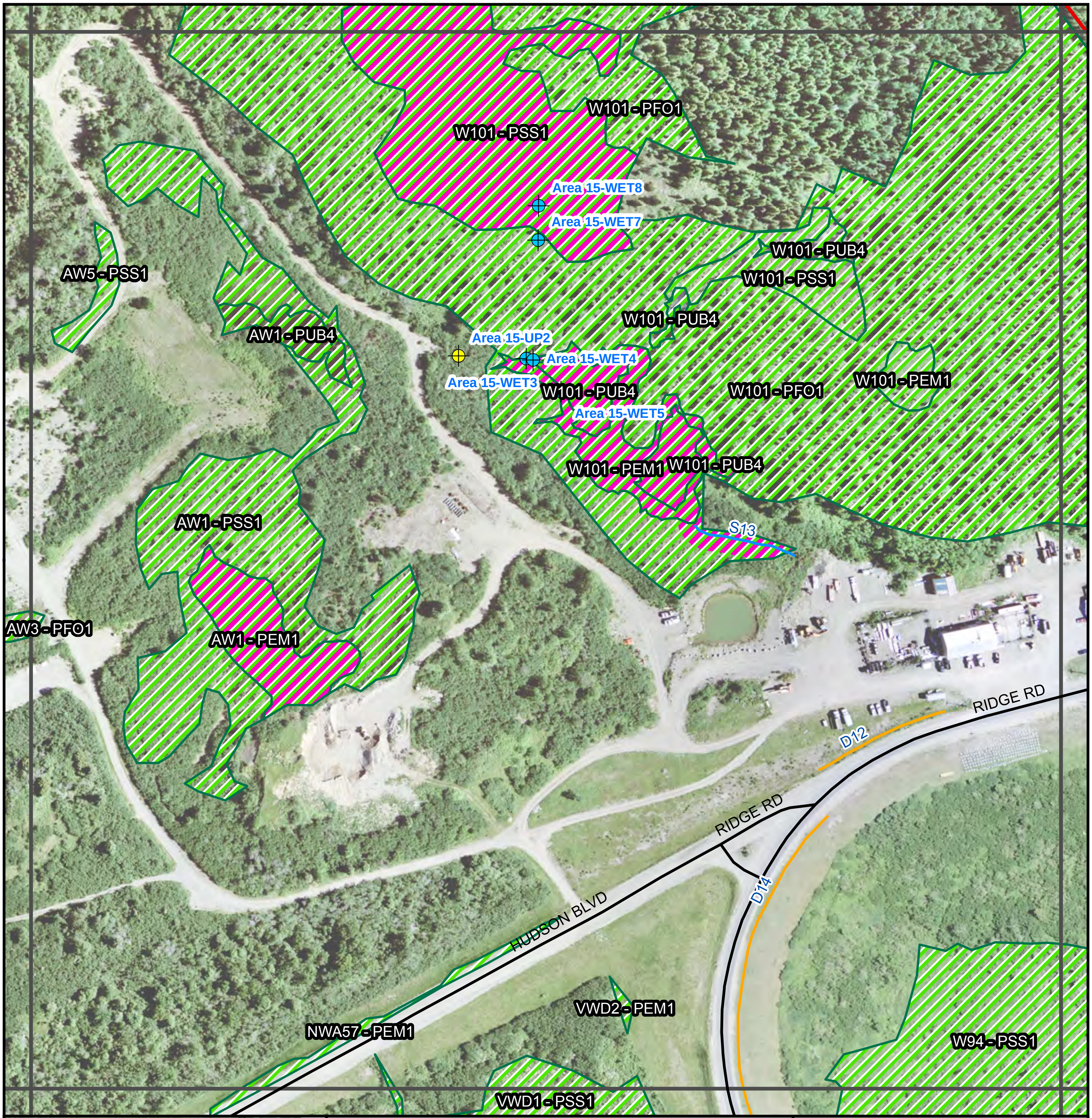
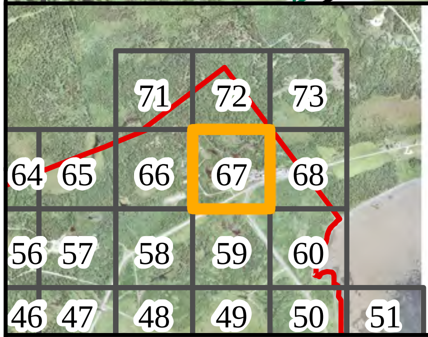


Figure 5. Sheet 66
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

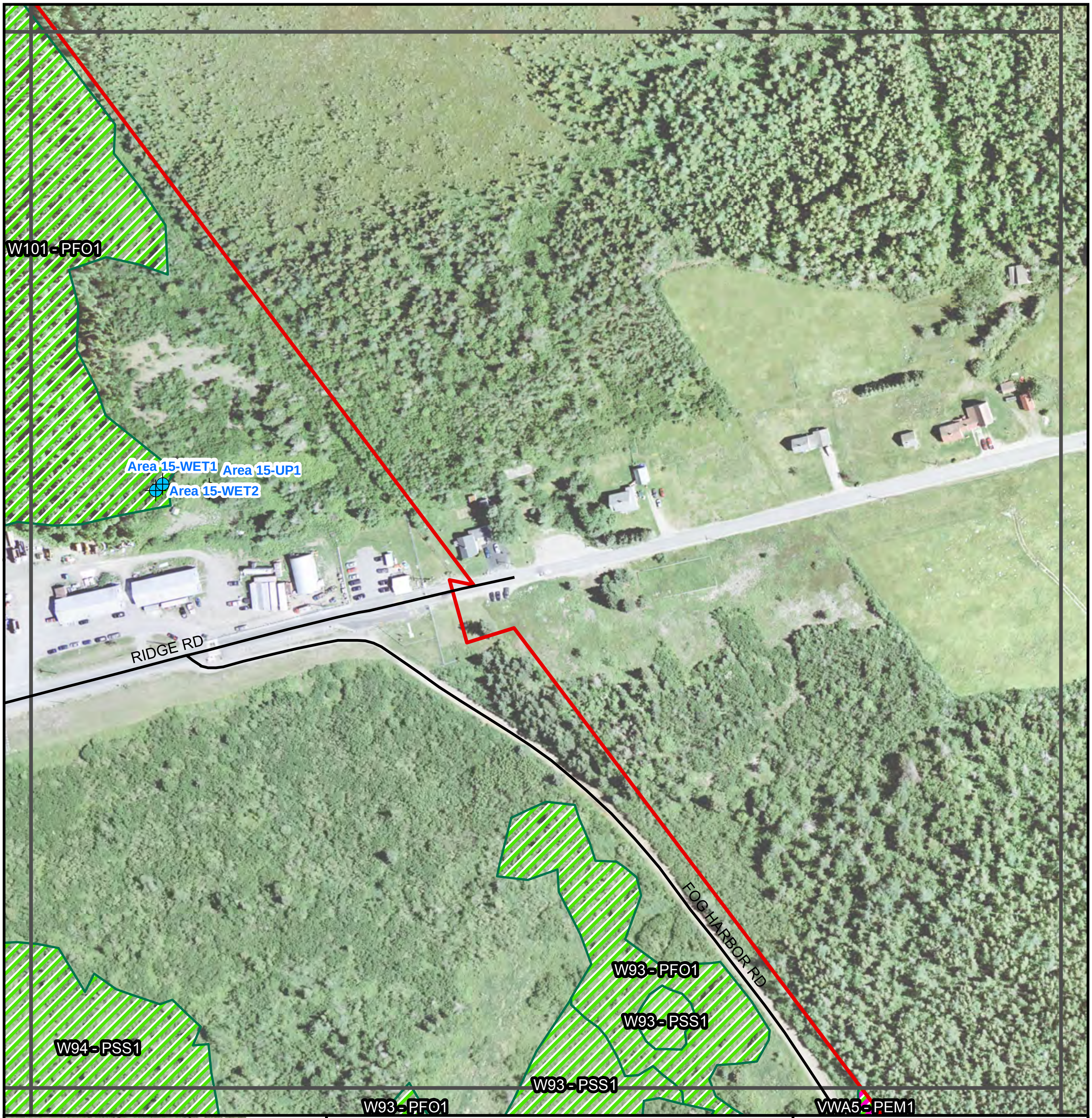
0 200 400 Feet

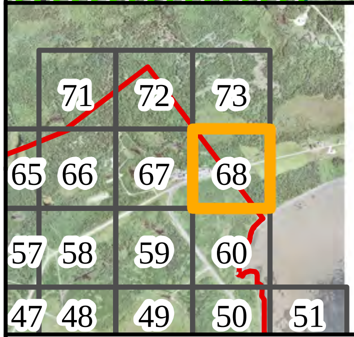
0 50 100 Meters

N

Figure 5. Sheet 67 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

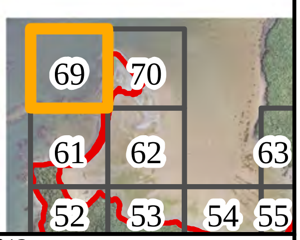
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 68
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

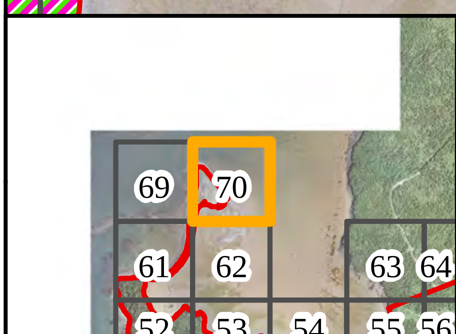
0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 69 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

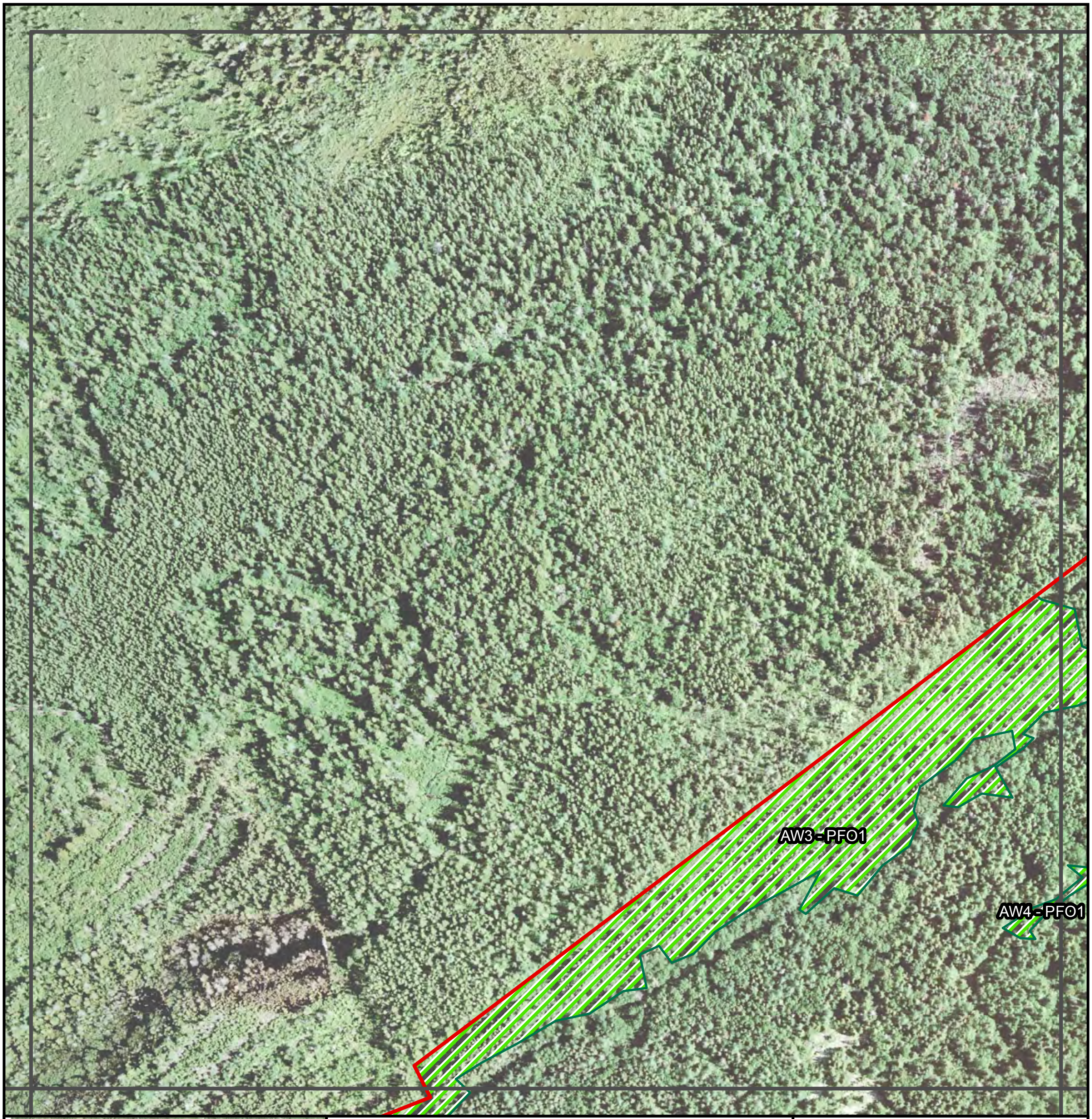
0 50 100 Meters

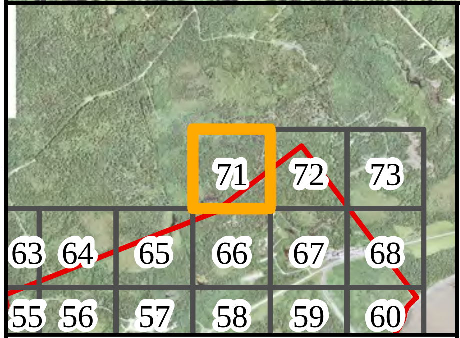
N

Figure 5. Sheet 70 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100_NRS\T23330_WE40_ME_SERE\CUTLER\CUTLER_GIS\MXD\FIGURES\FINALS_2014_V102\Finals_2014_20140904\NJ_FIGURES_EDITS_20140918\T23330WE40_Fig5_WaterResources_DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

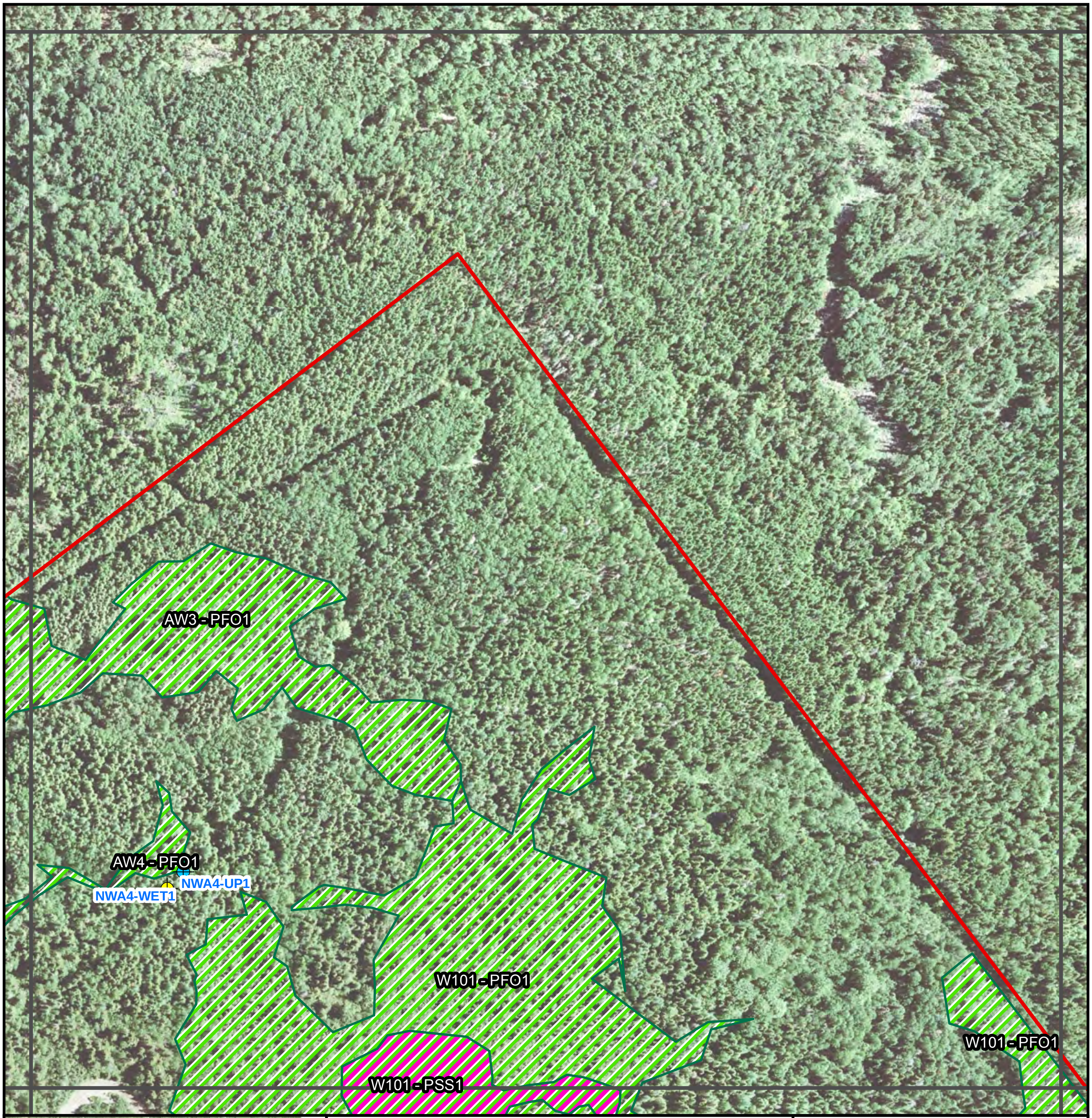
0 200 400 Feet

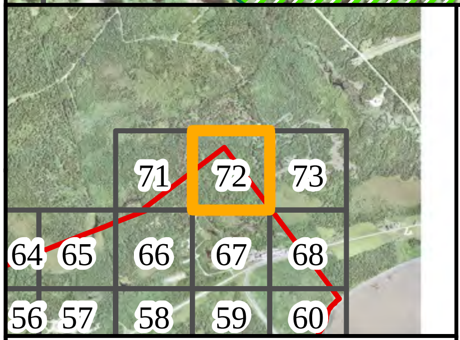
0 50 100 Meters

N

Figure 5. Sheet 71
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

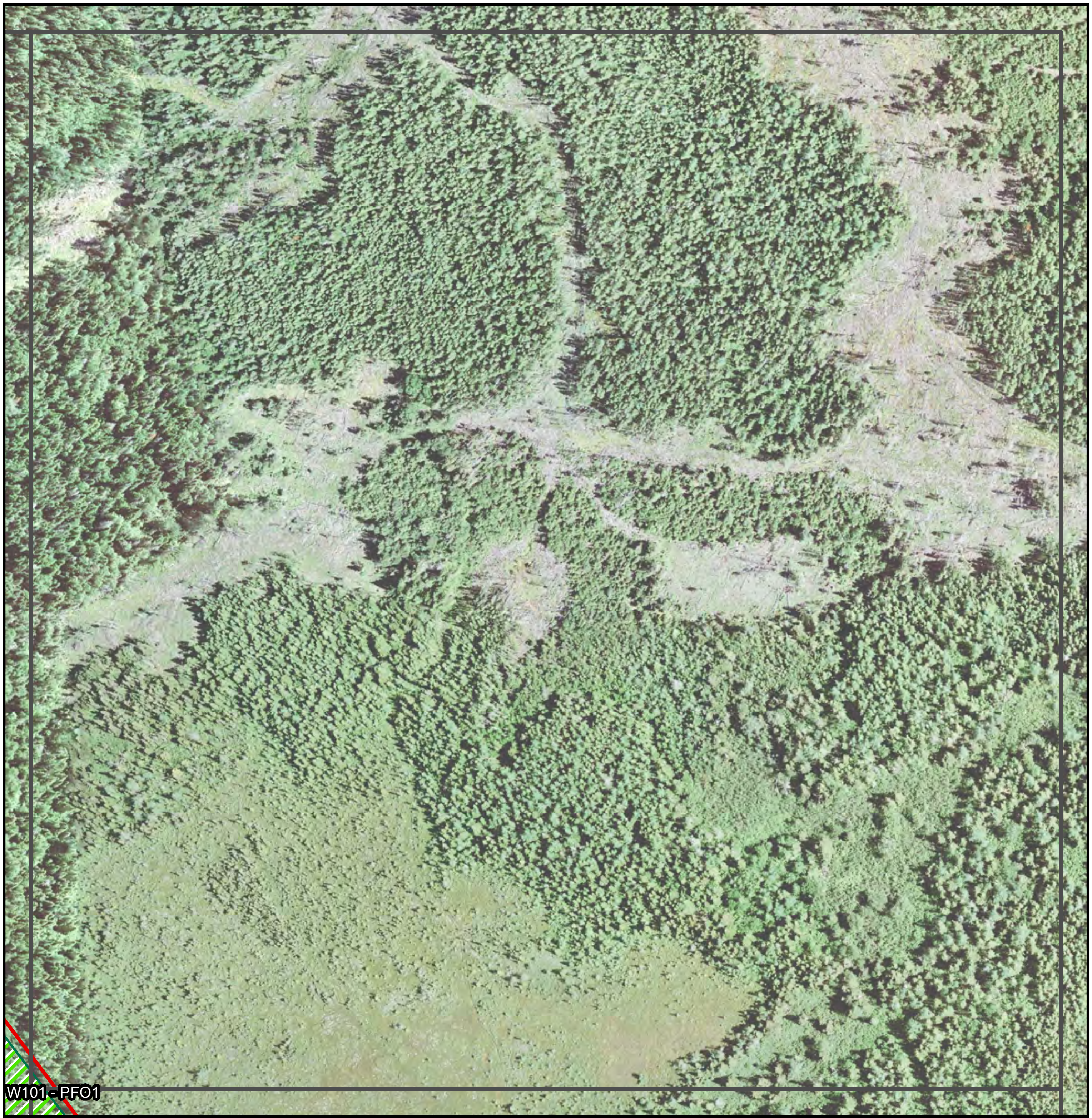
0 200 400 Feet

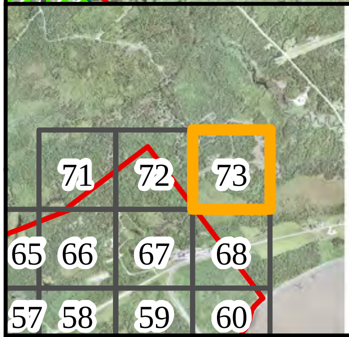
0 50 100 Meters

N

Figure 5. Sheet 72 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

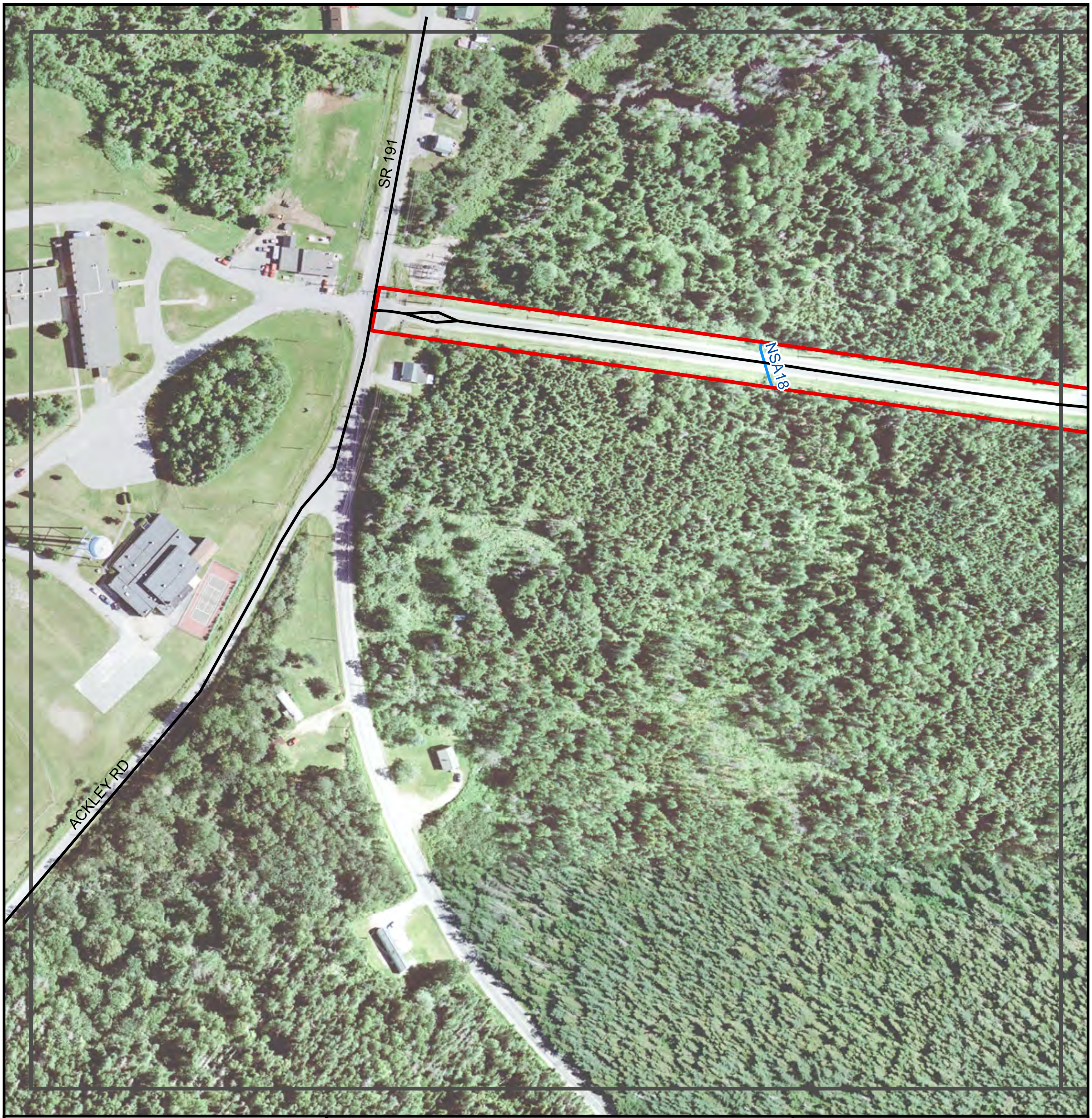
0 200 400 Feet

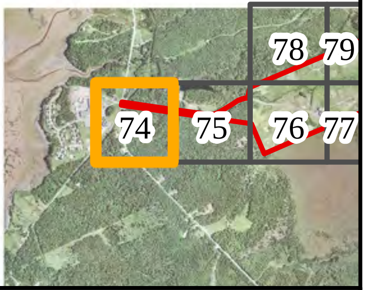
0 50 100 Meters

N

Figure 5. Sheet 73
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 74
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

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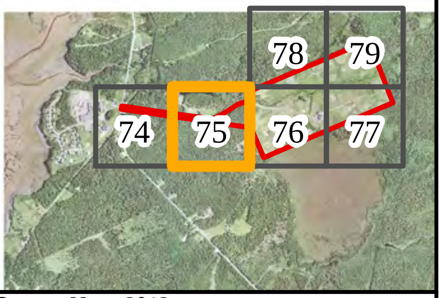

Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 75 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

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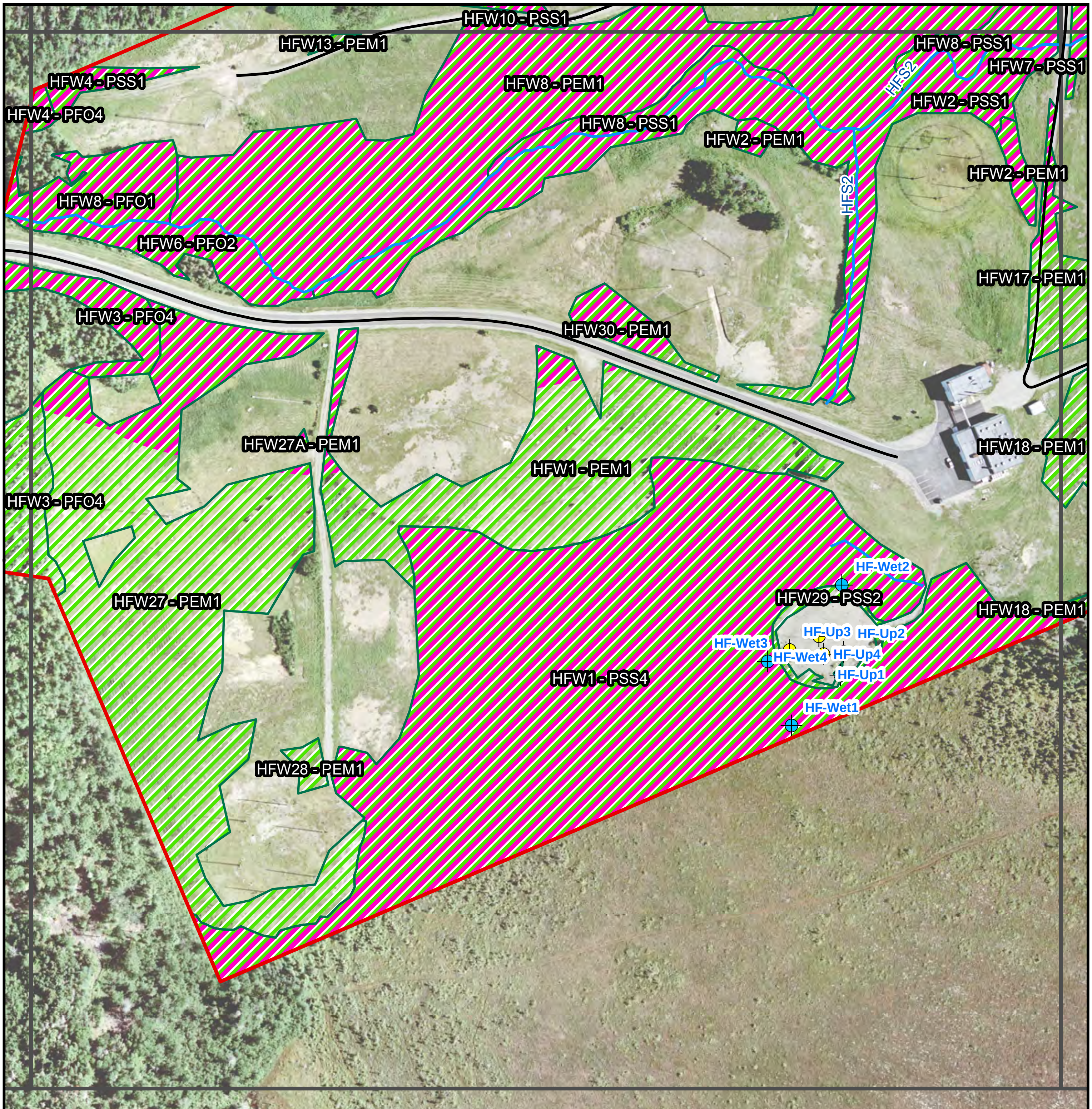
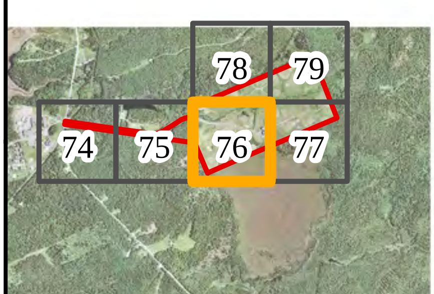




Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

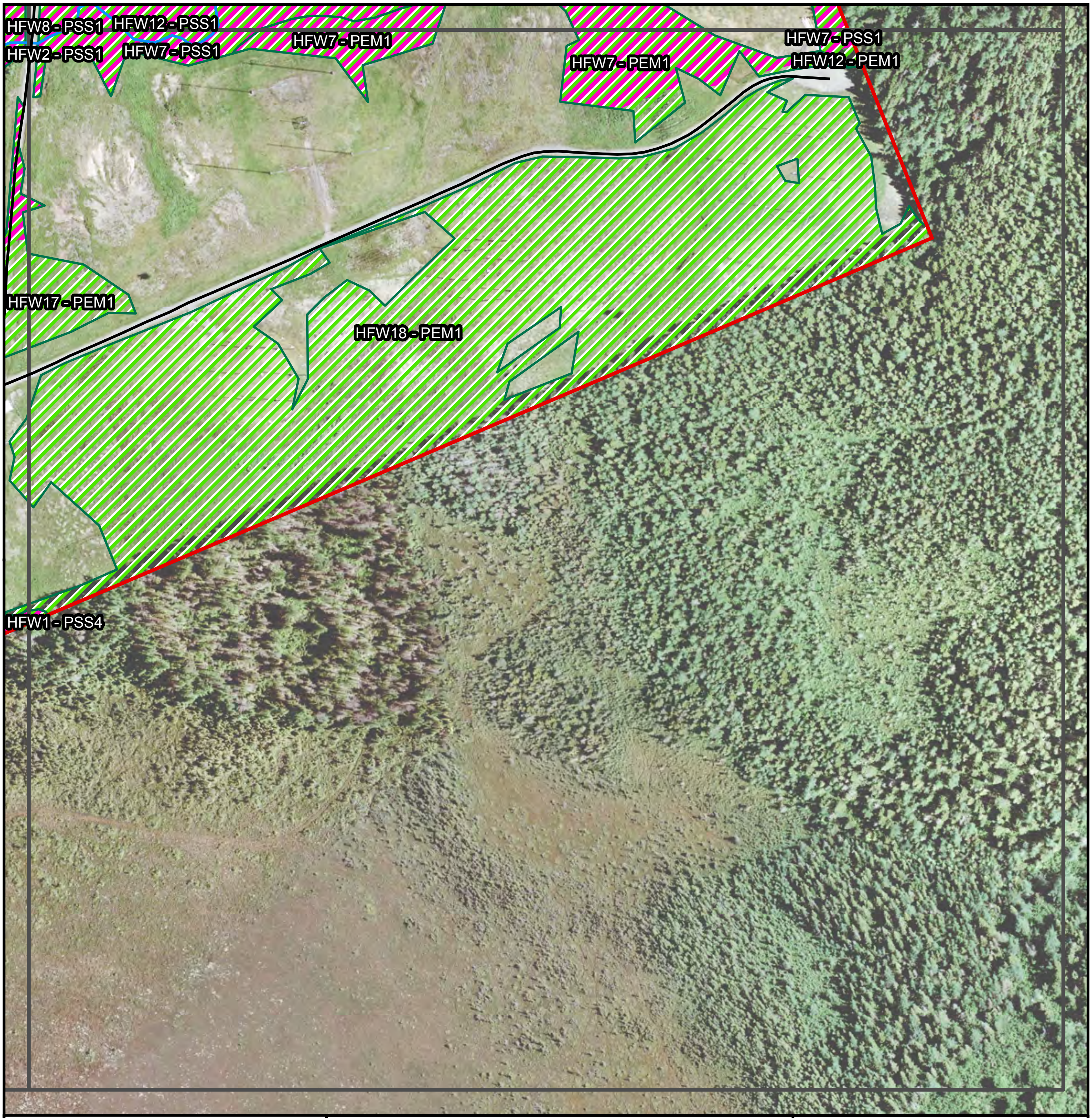
- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

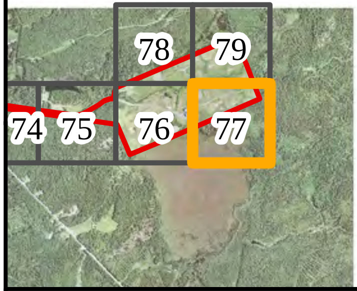
0 200 400 Feet
0 50 100 Meters

N

Figure 5. Sheet 76 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

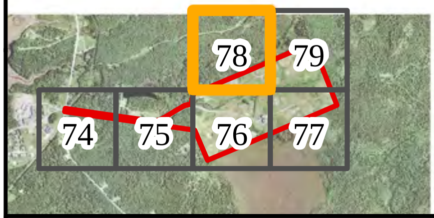
0 50 100 Meters

N

Figure 5. Sheet 77 Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC 2012 TASKS 100 NRS T23330 WE40 ME SERE CUTLER\CUTLER GIS\MXD\FIGURES\FINALS 2014 V102\Finals 2014 20140904 NJ FIGURES EDITS 20140918\T23330WE40 Fig5 WaterResources DDP.mxd



Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

- Installation/ Delineation Area
- Roads
- Streams (Tetra Tech)
- Ditches (Tetra Tech)
- Wetlands
- Wetlands of Special Significance
- Wetland Plots
- Upland Plots

0 200 400 Feet

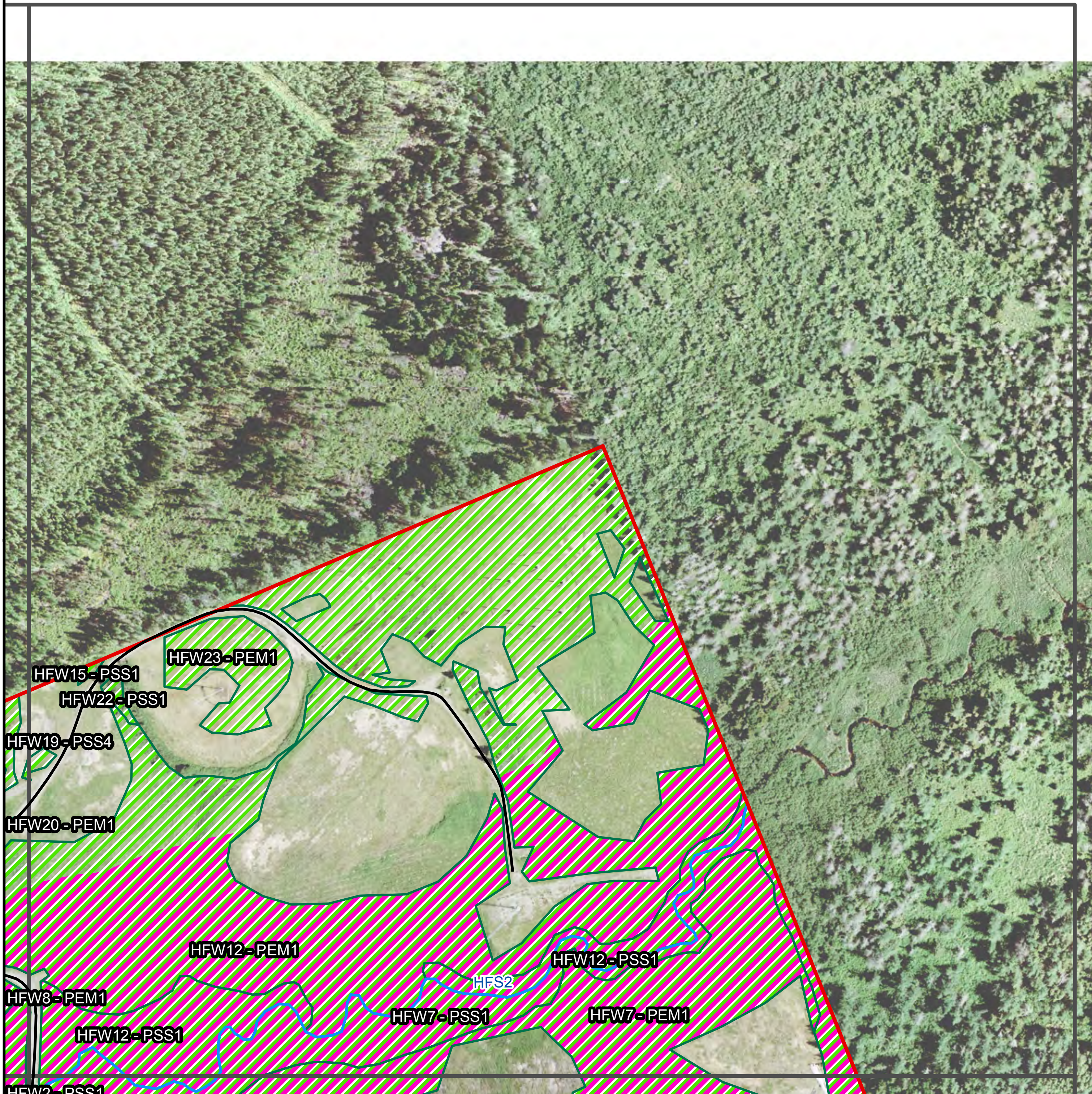
0 50 100 Meters

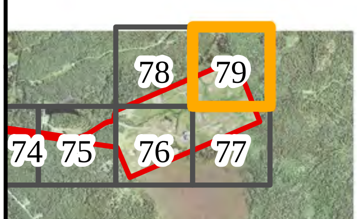
N

Figure 5. Sheet 78
Aquatic Resources Map of NCTAMSLANT DET Cutler Wetland Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012\TASKS\100\NRS\T23330\WE40\ME\SERE\CUTLER\CUTLER\GIS\MXD\FIGURES\FINALS\2014\V102\Finals\2014\20140904\NJ\FIGURES\EDITS\20140918\T23330WE40\Fig5\WaterResources\DDP.mxd





Source: Navy 2012

Coordinate System: WGS 84
UTM, Zone 19, North, Meters

Legend

Installation/ Delineation Area

Roads

Streams (Tetra Tech)

Ditches (Tetra Tech)

Wetlands

Wetlands of Special Significance

Wetland Plots

Upland Plots

0 200 400 Feet

0 50 100 Meters

N

Figure 5. Sheet 79
Aquatic Resources
Map of NCTAMSLANT
DET Cutler Wetland
Delineation, Cutler, Maine.

Date:
09/2014

Document Path: Z:\projects\NAVFAC\2012 TASKS\100 NRS\T23330_WE40_ME_SERE_CUTLER\CUTLER GIS\MXD\FIGURES\FINALS_2014_V102\Finals_2014_20140904_NJ_FIGURES_EDITS_20140918\T23330WE40_Fig5_WaterResources_DDP.mxd

ENCLOSURE B

Site History and Conditions

Site History:

The Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler (NCTAMSLANT DET Cutler) site background is described in the installation’s Final Integrated Natural Resource Management Plan (Navy 2012) as:

> *NCTAMSLANT DET Cutler is located in the Town of Cutler, Maine, and was commissioned in 1961. Construction of the Installation began in 1958, with services coming online on June 23, 1961. The primary mission of the military Installation is to provide communication services to ships and submarines operating in the North Atlantic, Arctic Ocean, and the Mediterranean Sea. From the time of inception until the end of the Cold War in 1989, NCTAMSLANT DET Cutler was considered pivotal in the Navy’s master plan for instantaneous defense against Soviet Union aggression (NCTAMSLANT DET Cutler 2003). The official mission of NCTAMSLANT DET Cutler is to:*
>
> > *“Provide secure and reliable, Strategic and Tactical Command and Control (C2) Telecommunications services to U.S. and Coalition Submarine Services.”*
>
> *The NCTAMSLANT DET Cutler occupies 3,003 acres in the Town of Cutler, Maine, and comprises two parcels, the VLF [Very Low Frequency] (2,896 acres), and the HF [High Frequency] (107 acres) areas. The VLF area power line right-of-way runs north from the VLF area and is approximately 11 acres. The Town of Cutler is located in easternmost region of the State of Maine, in Washington County, approximately 30 miles southwest of the Canadian border and Campobello Island, New Brunswick, Canada.*
>
> *The VLF area is approximately 2,896 acres, and is situated on a peninsula overlooking the Atlantic Ocean. The VLF area is located south of Route 191, and major access to this parcel is provided by Ridge Road. The VLF peninsula is surrounded on three sides by the following ocean waters: Little Machias Bay to the east; Cross Island, Cross Island Narrows, Little Holly Cove, Big Holly Cove, and the Atlantic Ocean to the south; and Holmes and Machias bays to the west. The panels in each antenna array (known as the North Tower Field and South Tower Field) are supported by 13 main towers, including a center tower surrounded by an inner circular array of six towers and an outer circular array of six towers. The main towers are approximately 800 to 1,000 feet (ft) tall. Each main tower is supported by one or two counterweights, which are supported by towers that are approximately 200 ft tall. Currently, 117 structures are located throughout the VLF area, including winch houses and electrical distribution buildings associated with the antennas and supporting towers, and support and operation facilities. The support and operation facilities include a centrally located transmitter building, two helix houses, a public works shop, a power plant building, and security and administrative buildings, all of which are structures contributing to the Cutler VLF and HF Communications Historic District (NCTAMSLANT DET Cutler 2003).*

Tetra Tech, Inc.
451 Presumpscot Street, Portland, Maine 04103
Tel 207.358.2400 Fax 207.879.9481 www.tetratech.com

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The HF area is approximately 107 acres, and is located approximately 2 miles north of the VLF parcel, off Route 191, and approximately 0.5 mile inland from the eastern edge of Holmes Bay. Major access to the HF area is provided by the access road that extends east from Route 191 (Cutler Road). The reservoir located adjacent to the western boundary of the HF site is privately owned. The HF area is equipped with 19 high frequency transmitters and supporting antennas, and functions as a backup for the VLF area in the event of transmitter failure. In addition to providing backup, the HF area supports other communication activities, including shore-to-ship and ground-to-air transmissions, and includes two buildings: the main operations building and the building that houses the emergency power generator.

The Installation historically included an Administrative and Housing Area (51.3 acres), located on the opposite side of Maine Route 191, west of the HF area, as well as the approximately 20-acre water treatment and reservoir site. Both of these parcels were formerly part of the HF area; however, both parcels were transferred in 2003 to the Washington County Development Authority (Moore 2010). The Fire Station, located in the historic Administrative Area, currently provides fire protection support to both the HF and VLF areas, and was retained under Navy ownership. The Fire Station, and the Sprague Neck peninsula portion of the VLF (approximately 160 acres), are not used to fulfill the Installation's military mission. The Sprague Neck peninsula has been retained in its natural state, with the exception of a recreational cabin that remains. Due to the peninsular location of the VLF area, and the rural character of the surrounding area, encroachment pressure is not an issue for NCTAMSLANT DET Cutler. The Navy designated Sprague Neck Bar as an Ecological Reserve Area (ERA[1]) in 1990. The site was selected as an ERA because it provides valuable habitat for a significant number of migratory shorebirds and waterfowl (DoD 1990). The Navy coordinated designation of the ERA with several agencies including USFWS, MDIFW, University of Maine, and The Nature Conservancy (Conservancy). No active management of this site has occurred since the ERA designation.

As part of the reorganization of the Mid-Atlantic division of the Naval Facilities Engineering Command (NAVFAC), ownership of the NCTAMSLANT DET Cutler facility was recently transferred to Public Works Department – Maine (PWD-ME), and is currently being managed by the Portsmouth Naval Shipyard Commanding Officer (Joy 2009a).

[1] An ERA is "a physical or biological unit in which current natural conditions are maintained insofar as possible. These conditions are ordinarily achieved by allowing natural, physical, and biological processes to prevail without human intervention. However, under unusual circumstances, deliberate manipulation may be utilized to maintain the unique feature which the ecological reserve areas was established to protect" (Navy 1990).

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Site Conditions:

Wetland Disturbance History

The spruce forests, vegetation, and soils were removed from the NCTAMSLANT DET Cutler tower fields in 1960. After removal, copper ground wires and an underground net-like antenna were installed on the excavated surfaces. Next, a homogenized mixture of hydric and upland soils was placed over the antenna net and grounding wires, leaving a soil layer with restricted permeability 4–6 inches below the surface and no resemblance in composition and structure to natural soils. The artificial soil surface was then stabilized. Plant recolonization resulted from a combination of artificial seed mixtures and the natural seed bank.

Repeated disturbance to the vegetation has continued since 1960. Presently, each antenna array is mowed every other year. Previously, it was burned each year and mowed every other year until about 14–17 years ago (Ackley 2012). Burning resulted in lower plant cover with a high density of wild strawberries (*Fragaria virginiana*) and other disturbance dependent species. Vegetation management prevented the development of forests and tall scrub dominated wetlands and uplands, most of which are located outside the managed tower fields or along steep-sided drainage ditches inaccessible to mowing.

Some areas of the installation (e.g., south of the guardhouse) were burned most years until burning was stopped about 14 years ago. In this highly maritime area of Maine, repeated burning restricts woody plant development, which in turn encourages the establishment of large populations of reed bentgrass (*Calamagrostis canadensis*) mixed with green alders (*Alnus viridis* ssp. *crispa*). Under cool maritime conditions, reed bentgrass produces a thick root mass or sod that further limits woody plant colonization in both wetlands and uplands.

By contrast, some areas of the installation remain undeveloped. For example, the forested parcel north of the guardhouse has remained undisturbed except for a strip of cleared land on the north side of the buildings, a fire pond area, and cleared areas on the west side of the gravel road that runs parallel. The large wetland in the forested parcel north of the guardhouse (wetland W101) remains undeveloped, as well as many areas out of the tower fields.

Wetland Sampling and Conditions

The three factor wetland determination method was used, as described in the revised 2012 edition of the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Northcentral and Northeast Region* (USACE 2012). The dominance test was most often used to determine if a predominance of hydrophytes were present, but the Rapid Test also was used when a wetland was dominated by plant species that were obligate (OBL) or facultative wetland (FACW) vegetation. The 2012 National Wetland Indicator Plant List (NRCS 2012) and the North Central and Northeast 2014 Regional Wetland Plant List (Lichvar et al. 2014) for wetland preference status were used for these calculations. When a species was unlisted, it was treated it as an upland species. The list of Hydric Soil Indicators on the wetland determination data forms was used for hydric soil determination, whereas the list of Primary and Secondary Wetland Hydrology Indicators was used to determine the presence or absence of wetland hydrology.

The Cowardin wetland classification system was used to classify each wetland unit (Cowardin et. al 1979). Paired wetland determination plots were placed on both sides of the wetland-upland boundary in each wetland class and selected subclasses. Single upland determination plots were used where different wetland classes and subclasses shared the same or similar hydrologic and soil characteristics; thus the number of wetland plots exceeded upland sampling plots. We defined wetland classes after the 2012 *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Northcentral and Northeast Region* (Version 2.0). It should be noted that for consistency, because the tower fields were comprised of managed vegetation, we restricted Scrub-Shrub wetland sampling protocol to include wetlands dominated by woody plants (e.g., *Alnus virdis* ssp. *crispa*), even when less than 1 meter in height. Recently mowed wetlands with 30% or greater cover by woody plants but less than 1 meter tall were classified as Scrub-Shrub wetlands. Left unmowed, these wetlands would rapidly revert to Scrub-Shrub wetlands taller than 1 meter.

Wetlands were delineated across the installation during the growing season, from June 2012 through July 2014.The size of wetland determination plots followed the recommended 30-foot radius circle for the tree stratum, and a 15-foot radius circle was used for the sapling and shrub stratum. For the forb stratum, a combination of a 10-foot by 10-foot square as well as the recommended 5-foot radius circle were used. The square plots, which were easily divided into four quadrants with distinct boundaries, were a more efficient and consistent format for detecting species and estimating percent cover, especially in dense, heavily managed vegetation. No woody vines were present. Soil pits were excavated inside the forb plots.

Because the soils and vegetation were severely altered, a combination of reliable wetland indicator species and wetland hydrology patterns were used to determine most boundaries. Soils were frequently examined to assure consistency in the 3-factor method and to assess questionable and more difficult-to-determine boundaries.

Scientific names follow those used in the National Wetlands Indicator Plant List and the North Central and Northeast 2014 Regional Wetland Plant List. The indicator status for the north central and Northeast U.S. was followed. Any recent changes in scientific names that deviate from the list are noted, and both the new and old names are listed for recently changed species.

To summarize the vegetation at NCTAMSLANT DET Cutler, 228 plant species were identified in 48 sampling plots. Of these, 191 occurred with 5% or higher cover. Seventy-five (75) were "Obligate" wetland species (OBL), 55 were "Facultative Wetland" species (FACW), 33 were "Facultative" species (FAC), 55 were "Facultative Upland" species (FACU), and 10 were "Upland" species. There were 36 species with less than 5% cover. Thirty-two (32) species were non-native introduced species; 12 of which had less than 5% cover.

Six aggressive invasive plant species were encountered at the installation. These include common reed (*Phragmites australis*), Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Polygonum cuspidatum*), purple loosestrife (*Lythrum salicaria*), reed canary grass

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(*Phalaris arundinacea*), and Russian olive (*Elaeagnus angustifolia*). Although these invasive plants are present at the installation, they did not all occur within the wetland determination plots.

For the most reliable wetland and upland indicator species or species associations used to guide our wetland/upland line placement, we frequently reassessed or recalibrated their local wetland/upland preferences as we moved across the landscape into new habitats and microhabitats with different soil and hydrology features. Recalibrations were especially important on the south flank of the Bay Ridge Terminal Moraine where soils graded downslope from well-drained at the top and upper flanks of the moraine to poorly drained where the moraine transitioned to fine grained marine silts and clays (Presumpscot formation).

Many wetland and upland species proved to be unreliable as indicator species. For example, facultative species (FAC) such as green alder (*Alnus viridula* ssp. *crispa*), horsetail (*Equisetum arvense*), and common raspberry (*Rubus idaeus*) were, like their wetland indicator status, found more-or-less in both wetlands and uplands. Many facultative upland species (FACU) such as wild strawberry, trailing cinquefoil (*Potentilla simplex*), red clover (*Trifolium pratense*), red fescue grass (*Festuca rubra*), and hawkweeds (*Hieracium* sp.) were distributed like FAC species and were more common in wetlands than predicted by their FACU status. By comparison, some abundant facultative wetland species (FACW) including dense stands of reed bentgrass, New York aster (*Symphyotrichum novi-belgii*) and flat-topped aster (*Symphyotrichum umbellatus*) were distributed like FAC species where they were found more extensively in uplands than predicted, making them marginally useful or unpredictable for wetland boundary determinations.

The most consistent wetland predictors were rushes (*Juncus* spp.), most Carexes (*Carex* spp.), bulrushes (*Scirpus* spp.), spike-rushes (*Eleocharis* spp.), cotton grasses (*Eriophorum* spp.), high densities of most willows (*Salix* spp.), *Sphagnum* mosses, manna grasses (*Glyceria* spp.), and mountain holly (*Ilex mucronatus*). In scrub-shrub areas, species such as green alder, sensitive fern (*Onoclea sensibilis*), and meadowsweet (*Spiraea alba* ssp. *latifolia*) had to be carefully assessed when growing with fairly consistent local upland indicators such as blackberries (*Rubus allegheniensis*), lowbush blueberries (*Vaccinium angustifolium*), and white spruce (*Picea glauca*). By contrast, when green alder, sensitive fern, and meadowsweet were mixed with scattered sedges, dwarf raspberry (*Rubus pubescens* var. *pilosifolius*), and sweet gale (*Myrica gale*), the site would have been classified as wetland. Despite the historically disturbed nature of the soils, soil characteristics generally supported wetland boundary determinations.

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ENCLOSURE C

Summary Tables

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
AW1	PSS1, PUB4, PEM1	4.07	177,388.8	Yes	No	Large alder, *Spiraea alba* dominated wetland. Surrounds impounded pool (active beaver impoundment). Many areas along edges of wetland have been filled. Edges of pool dominated by PEM1. Likely originally part of a larger wetland complex but now bisected by roads.	□20,000 sq. ft. PEM
AW3	PFO1, PSS1, PEM1, PUB	117.65	5,124,659.8	Yes	No	Extensive wetland complex extending from northeast corner of the Base across the Sprague Neck parcel to the west to the ocean. Comprised of spruce, fir, *Sphagnum* spp. PFO; alder and *Spiraea* spp. PSS; and *Calamagrostis, Carex*, and *Rubus spp.* PEM. Includes at least five old or active beaver impoundments and boggy areas of PUB.	□20,000 sq. ft. PEM, Stream, Peatland
AW4	PFO1	0.27	11,630.3	Yes	No	Perched wetland on old road, hydrology from upslope areas. Drains into wetland AW3. Predominately PFO spruce, fir, tamarack; with alders, wild raisin, *Spiraea* spp. shrub layer; and *Calamagrostis* spp. in herbaceous layer.	
AW5	PSS1	0.15	6,643.6	Yes	No	Roadside PSS and potential vernal pool. Dominated by alders, *Spiraea* and wild raisin. Appears to be human-made and excavated as part of road building or berm creation.	
AW6	PSS1, PEM1	2.70	117,396.2	Yes	Partially	Extensive, includes several potential vernal pools. Meanders along what appear to be human-made berms (now naturalized). Disturbed areas abut much of the complex. Human-made trenches are a unique feature found in the northern portion of the wetland and extend from a PCB remediation site, through AW6 and into AW3. Wetland extends to road edge and is hydrologically connected to wetland to the south via drainage beneath the road. Wetland likely ties into AW3 near remediation site. Northeastern end of wetland polygon was closed off in GIS and not field delineated due to safety issues within the remediation area.	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
AW7	PSS1, PEM1	1.16	50,668.7	Yes	No	Dominated by alder, *Spiraea*, *Betula*, *Sphagnum*, and *Carex* spp. Wetland is hydrologically connected to AW6 via ephemeral drainages. Similar to AW6, much of this wetland abuts disturbed areas and meanders around human-made berms. Wetland is terraced above AW6. Part of AW7 is an active dump site, and dumping is occurring within a large potential vernal pool.	
AW8	PSS1, PEM1	0.13	5,776.4	Yes	No	Alder, *Spiraea*, wild raisin, *Sphagnum* spp. dominated wetland in low-lying area along perennial stream AS5. Wetland also receives hydrology via small drainages from AW3.	Stream
AW9	PFO1, PSS1	0.05	2,137.9	Yes	No	Small pocket of wetland that extends within Base property. Spruce, fir, *Sphagnum* spp. along edges and alder, wild raisin, *Spiraea*, *Sphagnum* spp. dominated toward center. Wetland continues off property to the north and is predominately PFO off property.	
BW1	PSS1	0.38	16601.4	Yes	No	Narrow wetland along road, human-made (or at least dug out next to a berm), hydrology mostly from upslope and roadside drainage, comprised primarily of alders.	
BW2	PFO1, PSS1, PEM1	49.69	2,164,490.3	Yes	No	Huge contiguous complex comprised of a mix of wetland types. Includes an open bog area and three streams (BS1, BS2, BS3).	≥20,000 sq. ft. PEM, Shorebird habitat, Shoreline buffer, Stream, Peatland
HFW1	PEM1, PSS4, PSS2, PFO4, PFO2	11.76	512,123.4	Yes	No	North edge of a large raised plateau bog complex (known locally as Kelly Bog) comprised of PEM1, PSS4, PSS2, PFO4 and PFO2 wetland types. Dominated by stunted ericaceous shrubs, black spruce, *Empetrum nigrum*, *Rubus chamemorus, Trichphorum caepitosum,* and over 90% *Sphagnum* spp. cover. Peat soils (histosols) up to 10 feet deep over marine clays.	IWWH, Peatland, Stream

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
HFW10	PSS1, PSS2	0.16	6,808.4	Yes	Partial	Dominated by willows, *Spiraea alba*, red maples, and larch (back 1–3). Herbaceous layer dominated by *Calamagrostis canadensis*, soft rush, *Carex* sedges, and *Spiraea alba*.	IWWH
HFW11	PSS1, PSS4	0.09	3,848.9	Yes	No	PSS1 on the east side of Antenna H-3 starting at the road and extending NE to the north boundary line. Dominated by willows, *Spiraea alba*, red maples, and larch. Herbaceous layer dominated by *Calamagrostis canadensis*, soft rush, sedges, and *Spiraea alba* with *Sphagnum* spp.in the Bryophyte layer.	IWWH
HFW12	PSS1, PEM1	10.87	473,567.1	Yes	Yes	Very large streamside PSS and PEM1 paralleling Huntley Stream starting at the culvert running east to the boundary. The PSS1 borders the stream (Speckled alder, green alder, willows, *Spiraea alba*, red shrub-sized red maple, *Glyceria* sp., *Calamagrostis canadensis,* and *Scirpus* sp.). The meadow is dominated by *Calamagrostis canadensis*, sedges and rushes, green alder, *Spiraea alba,* and scattered stunted ericaceous shrubs.	IWWH
HFW13	PEM1	0.02	849.9	Yes	Yes	Small PEM1 paralleling the road west of H-2 dominated by *Calamagrostis canadensis, Scirpus microdiscus*, sensitive fern, and sedges. Mowed.	IWWH
HFW14	PEM1	0.03	1,171.8	Yes	Yes	Small, poorly vegetated PEM1 with stunted ericaceious shrubs.	
HFW15	PSS1	0.02	688.7	Yes	No	Small PSS1 along fence above the forested gorge between C-3 and F-2 (Wet-12 extension).	
HFW17	PEM1	0.66	28,769.4	Yes	Yes	PEM1 dominated by *Calamagrostis canadensis* and sedges. Sections sparsely vegetated. Orchids common.	IWWH
HFW18	PEM1	10.25	446,634.6	Yes	Yes	Large PEM1 wetland surrounding Antennas H-1, K-3 and K-2. Sparsely vegetated west of Antenna H-1. Six species of orchids present among stunted ericaceous shrubs. Much open soil.	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
HFW19	PSS4, PEM1	0.56	24,444.8	No	Partially	PSS4 surrounding Antenna F-2 pad. Sparsely vegetated PEM1 inclusions located along the east side. Dominated by stunted larch, balsam fir, sedges, flat-topped goldenrod, flat-topped Symphyotrichum, raspberries, and *Calamagrostis canadensis*.	
HFW2	PEM1, PSS1	2.18	94,973.6	Yes	No	Large PEM1 and PSS1 complex on the southwest side of Huntley Brook. The PEM1 portion is dominated by *Calamagrostis canadensis*, sedges, scattered willows, *Spiraea alba,* and flat-topped Symphyotrichum. The PSS1 wetland is primarily found along the side of the brook and is dominated by speckled alder, willows, and *Spiraea alba*. Patches of PSS1 within the PEM1 are dominated by green alder, willows, and *Spiraea alba*.	IWWH, Stream
HFW20	PEM1	0.06	2,646.4	Yes	Yes	Small PEM1 running parallel to the road on the south SSW side of Antenna F-2. Dominated by *Calamagrostis canadensis, Scirpus microdiscus, Glyceria* sp., soft rush, and blue flag.	
HFW22	PSS1	0.04	1,776.5	Yes	No	Small PSS1 located at the top of the forested valley along the road between Antennas F-2 and C-1 (N side of road near the boundary fence). Dominated by red maple, *Ilex mucronata*, balsam fir, and *Spiraea alba*.	
HFW23	PEM1	0.54	23,352.4	Yes	Yes	Stunted PEM1 surrounding Antenna C-1. Located on coarse sand and gravel fill, it is dominated by *Empetrum nigrum*, sedges, scattered stunted ericaceous shrubs, soft rush, sedges (*Carex* spp.), and *Scirpus microdiscus, Spiraea alba, Spiraea tomentosa* and *Lonicera*.	
HFW27	PEM1	4.92	214,246.5	Yes	Yes	PEM1 along tree line west of H-2. Antenna fill colonized by stunted ericaceous shrubs, *Empetrum nigrum*, sedges, green alder, and five species of orchids. Meadow along the tree line dominated by *Calamagrostis canadensis*, sedges, green alder, and *Spiraea alba*.	IWWH

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
HFW27A	PEM1	0.01	431.0	Yes	Yes	Small PEM1 along W tree line W of H-2. Antenna fill colonized by stunted ericaceous shrubs, *Empetrum nigrum*, sedges, green alder and five species of orchids. Meadow along the tree line dominated by *Calamagrostis canadensis*, sedges, green alder, and *Spiraea alba*.	IWWH
HFW28	PEM1	0.08	3419.1	Yes	Yes	Small PEM1 Inclusion below Wet-27 along H-2 access road. Dominated by sedges and *Calamagrostis canadensis*.	
HFW29	PEM1, PSS2	0.14	6,013.3	Unknown	Partially	Regenerating wetlands on sand and gravel fill. Bog vegetation redevelopment is exemplary.	
HFW3	PFO2, PFO4	3.32	144,630.6	Yes	No	PFO2 and PFO4 wetland complex that extends north from the SE corner of the HF site to the paved road; dominated by larch, Balsam fir, red and black spruce, red maple, speckled alder, and *Ilex mucronata*. *Osmunda* spp., bunchberry, *Rubus hispidula*, and *Carex trisperma* were common in the herb layer. *Sphagnum* spp. comprised most of the bryophyte layer.	IWWH
HFW30	PEM1	0.26	11,485.3	Yes	Yes	PEM1 SW of Antenna SC-1. Near road and dominated by *Calamagrostis canadensis*, rushes, and sedges.	IWWH
HFW4	PFO4 with PSS1 inclusion	0.21	9,071.6	Yes	No	Small mixed PSS (PSS1 □ PSS2) addition to the PFO portion of HFW4, extending NNW from the end of the road to Antenna Q-2. It starts at the road and extends NW to the HF boundary fence. It is dominated by larch, Balsam fir, green alder, willows, and *Spiraea alba*. Scattered sedges and rushes were present.	IWWH
HFW6	PSS1, PFO2	0.52	22,729.9	Yes	No	Narrow streamside PSS1 band running parallel to the north side of the paved access road and south side of Huntley Brook. Dominated by speckled alder, *Spiraea alba, Calamagrostis canadensis*, larch, and red maples with PFO2 inclusions.	IWWH

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
HFW7	PSS1, PEM1	4.70	204,529.7	Yes	Yes	PSS1/PEM1 along the SE side of Huntley Brook starting at the culvert under Huntley Brook and extending east to the boundary. Dominated by speckled alder, willows, and *Spiraea alba* along the stream. Herbaceous layer dominated by *Calamagrostis canadensis*, soft rush, *Carex* sedges, *Spiraea tomentosa*, and *Spiraea alba*.	IWWH
HFW8	PSS1, PEM1	6.72	292,677.9	Yes	Yes	PSS1/PEM1 along the NW side of Huntley Brook starting at the road over Huntley Brook and extending west to the forest line below Q-2. Dominated by speckled alder, willows, and *Spiraea alba* along the stream. Herbaceous layer dominated by *Calamagrostis canadensis*, soft rush, *Carex sedges, Spiraea tomentosa*, and *Spiraea alba*.	IWWH
NWA11	PEM1, PSS1	162.12	7,061,908.8	Yes	Yes	Extensive wetland complex covering most of the western half of the South tower field, with numerous upland islands. Area last mowed in fall 2012. Topography and soils historically disturbed and evidence of disturbance found throughout. Wetland is dominated by PEM, but also large areas of PSS below 1 meter height. Dominant vegetation includes *Alnus viridula crispa*, *Myrica gale*, *Spiraea alba*, *Salix* spp., *Calamagrostis canadensis*, *Equisetum arvense*, *Carex niger*, *Carex scoparia*, *Scirpus microcarpus*, *Eleocharis* spp., *Symphyotrichum novi-belgii*, *Fragaria virginiensis*, *Potentilla simplex*, and *Rubus pubescens*.	Shoreline buffer
NWA12	PEM1, PSS1	5.80	252,476.2	Yes	Yes	Large wetland adjacent to Ridge Road in the western half of the south tower field. Wetland is dominated by PEM, with large portions of PSS. Dominant vegetation includes green alder, sweet gale, *Spiraea*, *Carex* spp., *Scirpus* spp., and *Calamagrostis canadensis*.	
NWA13	PEM1, PSS1	0.90	39,255.5	Yes	Yes	Small wetland adjacent to the south side of Ridge Road in the western half of the south tower field. Wetland is associated with roadside drainage ditch and seepage slope. Wetland is dominated by PEM vegetation with portions of PSS.	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA14	PEM1	0.21	9,241.1	Yes	Yes	Small wetland adjacent to the south side of Ridge Road in the western half of the south tower field. Wetland is associated with roadside drainage ditch. Wetland is dominated by PEM vegetation dominated by *Carex nigra*.	
NWA15	PEM1, PSS1	9.00	392,100.7	Yes	Yes	Large wetland that is adjacent to wetland NWA11 via culvert under a gravel road. Wetland consists of PEM and PSS portions and contains a single small upland island.	
NWA16	PEM1, PSS1	0.74	32,231.8	Yes	Yes	Small isolated wetland in the western half of the south tower field. Wetland consists of a small depression at the top of a hill. Wetland is dominated by PEM vegetation dominated by *Scirpus* and *Carex* spp.	
NWA17	PEM1	1.26	54,857.0	Yes	Yes	Large isolated wetland in the western half of the south tower field. Wetland is dominated by PEM vegetation. Wetland separated from wetland NWA18 by narrow strip of wetland.	
NWA18	PEM1, PSS1	1.06	46,090.7	Yes	Yes	Large isolated wetland in the western half of the south tower field. Wetland has portions with PEM and PSS vegetation. Wetland separated from wetland NWA17 by narrow strip of wetland.	
NWA19	PSS1, PEM1	0.22	9,503.5	Yes	No	Narrow wetland along/within a drainage ditch that abuts a road edge and surrounds the power station. Possibly portions were originally a natural wetland area, but now highly disturbed/modified. Dominant vegetation includes *Alnus viridula crispa, Spiraea alba, Calamagrostis canadensis, Typha angustifoloia, Eleocharis* spp., *Symphyotrichum novi-belgii, Symphyotrichum umbellatus, Rubus idaeus,* and *Potentilla simplex*. One culvert found.	Shoreline buffer
NWA20	PSS1, PEM1	0.03	1,455.9	Yes	No	Wetland is a continuation of NWA19, but wetlands are separated by a 6-foot wide road into the power station tank field. No culvert. Same characteristics, species, and general location along power plant. Three culverts found.	Shoreline buffer

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA21	PSS1, PEM1	0.14	6,210.8	Yes	No	Narrow wetland along what may□may not be a natural stream (stream not yet mapped). Entire area disturbed□topography modified. Receives flow from wetlands NWA19 □ NWA20 via a culvert. South end of wetland widens and is somewhat brackish. Dominant vegetation includes *Alnus viridula crispa, Spiraea alba, Calamagrostis canadensis, Symphyotrichum novi-belgii, Symphyotrichum umbellatus, Rubus idaeus, Panicum virgatum, Rumex longifolium, Solidago sempervirens, Potentilla simplex, Agropyron* spp., *Iris versicolor, Euthamia* spp., and numerous grasses. One culvert found.	FEMA 100-year flood zone, Shorebird habitat, Shoreline buffer
NWA22	PSS1, PEM1	0.33	14,542.2	Yes	No	Narrow wetland that follows a natural perennial stream and roadside ditches (stream and ditches not yet mapped). Dominant species include *Alnus viridula crispa, Salix* spp., *Spiraea alba, Calamagrostis canadensis, Scirpus cyperinus, Symphyotrichum novi-belgii, Symphyotrichum umbellatus, Rubus idaeus*, *R. Impatiens capensis, Glyceria* spp., *Onoclea sensibilis, Gallium triffidum, Equisetum arvense*, and numerous grasses. Two culverts found.	Shorebird habitat, Shoreline buffer

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA23	PSS1, PEM1	3.51	153,077.1	Yes	No	Wetland complex in low-lying areas adjacent to stream NSA-15, comprised of PSS (alder) thickets and some locations of extremely dense near monocultures of *Calamagrostis canadensis* with thickets of *Spiraea*. A portion of the wetland is narrow and follows stream NSA-15. Dominant species include *Alnus viridula crispa, Salix* spp., *Spiraea alba, Betula populifolia, Calamagrostis canadensis, Symphyotrichum novi-belgii, Symphyotrichum umbellatus, Rubus idaeus, R. hispidus, R. pubescense* var. *pilosilfolius, Impatiens capensis, Glyceria* spp., *Onoclea sensibilis, Gallium triffidum, Equisetum arvense*, and numerous grasses. Many species that would typically occur in uplands were also found throughout (*Rubus allegheniensis, Phleum pratense, Fragaria virginiensis, Populus tremuloides*, and the invasive species *Galeopsis tetrahit*). Two culverts found.	Shorebird habitat, Shoreline buffer
NWA24	PSS1, PEM1	1.94	84,620.7	Yes	No	Similar to NWA23, wetland complex is found along and immediately adjacent to a small ephemeral stream (NSA-16). Species composition is similar, including the presence of dense monocultures of *Calamagrostis* and *Spiraea*. Many species that would typically occur in uplands were also found throughout (*Rubus allegheniensis, Phleum pratense, Fragaria virginiensis, Populus tremuloides*, and the invasive species *Galeopsis tetrahit*). Two culverts found.	Shorebird habitat, Shoreline buffer
NWA26	PSS1, PEM1	0.19	8,456.1	Yes	No	Tidal freshwater wetland with PSS fringe dominated by *Alnus viridus, Spiraea alba,* and *Calamagrostis canadensis*. Center of wetland vegetated but inundated. Dominant species include *Alnus viridula crispa, Spiraea alba, Calamagrostis canadensis, Typha angistifolia, Scirpus cyperinus, Iris versicolor, Carex crinita, Polygonum sagittatum, Sparganium eutycarpum, Leersia oryzoides, Juncus effusus, Schoenoplectus tabernaenmontani*, and several grass species. Two culverts found.	FEMA 100-year flood zone, Shoreline buffer

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA27	PSS1, PEM1, PUB	10.12	440,708.6	Yes	No	Large and diverse tidal freshwater wetland complex bisected by roads and tower pads□access berms. Southern end with brackish plants. Center of wetland is comprised of two ponds (with active beaver) transitioning into dense alder-dominated thickets. Dominant species include *Alnus viridula crispa, Spiraea alba, Betula populifolia, Calamagrostis canadensis, Typha angistifolia, Scirpus cyperinus, Potentilla anserina, Rose* spp., *Iris versicolor, Carex crinita, Sparganium eutycarpum, Leersia oryzoides, Juncus effusus, Schoenoplectus tabernaenmontani, Myrica gale, Scirpus americanus, Spartina alterniflora, Eleocharis* spp., and several grass species. Five culverts found.	FEMA 100-year flood zone, □20,000 sq. ft. PEM, Shoreline buffer
NWA28	PSS1, PEM1	0.39	17,078.8	Yes	No	Small isolated wetland in depression behind dune□coastal rock berm, mostly emergent, but some shrub along edges. Dominant species include *Alnus viridula crispa, Spiraea alba, Salix* spp., *Atriplex glabriuscula, Calamagrostis canadensis, Carex paleacea* (?), *Potentilla anserina, Rose* spp. (*Palustris*?), *Solidago sempervirens*, *Juncus gerardii, Schoenoplectus tabernaenmontani, Scirpus americanus, Spartina* spp., and *Eleocharis* spp. Salt-tolerant plants observed, no culverts found.	Shoreline buffer
NWA29	PSS1	1.47	64,030.6	Yes	No	Alder-dominated wetland that likely receives hydrology from wetland NWA-27, but no culverts were located. Some small pockets of standing water throughout. Dominant species include *Alnus viridula crispa, Salix* spp. *Betula populifolia, Populus tremuloides, Spiraea alba, Calamagrostis canadensis, Solidago rugosa, Equisetum* spp., *Symphyotrichum novi-belgii, Symphyotrichum umbellatus, Rubus idaeus*, and several grass species.	Shoreline buffer

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA30	PSS1, PEM1, PUB	19.35	843,006.1	Yes	No	Large wetland complex comprised of open ponds, PEM and PSS and numerous areas of dense monocultures of *Calamagrostis canadensis* with dense pockets of *Spiraea alba*. Wetland has been ditched (visible on satellite imagery) and as a result soils are highly disturbed and there are numerous upland soil disposal areas within wetland. Species composition is diverse and includes many upland plants. Dominant species include *Alnus viridula crispa, Salix* spp., *Betula populifolia, Spiraea alba, Calamagrostis canadensis, Symphyotrichum novi-belgii, Symphyotrichum umbellatus, Rubus idaeus*, *R. hispidus, R. pubescense* var. *pilosilfolius, Impatiens capensis, Glyceria* spp., *Onoclea sensibilis, Osmunda cinnamomea, Osmunda claytoniana, Betula populifolia, Gallium triffidum, Equisetum arvense*, and numerous grasses. Many species that would typically occur in uplands also were found throughout (*Rubus allegheniensis, Picea rubens, Phleum pratense, Fragaria virginiensis, Pteridium aquillinum, Populus tremuloides*, and the invasive species *Galeopsis tetrahit*). One culvert found, but more likely exist. Evidence of recent beaver activity resulting in some PUB area.	□20,000 sq. ft. PEM, Shoreline buffer
NWA31	PEM1	0.05	2,066.5	Yes	Yes	Small emergent roadside wetland associated with larger PFO wetland off property. Wetland adjacent to NWA32 via culvert under access road. Plant species include *Scirpus* sp., *Carex* sp., *Sphagnum* spp., *Rhododendron canadense*, *Ledum groenlandicum*, *Calamagrostis canadense*, and *Spiraea alba* var. *latifolia*.	
NWA32	PEM1	0.00	64.3	Yes	Yes	Small emergent roadside wetland associated with larger PEM□PSS wetland off property. Wetland adjacent to NWA31 via culvert under access road. Plant species include *Scirpus* sp., *Carex* sp., and *Sphagnum* spp.	

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA33	PSS1	1.44	62,697.7	Yes	Partially	Hydrologic connection to wetlands within mowed tower field via road culverts. Wetland associated with a large likely human-made channel extending east-west. Vegetation dominated by *Alnus viridis, Populus tremuloides, Betula populifolia, Spiraea alba* var. *latifolia, Calamagrostis canadense, Scirpus* sp., *Symphyotrichum umbellatus*, and *Solidagos*. Several upland fill piles along road edge within wetland.	Shoreline buffer
NWA34	PSS1	5.09	221,796.6	Yes	No	Hydrologically connected to other wetlands surrounding tower N-9. Flow leaves wetland to coastline via culverts at road crossings. Dominant species include *Alnus viridula crispa, Salix* spp. *Betula populifolia, Populis tremuloides, Spiraea alba, Calamagrostis canadense, Solidago rugosa, Equisetum* spp., *Symphyotrichum novi-belgii, Symphyotrichum umbellatus, Rubus idaeus*, and several grass species. Hummocky area includes several small upland inclusions.	FEMA 100-year flood zone, Shoreline buffer, TWWH
NWA35	PSS1	0.07	2,949.7	Yes	No	Small swale with intermittent hydrologic connection to NWA34. No culvert at road edge but flow extends along road side ditches. Area dominated by *Alnus viridula crispa*.	FEMA 100-year flood zone
NWA36	PSS1	0.11	5,001.4	Yes	No	Roadside swale, dominated by *Alnus viridula crispa*.	FEMA 100-year flood zone
NWA38	PSS1	0.38	16,347.6	Yes	No	Roadside swale at toe of slope. Several PVPs in complex. Area dominated by *Alnus viridula crispa*.	Shoreline buffer
NWA39	PSS1	0.72	31,541.7	Yes	No	Hummocky fill piles and linear ditch-like features throughout. Likely hydrologically connected to NWA37 □ NWA30, but direct connection could not be identified. Species composition similar to NWA30.	Shoreline buffer
NWA40	PSS1	0.02	1,067.4	Yes	No	Roadside wetland caused by berm of road. Area dominated by *Alnus viridula crispa*.	Shoreline buffer, Stream

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA41	PSS1, PEM1	0.57	24,919.1	Yes	No	Hummocky area with fill berms near road. Hydrologically connected to NWA42 and likely other wetlands in the south tower field via road culverts. Also likely connected to NWA30, but unable to confirm based on site conditions. Dominant species same as wetland NWA30.	
NWA42	PSS1, PEM1, PUB	2.98	129,733.2	Yes	No	Active beaver impoundment and fringe PSS□PEM tidal freshwater wetland complex. Hydrologically connected to NWA41 and wetlands in south tower field via road culverts. Southern end with more brackish-tolerant plants. Fringe is primarily dense alder-dominated PSS thickets transitioning into PEM. Dominant species include *Alnus viridula crispa, Spiraea alba, Betula populifolia, Calamagrostis canadense, Typha angistifolia, Scirpus cyperinus, Potentilla anserina, Rose* spp. , *Iris versicolor, Carex crinita, Sparganium eutycarpum, Leersia oryzoides, Juncus effusus, Schoenoplectus tabernaenmontani, Myrica gale, Scirpus americanus, Spartina alterniflora, Eleocharis* spp., and several grass species. One large culvert on north end of wetland and several smaller culverts along road on south end.	□20,000 sq. ft. PEM, Shoreline buffer

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA43	PSS1, PEM1, PSS1	36.65	1,596,351.2	Yes	No	Large wetland with several vegetative communities. Hydrology affected by active beaver pond and impounded by outer perimeter road. Culvert under the outer perimeter road (stream NSA35) provides hydrologic connection to the ocean. Hydrologically connected to wetlands in south tower field via road culverts, additional culverts along southern□eastern road edge. Southern end with more brackish-tolerant plants. Fringe is primarily dense alder-dominated PSS thickets transitioning into PEM. Dominant species include *Alnus viridula crispa, Spiraea alba, Betula populifolia, Calamagrostis canadense, Typha angistifolia, Scirpus cyperinus, Potentilla anserina, Rose* spp., *Iris versicolor, Carex crinita, Sparganium eutycarpum, Leersia oryzoides, Juncus effusus, Schoenoplectus tabernaenmontani, Myrica gale, Scirpus americanus, Spartina alterniflora, Eleocharis* spp., and several grass species.	FEMA 100-year flood zone, □20,000 sq. ft. PEM, Shoreline buffer, Stream
NWA44	PEM1, PFO1	3.66	159,257.8	Yes	No	Small bog and forested wetland. Dominant vegetation in bog portion includes *Iris versicolor, Eriophorum angustifolium, Osmunda cinnamomea, Carex cannescens, Vaccinium oxycoccus, Symphyotrichum puniceum, Rhododendron groenlandicum, Carex trisperma, Carex magellanica,* and *Sphagnum* spp. PFO portion dominated by *Picea mariana, Abies balsamea, Picea rubra, Larix laracina, Carex trisperma, Carex* spp., and *Sphagnum* spp. *Alnus viridula crispa* shrub layer around bog perimeter.	FEMA 100-year flood zone, Shorebird habitat, Shoreline buffer

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA45	PFO4	19.00	827,589.0	Yes	No	Extensive spruce-fir wetland, hummocky pit-mound micro-topography, shallow soils on bedrock scattered throughout, many areas with deep organic soil. Standing water observed near surface in tip-up pits throughout. Spodosols some follist soils in uplands nearby. Dominated by overstory of *Picea* (red, black, hybrid), *Abies balsamea, Sorbus americana*, and scattered *Betula papyrifera*. Sparse shrub layer of sapling tree species. Ground cover dominated by *Sphagnum* spp. (up to 10 inches thick in some areas), *Cornus canadensis*, and grasses. Complex perched on peninsula and elevated 20□feet above high tide line. Associated with stream NSA22.	Shorebird habitat, Shoreline buffer, Stream
NWA46	PFO1	0.64	27,876.7	Yes	No	Same overall characteristics as NWA45. Two ravines with ephemeral drainages extend from peninsula interior□wetland to the coastline (NSA23 □ NSA24).	Shorebird habitat, Shoreline buffer
NWA46A	PFO1	6.42	279,814.4	Yes	No	Separated from NWA46 by small access road. It was previously likely part of the same forested wetland feature.	Shorebird habitat, Shoreline buffer, Stream
NWA47	PFO1	1.33	58,138.7	Yes	No	Same overall characteristics as NWA45, but small area and elevation closer to 5 feet above high tide line. Evidence of tidal influence along wetland edges, especially toward west end of complex.	FEMA 100-year flood zone, Shorebird habitat, Shoreline buffer
NWA48	PFO, PSS	0.84	36,674.1	Yes	No	Terraced area on peninsula, elevated 20□feet above high tide line. Canopy dominated by *Picea* spp. and *Abies balsamea*, but center of complex is open with average of 10 inches of standing water on organic soil over shallow bedrock. Open area dominated by *Sphagnum* spp., *Iris versicolor, Eleocharis, Equisetum fluviatile, Calamagrstis canadensis,* and *Ribes glandulosum*. Edges are dominated by *Alnus viridula crispa*.	FEMA 100-year flood zone, Shoreline buffer

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA49	PFO1	4.36	189,900.4	Yes	No	Same overall characteristics as Wetland NWA45 and hydrologically connected via culvert beneath Sprague Neck Road, but *Sphagnum* spp. in understory herb layer less dominant with greater prevalence of herbs such as *Trientalis borealis, Cornus canadensis, Oxalis montana,* and *Dryopteris intermedia*. Ravine with ephemeral drainage extends from peninsula interior wetland to the coastline (NSA25).	Shoreline buffer, Stream
NWA50	PFO1	7.28	317,224.6	Yes	No	Same overall characteristics as Wetland NWA45 and connected to NWA45 via a culvert beneath Sprague Neck Road. Large older growth forest with numerous large diameter *Picea, Abies balsamea,* and *Betula papyrifera* in center of complex visible on aerial imagery. Two ravines with ephemeral drainages extend from peninsula interior wetland to the coastline (NSA26 – NSA27).	Shoreline buffer, Stream
NWA52	PSS1, PEM2	0.03	1,466.8	Yes	No	Small pocket wetland sits in a depression directly adjacent to coast but above marine line. Soils dark, fibric, and shallow over bedrock. Dominant species include *Alnus viridis, Salix bebbii, Spiraea alba, Impatiens capensis, Iris versicolor, Onoclea sensibilis, Symphyotrichum umbellatus, Solidago* spp., and *Calamagrostis canadense* along edges.	Shoreline buffer
NWA53	PSS1, PEM1	0.01	563.3	Yes	Yes	Small roadside drainage, but also hydrologically connected to adjacent wetlands. Mostly PEM, but would be PSS not mowed. Includes an ABA that had frogs in it at time of survey. Dominant shrubs/vines include *Alnus viridis* and *Spiraea alba, Fragaria virginiana*, and *Potentilla simplex*. Herb layer dominated by *Calamagrostis canadense, Carex scoparia, Scirpus atrovirens, Scirpus cyperinus, Eleocharis species, Juncus tenuis, Solidago* spp., and several unidentifiable grasses.	Shoreline buffer

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA54	PSS1, PEM1	0.04	1,568.6	Yes	Yes	Continuation of water flow from NWA52. Small roadside drainage, but also hydrologically connected to adjacent wetlands. Mostly PEM, but would be PSS not mowed. Standing water present in wetland at time of survey. Dominant shrubs/vines include *Alnus viridis* and *Spiraea alba, Fragaria virginiana,* and *Potentilla simplex*. Herb layer dominated by *Calamagrostis canadense, Carex scoparia, Scirpus atrovirens, Scirpus cyperinus, Eleocharis species, Juncus tenuis, Solidago* spp., and several unidentifiable grasses.	Shoreline buffer
NWA55	PEM1	0.14	6,134.1	Yes	No	Pocket wetland sits in a depression directly adjacent to coast but above marine line. Likely hydrologically connected to adjacent wetland across road (NWA26), which is connected to NWA27, but no culvert found. Soils dark, fibric, and shallow over bedrock. Dominant species include a near monoculture of *Calamagrostis canadense* with some scattered *Scirpus cyperinus* and *Lysimachia terrestris*. *Solidago, Euthamia* spp.; *Spiraea alba*; and *Alnus viridis* become dominant along wetland perimeter.	FEMA 100-year flood zone
NWA56	PEM1	0.10	4,430.2	Yes	Yes	Narrow roadside swale, hydrologically connected to adjacent wetlands via road swale/ditch. Ends at a culvert. Would likely have a higher PSS component if not mowed. Likely formerly all one large wetland complex before road. Soils primarily fill material. Dominant species include *Carex nigra, Carex cryptolegus, Carex scoparia, Scirpus cyperinus, Scirpus atrovirens, Juncus tenuis*, and scattered *Iris versicolor*. Also scattered *Spiraea alba, Alnus viridis*, and *Larix laricina* (but mowed recently).	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA57	PEM1	0.17	7,417.7	Yes	Yes	Narrow roadside swale, hydrologically connected to adjacent wetlands via road swale ditch. Ends at a culvert. Would likely have a higher PSS component if not mowed. Likely formerly all one large wetland complex before road. Soils primarily fill material. Dominant species include *Carex nigra, Carex cryptolegus, Carex scoparia, Scirpus cyperinus, Scirpus atrovirens, Juncus tenuis*, and scattered *Iris versicolor*. Also scattered *Spiraea alba, Alnus viridis*, and *Larix laricina* (but mowed recently).	
NWA58	PSS1, PEM2	0.18	7,907.1	Yes	No	Ends at culvert, ties into roadside wetland NWA36. Dominated by *Alnus viridula crispa, Spiraea alba,* and a small amount of *Salix* along road edge, but also has a PEM component within a mowed area associated with tower cable support. PEM area dominated by *Carex crinite; Carex scoparia; Scirpus atrovirens; Scirpus cyperinus; Eleocharis* spp.; *Juncus effuses; Juncus tenuis; Symphyotrichum puniceum; Solidago, Euthamia* spp.; scattered *Osmunda regalis; Fragaria virginiana;* and *Potentilla simplex* as well as several unidentifiable grasses. Associated with two ephemeral drainages.	FEMA 100-year flood zone
NWA59	PEM1	0.18	7,817.5	Yes	Yes	Pocket wetland sits in a depression between the road and coastline berm. Ties into marine wetland line. Soils mostly deep, dark, fibric. Standing water within wetland center. Dominant species include *Typha latifolia, Scirpus validus, Scirpus atrocinctus, Juncus acuminatus, Iris versicolor* and *Sphagnum* spp. Also Symphyotrichum species; *Solidago, Euthamia* spp., *Calamagrostis canadense*; *Alnus viridis; Salix bebbii;* and *Spiraea alba* along perimeter. Likely part of wetland NWA43 prior to road construction. Portion of wetland along road edge mowed.	FEMA 100-year flood zone

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA60	PEM1	0.17	7,237.6	Yes	No	Similar to Wetland NWA59. Pocket wetland sits in a depression between the road and coastline berm. Ties into marine wetland line. Soils mostly deep, dark, fibric. Standing water within wetland center. Dominant species include *Typha latifolia, Calamagrostis canadense, Sphagnum* spp., and scattered *Iris versicolor*. Also *Alnus viridis, Salix bebbii*, and *Spiraea alba* along perimeter. Likely part of wetland NWB15 prior to road construction, now connected via culvert.	FEMA 100-year flood zone, Shoreline buffer
NWA61	PEM1	0.00	95.3	No	No	Extremely small isolated small wet depression from surface water drainage. Dominated by monoculture of *Calamagrostis*. Soil saturated but less than 2 inches of leaf litter/roots/organic. Low-value/quality wet area with limited wetland function/value.	FEMA 100-year flood zone, Shoreline buffer
NWA62	PEM1	0.64	27,961.9	Yes	No	Pocket wetland sits in a depression between the road and coastline berm. Ties into marine wetland line. Soils with depleted matrix. Near monoculture of *Calamagrostis canadense*. *Alnus viridis, Spiraea alba*, and scattered *Iris versicolor* along perimeter. Likely part of wetland NWB14 prior to road construction, now connected via culvert.	FEMA 100-year flood zone, TWWH
NWA63	PEM1	0.06	2,572.1	Yes	No	Pocket wetland sits in depression between the road and coastline berm. Ties into marine wetland line. Soils with depleted matrix. Near monoculture of *Calamagrostis canadense*, scattered *Lysimachia terrestris*, and Iris versicolor. *Alnus viridis* and *Spiraea alba* along perimeter. Likely part of wetland NWB14 prior to road construction, now connected via culvert.	FEMA 100-year flood zone, TWWH

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA64	PEM1	0.13	5,654.7	Yes	No	Small pond, low depression between the road and coastline berm. Ties into marine wetland line. Soils mostly deep, dark, fibric but also many areas of shallow dark soil with fill material. Standing water within pond in wetland center. Dominant species include *Typha latifolia*, but also *Calamagrostis canadense, Lysimachia terrestris, Iris versicolor, Scirpus atrocinctus, Carex scoparia, Scirpus cyperinus, Juncus acuminatus* (?), *Juncus tenuis*, and *Carex vulpenoidea*. *Alnus viridis, Myrica*, and *Spiraea alba* along perimeter. Likely part of wetland NWB12 prior to road construction, now connected via culverts.	FEMA 100-year flood zone
NWA65	PEM1	0.10	4,236.3	Yes	No	Low depression between the road and coastline berm. Ties into marine wetland line. Soils shallow, dark with fill material and some organic and roots. Challenging area, dominated by *Calamagrostis canadense, Spartina pectinata, Iris versicolor*, and small *Myrica gale* shrubs, but also many upland plants. Likely part of wetland NWB12 prior to road construction.	FEMA 100-year flood zone
NWA66	PEM1	0.03	1,158.0	Yes	No	Small wetland in depression between road and coastline. Dominant species include *Calamagrostis canadense* and *Spartina pectinata*. Other species include *Lysimachia terrestris, Iris versicolor, Carex scoparia, and Spiraea alba* along perimeter. Likely part of wetland NWB12 prior to road construction, no culvert connection located.	FEMA 100-year flood zone
NWA67	PEM1	0.03	1,438.4	Yes	No	Pond and wetland in low depression between the road and coastline berm. Ties into marine wetland line. Soils mostly deep, dark, fibric. Standing water within pond in wetland center. Dominant species include *Typha latifolia, Lysimachia terrestris, Iris versicolor, Scirpus atrocinctus, Glyceria* spp., *Carex scoparia, Scirpus cyperinus, Juncus effusus, Juncus tenuis, Spartina pectinata,* and *Calamagrostis canadense*. *Alnus viridis* and *Spiraea alba* along perimeter. Likely part of wetland NWB12 prior to road construction, now connected via culvert.	FEMA 100-year flood zone

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWA9	PFO4, PSS1, PEM1, PUB	77.89	3,392,835.1	Yes	No	Extensive wetland complex extending from southeast of the wetland mitigation site to the south□southwest across Sprague Neck toward the ocean. Similar to wetland AW3, this complex is comprised primarily of alder; *Spiraea*; *Calamagrostis* PSS; spruce, fir, *Sphagnum* spp. PFO; *Calamagrostis*, *Carex*, *Rubus* dominated PEM. Includes several old active beaver impoundments□*Sphagnum* spp.-dominated bog areas. This wetland is a different complex from AW9.	FEMA 100-year flood zone, □20,000 sq. ft. PEM, Shorebird habitat, Shoreline buffer, Stream
NWB10	PEM1, PSS1	0.22	9,757.3	Yes	Yes	Small wetland in large upland ridge separating wetlands NWB5 and NWB4. Wetland likely adjacent to NWB4 via overland sheet flow. Plant species include *Scirpus atrocinctus, Scirpus cyperinus, Carex scoparia, Symphyotrichum umbellatus, Calamagrostis canadense,* and *Spiraea alba* var. *latifolia*.	
NWB11	PEM1	0.59	25,786.7	Yes	Yes	Small wetland located at intersection of Buster Blvd. and Wildlife Drive, across the street from Ridge Road. Wetland dominated by emergent vegetation consisting of *Calamagrostis canadense, Typha angustifolia, Typha latifolia,* and *Solidago rugosa*. Shrub vegetation dominated by *Spiraea alba* var. *latifolia*. Wetland is partially ditched with surface water flowing directly into Little Machias Bay.	FEMA 100-year flood zone, Shoreline buffer, TWWH
NWB12	PEM1, PSS1	6.83	297,700.5	Yes	No	Large PEM□PSS wetland between inner and outer perimeter roads on east side of south tower field. Vegetation dominated by *Typha angustifolia, Calamagrostis canadense, Scirpus* sp., *Spartina pectinata, Spiraea alba* var. *latifolia, Spiraea tomentosa, Salix* spp., *Alnus viridis, Populus tremuloides,* and *Symphyotrichum umbellatus*.	FEMA 100-year flood zone, □20,000 sq. ft. PEM, Shoreline buffer, Stream
NWB13	PEM1, PSS1	0.49	21,518.7	Yes	No	Small PEM1□PSS1 wetland between inner and outer perimeter roads on east side of south tower field. Vegetation dominated by *Carex nigra, Scirpus* sp., *Scirpus microcarpus*, *Eriophorum* sp., *Spiraea alba* var. *latifolia*, *Salix* spp., and *Juncus balticus*.	FEMA 100-year flood zone

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWB14	PSS1, PEM1	18.77	817,569.8	Yes	No	Large PSS/PEM wetland between inner and outer perimeter roads on east side of south tower field. Vegetation dominated by *Alnus viridis, Populus tremuloides, Betula populifolia, Spiraea alba* var. *latifolia, Calamagrostis canadense, Scirpus* sp., *Symphyotrichum umbellatus,* and *Solidago rugosa*.	FEMA 100-year flood zone, Shoreline buffer
NWB15	PSS1, PFO1, PEM1, and PUB portions	48.68	2,120,528.7	Yes	No	This is a large PSS/PEM wetland located between the inner and outer perimeter roads on the south side of the south tower field, with PFO and PUB portions. It is separated from wetland NWB14 by an upland ridge (likely fill). Portion of wetland hydrology affected by beaver dam and road impoundment. Several plant communities identified within the wetland. Dominant species overall include *Salix* spp., *Calamagrostis canadense, Spiraea alba* var. *latifolia*, *Myrica gale, Populus tremuloides, Betula papyrifera, Alnus viridus, Carex* spp., *Picea mariana*, and *Larix laracina*.	FEMA 100-year flood zone, Shoreline buffer, TWWH
NWB16	PUB with PSS fringe	0.19	8,408.0	Yes	No	Wetland appears to be located in a gravel borrow pit. The wetland consists of a PUB portion with a small PSS wetland fringe. Vegetation consists of *Spiraea alba* var. *latifolia*, *Alnus viridus*, *Salix* spp., *Viburnum nudum, Calamagrostis canadense*, and *Carex nigra*.	
NWB17	PEM1	0.22	9,586.1	Yes	No	Small wetland in gravel pit area. Soils poorly developed and consist primarily of gravel. Vegetation dominated by *Scirpus atrocinctus, Scirpus cyperinus, Vaccinium macrocarpon, Carex silicea, Juncus* spp., *Viola macloskey, Drosera rotundifolia, Salix alba*, and *Salix bebbiana*.	
NWB18	PSS1	2.30	100,282.1	Yes	No	Wetland hydrologically connected to wetland NWB15 via overland sheet flow. Wetland hydrologically connected to wetland NWB20 via roadside ditch (DNSB8). Vegetation dominated by *Sphagnum* spp., *Spiraea alba* var. *latifolia, Alnus viridus, Salix* spp., *Rhododendron groenlandicum*, *Rubus* sp., *Rhododendron canadensis, Larix laracina, Betula papyrifera*, and *Maianthemum trifolium*.	Peatland, Shoreline buffer

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWB19	PSS1	0.06	2,672.1	Yes	No	Small wetland associated with roadside ditch. Vegetation dominated by *Eleocharis* sp., *Spiraea alba* var. *latifolia*, *Alnus viridus*, *Calamagrostis canadense*. Ponded by outer perimeter road. Overland sheet flow into wetland from trail to north.	Shoreline buffer
NWB20	PSS1	0.06	2,658.6	Yes	No	Small wetland associated with roadside ditch. Vegetation dominated by *Salix alba, Spiraea alba* var. *latifolia*, *Alnus viridus, Salix bebbiana, Salix discolor, Eleocharis* spp., *Scripus atrocinctus*, and *Eriophorum angustifolium*. Ponded by outer perimeter road. Culvert provides intermittent hydrologic connection to the ocean under the outer perimeter road.	Shoreline buffer
NWB21	PSS1	0.08	3,565.0	Yes	No	Small wetland in gravel pit area associated with borrow pit and ditch. Vegetation dominated by *Salix discolor*, *Spiraea alba* var. *latifolia, Alnus viridus, Rhododendron canadense, Calamagrostis canadensis, Onoclea sensibilis, Lycopus uniflorus*, and *Carex cannescens*.	
NWB23	PFO1	0.10	4,176.6	Yes	No	Small forested wetland along Sprague Neck Road. Separated from wetland NWA44 by Sprague Neck Road. Dominant vegetation consists of *Picea mariana, Osmunda cinnamomea, Spiraea alba* var. *latifolia, Maianthemum trifolium, Sphagnum* spp., and *Abies balsamea*.	FEMA 100-year flood zone, Shorebird habitat, Shoreline buffer
NWB24	PEM1, PFO1	1.63	71,068.2	Yes	No	Small bog and forested wetland. Dominant vegetation in bog portion includes *Iris versicolor, Eriophorum angustifolium, Osmunda cinnamomea, Carex cannescens, Vaccinium oxycoccus, Symphyotrichum puniceum, Rhododendron groenlandicum, Carex trisperma, Carex magellanica*, and *Sphagnum* spp. PFO portion dominated by *Picea mariana, Abies balsamea, Picea rubra, Larix laracina, Carex trisperma, Carex* spp., and *Sphagnum* spp. Culvert located at NWB24-03.	Shorebird habitat, Shoreline buffer

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWB25	PEM1	0.04	1,640.6	Yes	No	Small perched wetland in spruce-fir dominated forest. Dominant vegetation includes *Carex cannescens, Carex brunnescens, Carex trisperma, Ribes* sp., *Dryopteris carthusiana, Oxalis montanus, Lysimachia borealis, Cornus canadensis,* and *Rubus* sp.	FEMA 100-year flood zone, Shoreline buffer, TWWH
NWB4	PEM1, PSS1	96.68	4,211,282.5	Yes	Yes	Extensive wetland complex with numerous upland "islands." Area last mowed in fall 2012. Evidence of past disturbance found throughout. Wetland is dominated by PEM, but also areas of PSS below 1 meter height. Dominant vegetation includes *Alnus viridis, Myrica gale, Spiraea alba, Salix* spp., *Calamagrostis canadense, Equisetum arvense, Carex nigra, Carex scoparia, Scirpus microcarpus, Eleocharis* spp., *Symphyotrichum novi-belgii, Fragaria virginiana, Potentilla simplex,* and *Rubus pubescens*. Contains small patch of phragmites.	FEMA 100-year flood zone, Shoreline buffer, Stream
NWB5	PEM1, PSS1	85.47	3,723,051.8	Yes	Yes	Extensive wetland complex with numerous upland islands. Area last mowed in fall 2012. Evidence of disturbance found throughout. Wetland is dominated by PEM, but also large areas of PSS below 1 meter height. Dominant vegetation includes *Alnus viridis*, *Nyrica gale*, *Spiraea alba*, *Salix* spp., *Calamagrostis canadense*, *Equisetum arvense*, *Carex nigra*, *Carex scoparia*, *Scirpus microcarpus*, *Eleocharis* spp., *Symphyotrichum novi-belgii*, *Fragaria virginiana*, and *Potentilla simplex*.	
NWB6	PEM1	0.09	3,826.0	Yes	Yes	Small wetland depression on top of hill. Area last mowed in fall 2012. Evidence of disturbance found throughout. Wetland is dominated by PEM and dominant vegetation includes *Spiraea, Calamagrostis canadense, Equisetum arvense, Eleocharis* spp., and *Carex nigra*.	
NWB7	PEM1	0.03	1,483.7	Yes	Yes	Small wetland that is perched on a hillside near wetland NWB5. Plant species included *Scirpus atrocinctus, Scirpus microcarpus, Carex scoparia, Symphyotrichum umbellatus*, and *Calamagrostis canadense*.	

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Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
NWB8	PEM1, PSS1	0.24	10,453.0	Yes	Yes	Small wetland in large upland ridge separating wetlands NWB5 and NWB4. Wetland likely adjacent to NWB4 via overland sheet flow. Plant species include S*cirpus atrocinctus, Scirpus cyperinus, Carex scoparia, Symphyotrichum umbellatus, Calamagrostis canadense*, and *Spiraea alba* var. *latifolia*.	
NWB9	PEM1, PSS1	0.37	15,974.0	Yes	Yes	Small wetland in large upland ridge separating wetlands NWB5 and NWB4. Wetland likely adjacent to NWB4 via overland sheet flow. Plant species include *Scirpus atrocinctus, Scirpus cyperinus, Carex scoparia, Symphyotrichum umbellatus, Calamagrostis canadense,* and *Spiraea alba* var. *latifolia*.	
VWA12	PSS1	7.55	328,691.0	Yes	No	Wetland fed by culverts from main road to the west and water is trapped by gravel shore road. Dominated by alders, *Spiraea,* and grasses with *Sphagnum* spp. over much of the floor. Area flooded; standing water at time of sampling. Sporadic cattails along open water areas.	FEMA 100-year flood zone, Shoreline buffer, TWWH
VWA13	PEM1	0.03	1,359.0	Yes	Yes	Small isolated wetland in depression along road edge. Grass and sedge dominated.	Shoreline buffer
VWA15	PEM1	0.08	3,565.1	Yes	Yes	Small isolated wetland in depression along road edge. Grass and sedge dominated.	Shoreline buffer
VWA16	PSS1	37.07	1,614,867.0	Yes	Partially	Large wetland dominated the entire eastern half of this block. Contains areas of dense alders, tamarack, birch, *Spiraea*, as well as open areas of grasses and sedges. Potentially several vernal pools in the southern portion. Some areas are maintained by the Navy, being mowed regularly and others only seasonally. Also areas of marsh with cattails, reeds, and iris. These areas are in the northeast corner bottled up by the roads and in the southern area around possible vernal pool.	Shoreline buffer
VWA17	PEM1	0.58	25,085.9	Yes	Partially	Wetland was likely part of VWA16, but there is a manmade berm along its northern edge that limits separates the two. This wetland drains into road side ditch. Area is mostly mowed and made of grass and stunted alders.	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
VWA2	E2AB3	0.52	22,548.4	Yes	No	Small marsh impounded by roads to west and east. Fed by 48" culvert. Muddy bottom with alders along shore.	FEMA 100-year flood zone, Shorebird habitat, Shoreline buffer, Stream, TWWH
VWA21	PSS1	0.29	12,819.2	Yes	Yes	Mowed PSS wetland south of the larger VWD13 complex.	
VWA22	PSS1	0.05	2,202.0	Yes	Yes	Small mowed PSS wetland south of the larger VWD13 complex and north of Ridge Road. Dominated by *Calamagrostis canadensis*, *Carex nigra*, and alders.	
VWA5	PEM1	0.03	1,187.7	Yes	Yes	Part of a greater wetland system from adjoining property. Small on this side of the property line before it drains into culvert under shore road.	FEMA 100-year flood zone
VWA6	PEM1	0.13	5,873.4	Yes	No	Small wetland created by a natural depression dammed on the east by the berm of the road. Some speckled alders but primarily *Sphagnum* spp. dominated.	FEMA 100-year flood zone
VWA7	PSS1	6.13	267,040.4	Yes	No	Wetland fed by culverts from main road to the west and water is trapped by the gravel shore road. Dominated by alders, *Spiraea,* and grasses with *Sphagnum* spp. over much of the floor.	FEMA 100-year flood zone
VWA8	PEM1	0.11	4,593.5	Yes	No	Small isolated wetland dominated by grasses and sedges, probably only exists because of road blocking drainage to the west.	FEMA 100-year flood zone
VWD1	PUB3, PEM1, PSS1, PFO4	19.81	862,879.8	Yes	No	Large PUB3□PEM1□PSS1 complex draining toward stream SD1. Dominated by green alder shrubs, bluejoint (*Calamagrostis canadensis*), and sensitive fern. There are larch and alder on the fringes and a small section of PFO4. The stream is stopped by a series of beaver dams, which form the PUB3 areas.	□20,000 sq. ft. PEM, □20,000 sq. ft. open water, Stream
VWD10	PEM1	0.21	8,999.4	Yes	No	A series of PEM1 bluejoint dominated wetlands that drain into stream S7. There are larch and alder on the fringes of the wetland. Soils were A11.	Stream

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
VWD11	PEM1	22.32	972,257.5	Yes	Yes	Mowed field with *Salix* sp., sensitive fern, and other unidentified mowed grasses growing in the wetland.	Stream
VWD12	PEM1, PSS1	0.44	19,147.7	Yes	Partially	PEM1 of bluejoint, *Carex nigra*, and *Rhodora* spp. with a PSS1 fringe of alder and *Salix* sp. away from the road. Soil was saturated to the surface and drained to a culvert.	FEMA 100-year flood zone
VWD13	PEM1, PSS1	129.61	5,645,939.7	Yes	Partially	PEM1 in mowed ditch of *Carex nigra* and young unidentified grasses. Away from the road it was not mowed and a PEM1 of bluejoint with PSS1 fringe of speckled alder and *Salix* sp. The ditch drains to the stream.	FEMA 100-year flood zone
VWD14	PEM1, PSS1	3.00	130,558.0	Yes	No	Generally a PEM1 wetland of bluejoint and a PSS1 fringe of alder and sensitive fern. Soil is saturated to the surface and A11 dark surface over a depleted horizon.	□20,000 sq. ft. PEM, Stream
VWD15	PSS1	0.26	11,380.3	Yes	No	Dominated with speckled alder and a few *Salix* spp. shrubs. Herbaceous layer of bluejoint, sensitive fern, *Rhodora* spp., *Spiraea*, and *Sphagnum* spp. There were a few red maples on the fringes of the wetland. A depression wetland with some standing water.	
VWD16	PSS1	0.02	924.8	Yes	No	A small depression PSS wetland dominated by alder and *Salix* spp. Bluejoint and *Spiraea* were more abundant in the center of the wetland and the soil was saturated to the surface.	
VWD18	PEM2	0.05	2,202.7	No	No	This is a human-made drainage retention pond with cattails and standing water.	FEMA 100-year flood zone, Shorebird habitat, TWWH
VWD19	PEM2	0.03	1,096.2	Yes	Yes	Drainage way from parking area and road by power plant. The area was dominated with young unidentified grass, *Carex nigra*, and horsetail. The soil is a dark surface over a reduced matrix.	FEMA 100-year flood zone, TWWH
VWD2	PEM1	0.02	1,070.4	Yes	Yes	Small depression wetland in the mowed field edge. Plants and grasses mowed.	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
VWD20	PEM1, PSS1, PFO1	9.07	395,060.4	Yes	Partially	PEM has cattails, bluejoint grass, black sedge, horsetail. The PSS has *Salix* spp., alder, and *Spiraea* mixed with sensitive fern and bluejoint grass.	FEMA 100-year flood zone, Shoreline buffer
VWD3	PFO1, PSS1	4.23	184,447.7	Yes	No	Large forested wetland on north side of tower field. Contains smaller areas of PSS and PEM wetlands, as well as stream S6.	Stream
VWD32	PEM1	46.42	2,022,056.4	Yes	Yes	Large wetland with *Salix* and alder fringe, horsetail, sensitive fern, *Carex* spp., blue flag, and fox tail. Saturated soil to the surface. In part, wetland starts as a deep gully then deltas out past the stream area. Cattail, sedges, *Carex nigra*, green bulrush, horsetail, fox tail, *Salix* spp., and sensitive fern. Soil is a dark surface over depleted matrix and saturated.	Stream
VWD4	PSS1	0.68	29,619.1	Yes	No	Area starts as a drainage way that appears to be human-made and has standing water. Dominant plants were speckled alder, *Salix* sp., and bluejoint.	Stream
VWD47	PEM1	0.79	34,214.6	Yes	Yes	Wetland with *Salix* spp., bulrush, black sedge, bluejoint, cranberry, and sensitive fern.	Stream
VWD48	PEM1	0.05	2,239.3	Yes	Yes	Depression wetland with bulrush, willow, bluejoint, *Spiraea*, and black sedge.	
VWD5	PFO4, PEM1, PSS1	27.49	1,197,299.7	Yes	No	Drainage continued from VWD4 until a beaver dam and then fanned out into a large PSS1 alder dominated wetland. The interior portions were dominated by bluejoint (PEM1) and a small area of PUB3 due to beaver activity.	□20,000 sq. ft. PEM, Stream
VWD50	PEM1	0.44	18,976.3	Yes	Yes	Wetland with black sedge, sweet gale, alder, and willow.	
VWD51	PEM1	1.32	57,524.8	Yes	Partially	Wetland dominated by bluejoint, cattail, *Spiraea*, willows, alder, black sedge and foxtail.	FEMA 100-year flood zone
VWD52	*PEM1*	0.96	41,627.6	Yes	No	Wetland with foxtail, bulrush, *Spiraea*, bluejoint, alder, willow, sensitive fern, and wool grass.	FEMA 100-year flood zone
VWD54	PSS1, PEM1	0.35	15,313.3	Yes	No	Wetland is isolated and not connected to the salt water. The center is a PEM1 of cattail and horsetail. The fringes are a PSS1 of *Spiraea* and *Salix* spp. The *Spiraea* is 6' tall so wetland was classified as PSS.	FEMA 100-year flood zone

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
VWD7	PEM1	1.92	83,648.9	Yes	No	A series of PEM1 bluejoint dominated wetlands that drain into stream S7. There are larch and alder on the fringes of the wetland. Soils were A11.	□20,000 sq. ft. PEM, Stream
VWD8	PEM1	0.27	11,819.4	Yes	No	A series of PEM1 bluejoint dominated wetlands that drain into stream S7. There are larch and alder on the fringes of the wetland. Soils were A11.	□20,000 sq. ft. PEM, Stream
VWD9	PEM1	0.08	3,589.2	Yes	No	Isolated wetland with larch and alder on the fringes of the wetland. Soils were A11.	
VWN30	PSS1	3.58	155,787.3	Yes	Yes	Large mowed wetland on south end of North tower field near N-7. Dominated by mowed *Calamagrostis canadensis*, sedges, *Spiraea alba*, and mowed alder shrubs.	
VWN32	PSS1	0.08	3,378.7	Yes	Yes	Small wetland on south end of North tower field between N-6 and N-7. Dominated by mowed *Calamagrostis canadensis*, sedges, *Spiraea alba*, and mowed alder shrubs.	
VWN33	PSS1	0.30	12,924.0	Yes	Yes	PSS wetland adjacent to Ridge Road between N-7 and N-6. Dominated by mowed *Calamagrostis canadensis*, sedges, *Spiraea alba*, and mowed alder shrubs.	
VWN38	PSS1	0.06	2,635.0	Yes	Yes	Small PSS wetland near the larger W12 wetland complex. Dominated by mowed *Calamagrostis canadensis*, sedges, *Spiraea alba*, and mowed alder shrubs.	
VWN8	PEM1	10.04	437,441.5	Yes	Yes	Large freshwater PEM1 starting along the road south of N-9 and extends to the north side of N-8; it runs east from the perimeter road to the stream where it is jurisdictional. It also swings west back to the road on the north side of N-9. Dominated by *Calamagrostis canadensis*, *Scirpus microdiscus*, sedges, *Alnus viridis,* and *Spiraea alba*. Shrubs were mowed after delineation was completed.	Stream
W10	PSS1	0.03	1,095.8	No	Yes	Mowed roadside ditch.	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
W101	PEM1, PSS1, PFO1, PUB4	24.75	1,078,279.2	Yes	No	Large PEM1, PSS1, PFO1 wetland complex in the northeast corner of the installation. Mountain ash and black spruce forest north of security gate. Evidence of very shallow root system, dense *Sphagnum* spp., and areas of standing water across the site. Emergent marsh surrounding open water. Dominated by *Carex nigra, Lyschimachia terrestris, Gallium trifidum*, and other sedges. Emergent opening in the forest. Dominated by cotton grass and sedges. Open water area with organic substrate over sand.	20,000 sq. ft. PEM, Stream, Peatland
W12	PSS1, EEM1, EAB3	79.61	3,467,902.4	Yes	Yes	Large, partially mowed scrub-shrub wetland surrounding the tower. Areas of low shrubs and some large open water. Emergent wetland area dominated by *Typha latifolia*. Area of EAB3 open water closest to the southern culvert is likely brackish due to culvert connection that can receive the highest high tides.	FEMA 100-year flood zone, TWWH, Stream
W13	PEM1	0.03	1,356.8	Yes	Yes	Small mowed PEM wetland depression on gently sloping hillside.	
W20	PSS1	1.87	81,391.8	Yes	No	Mowed emergent wetland with low shrub growth. Southeast portion of wetland on slight slope. Wetland extends beyond survey area by road.	
W22	PSS1	0.03	1,157.2	Yes	No	Mowed emergent scrub-shrub wetland.	
W23	EEM1, EUS1, PSS1, M2US1	0.70	30,639.3	Yes	No	Estuarine marsh area impounded between berm and road fill. Receives daily tidal input. Saltmarsh bulrush, saltmarsh spike rush (*Eleocharis parvula*), and seaside crowfoot (*Ranunculus cymbalaria*) are abundant. Seaside alkali grass and seaside goldenrod also present higher up the banks. PSS1 areas near roadside, above tidal influence. Receives drainage from roadsides.	FEMA 100-year flood zone, TWWH

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
W23	PSS1, EEM1, E2US1, M2US1	2.29	99,928.3	Yes	No	PSS dominated by alder, cattail, *Spiraea*, and sensitive fern. As it goes north it transitions into PEM1, and the extreme northern end has some salt water influence due to the tidal action. Estuarine marsh area impounded between berm and road fill. Receives daily tidal input. Saltmarsh bulrush, saltmarsh spike rush (*Eleocharis parvula*), and seaside crowfoot (*Ranunculus cymbalaria*) were abundant at the site. Seaside alkali grass and seaside goldenrod were also present higher up the banks.	FEMA 100-year flood zone, TWWH
W24	PEM1	0.13	5,872.6	Yes	No	Mowed emergent wetland loosely disconnected from W22.	
W26	PSS1	0.03	1,448.0	Yes	No	Narrow shrubby drainage swale dominated by alders.	
W28	PFO1	0.14	6,282.5	Yes	No	Forested area with stands of alder interspersed. Some undefined drainage channels flowing through area.	
W28A	PSS1	0.00	135.7	Yes	No	Very small emergent wetland area in the forested area on the west side of the survey area. Connected to W28 by small undefined drainage channel.	
W34	PSS1	0.10	4,187.0	Yes	Yes	Small wetland on slope draining toward S1 by narrow swales.	Stream
W35	PSS1	2.32	101,159.7	Yes	No	Large area surrounding stream S3 south of the culvert. Drains mowed slope with PSS/PEM vegetation.	FEMA 100-year flood zone, Stream, TWWH
W35A	PSS1	0.07	3,159.0	Yes	Yes	Low area of slope draining down slope toward stream S3.	
W38	PSS1	0.05	2,021.3	Yes	Yes	Small wetland on slope draining toward S1 by narrow swales. Narrow wetland separated from surrounding wetlands.	Stream
W40A	PSS1	0.03	1,473.8	Yes	Yes	Small wetland on slope draining toward S1 by narrow swales. Narrow wetland separated from surrounding wetlands.	Stream
W42	PSS1	0.19	8,376.0	Yes	Yes	Emergent area under tower structure. Gravel fill present in soils.	Stream
W45	PSS1	0.08	3,356.4	Yes	Yes	Narrow, mowed roadside ditch, receiving drainage from wetlands W45A uphill. Non-jurisdictional ditch drains out of this wetland toward S5.	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
W45A	PFO1	0.13	5,860.0	Yes	No	Forested wetland draining by narrow PSS channel toward W45.	
W47A	PSS1	0.04	1,941.3	Yes	No	Small mowed PSS1□PEM1 wetland.	
W51	PSS1	0.08	3,373.0	Yes	Yes	Wet ditch adjacent to roadside, drains into stream S7.	Stream
W54	PSS1	0.06	2,639.9	Yes	Yes	Small wetland with low shrubs and some emergent vegetation. Likely mowed less frequently than main tower field.	Stream
W61	PSS1	3.96	172,466.5	Yes	Yes	Large mowed PSS1 wetland with *Calamagrostis canadensis, Carex nigra*, and *Alnus* seedlings.	
W63	EAB3, EEM1, PSS1, PFO1, PUB	0.59	25,615.1	Yes	No	Estuarine emergent marsh dominated by *Carex paleacea, Juncus articus* var. *littoralis*, and arrow grass (*Triglochin maritima*). With open water area connected to the highest tidal flows through culvert under road. South of road parcel becomes PSS, with a small forested PFO area near boundary road.	FEMA 100-year flood zone
W63	PSS1, EAB, EEM1, PUB, PFO1	3.53	153,644.0	Yes	No	Wetland fed by culverts from main road to the west and water is trapped by gravel shore road. Dominated by alders, *Spiraea,* and grasses with *Sphagnum* spp. over much of the floor. Sporadic cattails along open water areas. Estuarine emergent marsh dominated by *Carex paleacea*, *Juncus articus* var. *littoralis*, and arrow grass (*Triglochin maritima*). Open water area connected to the highest tidal flows through culvert under road.	FEMA 100-year flood zone
W65	PSS1	1.22	53,173.1	Yes	No	Forested area with vegetation reducing to shrubs closer to the ocean. Areas of standing water, above tidal influence, and a small open water area connected to W63 through culvert under the road. Only receives tidal influence under the highest of tides. The portion located here was dominated by alder and *Spiraea*. Fed from road drainage and culverts from the west.	FEMA 100-year flood zone

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
W65	PUB3, PSS1	0.06	2,403.2	Yes	No	Shrubland with small pockets of protected forested areas further from the ocean. Areas of standing water, above tidal influence, and a small open water area connected to W63 through culvert under the road. Only receives tidal influence under the highest of tides.	FEMA 100-year flood zone
W66	PEM1	5.38	234,225.5	Yes	Yes	PEM wetland that continues beyond survey area. Dominated by *Typha latifolia* with areas of standing water. Likely mowed during winter.	□20,000 sq. ft. PEM, Shoreline buffer
W67	EUS1	5.02	218,738.2	Yes	No	Intertidal beach fringed by narrow band of salt marsh vegetation.	FEMA 100-year flood zone, TWWH
W69A	PSS1	0.02	865.7	Yes	Yes	Small wetland depression, narrow wetland connected to the larger VWA16.	
W70	PSS1	0.02	695.7	Yes	Yes	Small wetland depression.	
W72	PSS1	0.26	11,206.9	Yes	Yes	Wetland on slope, loosely disconnected from VWA16 by low topography.	
W74	PSS1	0.13	5,776.6	Yes	Yes	Small mowed PSS wetland.	
W76	PSS1	0.91	39,813.8	Yes	Yes	Mowed PSS wetland with low shrubs.	
W77	PSS1	0.01	595.9	No	Yes	Mowed roadside ditch.	
W77A	PSS1	0.03	1,234.6	No	Yes	Mowed roadside ditch.	
W78	PSS1	0.07	3,195.1	Yes	Yes	Mowed wetland area.	
W82	PSS1	0.01	370.6	Yes	Yes	Small wet roadside ditch.	
W84	PSS1	0.05	2,094.6	Yes	Yes	Small mowed wetland area with roadside ditch running through it.	
W85	PSS1	0.03	1,324.1	Possible	Yes	Small wet ditch.	
W88	PSS1	0.07	2,850.5	Yes	Yes	Mowed PSS area with alder shrubs and *Salix* spp. shrubs.	
W9	PSS1	0.03	1,447.0	Yes	Yes	Small wet depression on top of slope.	
W91	PEM1	0.06	2,568.4	Yes	Yes	Mowed wetland adjacent to central tower building.	

Table 1. Wetlands Summary for NCTAMSLANT DET Cutler

Wetland Name	Cowardin Classification[1]	Area (acres)	Area (sq. feet)	Potential Jurisdiction	Mowed	Summary Wetland Notes	Wetlands of Special Significance[2]
W93	PFO1, PSS1	17.10	745,003.5	Yes	No	Forested/scrub shrub wetland complex dominated by red maple and spruce, with dense alder understory. Small pockets of standing water with *Sphagnum* spp. Draining toward stream SA1. Dominated by green alder shrubs, pussy willow (*Salix discolor*), meadowsweet, and manna grass. There are beavers currently in this wetland, with large bodies of open water. In part, a large wetland with an even mix of alders, *Spiraea,* and grasses. Drains to shore road and eventually into drainage swales.	FEMA 100-year flood zone, Shoreline buffer, Stream, Shorebird habitat
W94	PSS1, PEM1	6.02	262,300.9	Yes	No	Area dominated by alders with patches of red maple and spruce forest, as well openings dominated by *Calamagrostis* spp.	Stream
WM1 through WM127	M2US1,M2RS1	45.29	1,972,832.4	Yes	No	Intertidal marine areas between the Highest Average Tide line and the NCTAMSLANT DET Cutler installation boundary. Wetland areas were generated in ArcGIS from Navy boundary data, 2012 LIDAR elevation data, and highest average tide line GPS data as measured in the field.	FEMA 100-year flood zone, Shorebird habitat, Shoreline buffer, Stream, TWWH
	TOTAL	**1,426.93**					

1 Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

2 Maine Wetlands of Special Significance (WOSS) designations, as defined in the Maine Department of Environmental Protection Natural Resource Protection Act (38 M.R.S.A. §§480-A et seq.) and the Maine Wetland Protection Rules (Chapter 310). Areas of significant habitat according to the Maine Department of Environmental Protection. IWWH refers to Inland Wading □ Waterfowl Habitat and TWWH is Tidal Wading Waterfowl Habitat as defined by the Maine Department of Inland Fisheries and Wildlife. Mowed PEM wetlands determined not to meet WOSS designation. Criteria triggering WOSS designation included if present within a specific wetland; however the WOSS may be smaller than the entire wetland; see Figure 5 Sheet 1-79 for the spatial extent.

Table 2. Waterbodies Summary for NCTAMSLANT DET Cutler

Site Location	Feature[1]	Feature Name[2]	Length (feet)
HF	Stream	HFS1	173.5
HF	Stream	HFS2	4,287.1
HF	Stream	NSA17	77.9
HF	Stream	NSA18	145.3
VLF	Stream	AS1	134.4
VLF	Stream	AS2	97.8
VLF	Stream	AS3	846.1
VLF	Stream	AS4	199.1
VLF	Stream	AS5	673.9
VLF	Stream	BS1	2,276.2
VLF	Stream	BS2	37.0
VLF	Stream	NSA10	95.1
VLF	Stream	NSA11	282.1
VLF	Stream	NSA12	170.9
VLF	Stream	NSA13	264.0
VLF	Stream	NSA15	796.6
VLF	Stream	NSA16	587.3
VLF	Stream	NSA19	85.2
VLF	Stream	NSA20	385.8
VLF	Stream	NSA21	144.6
VLF	Stream	NSA22	374.8
VLF	Stream	NSA23	420.3
VLF	Stream	NSA24	135.4
VLF	Stream	NSA25	218.6
VLF	Stream	NSA26	116.8
VLF	Stream	NSA27	129.0
VLF	Stream	NSA28	139.6
VLF	Stream	NSA32	50.5
VLF	Stream	NSA33	111.8
VLF	Stream	NSA34	40.4
VLF	Stream	NSA35	75.5
VLF	Stream	NSA36	52.6
VLF	Stream	NSA6	158.9
VLF	Stream	NSA7	434.6
VLF	Stream	NSA8	408.5
VLF	Stream	NSA9	150.7
VLF	Stream	NSB4	1,048.7
VLF	Stream	NSB6	1,300.9
VLF	Stream	S1	1,704.0
VLF	Stream	S10	186.0
VLF	Stream	S11	473.8

Table 2. Waterbodies Summary for NCTAMSLANT DET Cutler

Site Location	Feature[1]	Feature Name[2]	Length (feet)
VLF	Stream	S13	171.6
VLF	Stream	S15	40.2
VLF	Stream	S16	1,702.8
VLF	Stream	S2	331.3
VLF	Stream	S3	1,327.7
VLF	Stream	S3a	282.9
VLF	Stream	S4	1,454.5
VLF	Stream	S5	947.1
VLF	Stream	S5a	372.0
VLF	Stream	S6	667.6
VLF	Stream	S7	1,645.2
VLF	Stream	S7A	88.7
VLF	Stream	S8	660.4
VLF	Stream	S9	1,860.2
VLF	Stream	SA1	391.6
VLF	Roadside Ditch	D1	242.6
VLF	Roadside Ditch	D10	532.4
VLF	Roadside Ditch	D11	341.3
VLF	Roadside Ditch	D12	225.1
VLF	Roadside Ditch	D13	26.0
VLF	Roadside Ditch	D14	951.0
VLF	Roadside Ditch	D15	242.1
VLF	Roadside Ditch	D16	264.3
VLF	Roadside Ditch	D17	558.9
VLF	Roadside Ditch	D18	112.7
VLF	Roadside Ditch	D19	185.7
VLF	Roadside Ditch	D2	875.2
VLF	Roadside Ditch	D20	198.4
VLF	Roadside Ditch	D21	32.1
VLF	Roadside Ditch	D22	217.7
VLF	Roadside Ditch	D23	1,170.0
VLF	Roadside Ditch	D24	80.0
VLF	Roadside Ditch	D25	186.4
VLF	Roadside Ditch	D26	611.3
VLF	Roadside Ditch	D27	682.4
VLF	Roadside Ditch	D28	852.8
VLF	Roadside Ditch	D29	415.9
VLF	Roadside Ditch	D3	776.1
VLF	Roadside Ditch	D30	513.9
VLF	Roadside Ditch	D4	428.6
VLF	Roadside Ditch	D5	893.1

Table 2. Waterbodies Summary for NCTAMSLANT DET Cutler

Site Location	Feature[1]	Feature Name[2]	Length (feet)
VLF	Roadside Ditch	D6	375.8
VLF	Roadside Ditch	D7	22.7
VLF	Roadside Ditch	D8	399.8
VLF	Roadside Ditch	D9	580.0
VLF	Roadside Ditch	DNSA29	199.6
VLF	Roadside Ditch	DNSA37	159.0
VLF	Roadside Ditch	DNSA38	148.5
VLF	Roadside Ditch	DNSB4	220.9
VLF	Roadside Ditch	DNSB5	22.7
VLF	Roadside Ditch	DNSB7	76.8
VLF	Roadside Ditch	DNSB8	397.5
VLF	Roadside Ditch	DVS13	262.8
		Total	**45,917.2**

1 All perennial, intermittent, and some ephemeral (i.e., when providing aquatic resource connectivity) ditches and streams were evaluated according to the Maine Department of Environmental Protection stream definition. Streams and other ditch features that were previously mapped by NAVFAC were verified in the field using a GPS and revised if necessary to ensure they were mapped accurately. In addition, linear features that were encountered during the field surveys but were not previously delineated were flagged and mapped using GPS. If a linear feature was determined to have an ephemeral flow regime and did not provide wetland connection it was not mapped.

2 Some stream names and numbers were intentionally skipped.

TETRA TECH

ENCLOSURE D

Wetland Determination Data Sheets

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 7/6/12

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: Area 15 Wet 1

Investigator(s): Norman Famous & Sam Altvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Base hillside Local relief (concave, convex, none): Building 135 Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 44.66773 Long: -67.27706° Datum: WGS 84

Soil Map Unit Name: Bucksport and Wonsqueak NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** Yes X No ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)	
___ High Water Table (A2)	___ Aquatic Fauna (B13)	
X Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 3 inches

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: Area 15 Wet 1

Tree Stratum (Plot size: 30 ft. radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Sorbus americana	20	✓	FAC
2. Picea mariana	20	✓	FACW
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft. radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus viridis	80	✓	FAC
2. Nemopanthus	20	✓	OBL
3.			
4.			
5.			
6.			
7.			
	100	= Total Cover	

Herb Stratum (Plot size: 10 x 10 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Rubus idaeus	20	✓	FAC
2. Aster puniceus	10		OBL
3. Aster umbellata	10		FACW
4. Rubus glandulosum	20	✓	FACW
5. Rubus pubescens	25	✓	FACW
6. Trientalis borealis	5		FAC
7. Nemopanthus mucronatus	15		OBL
8. Carex disperma	1		OBL
9. Carex billingsii	5		OBL
10. Carex intumescens	5		FACW
11. Calamagrostis canadensis	1		FACW
12. Sorbus americana	4		FAC
	117	= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Depleted matrix
Saturated 3"

SOIL

Sampling Point: Area 15 Wet 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10yr 3/2	100					silty clay loam	
9-12	10yr 4/4	90	7.5yr 5/8	10	c	m	loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: firm layer

Depth (inches): 10"

Hydric Soil Present? Yes X No ___

Remarks:

Slope 1%

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 7/6/12

Applicant/Owner: NAVFAC-MIDLANT State: ME Sampling Point: Area 15 Upl 1

Investigator(s): Norman Famous & Sam Altvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Disturbed hillside Local relief (concave, convex, none): Building 135 Slope (%): 4%

Subregion (LRR or MLRA): LRR R Lat: 44.66770 Long: -67.27677 Datum: WGS 84

Soil Map Unit Name: Bucksport and Wonsqueak NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: Area 15 Upl 1

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
= Total Cover			

Sapling/Shrub Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
= Total Cover			

Herb Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Spiraea alba	15	✓	FAC
2. Euthamia graminifolia	10		FAC
3. Poa pratensis	50	✓	FACU
4. Aster umbellata	10		FAC
5. Fragaria virginiana	5		FACU
6. Potentilla simplex	10		FACU
7. Ranunculus acris	5		FACU
8. Carex scoparia	5		FACW
9. Aster novi-belgii	10		FAC
10. Oenothera perennis	5		FACU
11. Festuca ruba	5		FACU
12. Rosa carolina	15	✓	FACU
13. Trifolium pratense	5	~~= Total Cover~~	FACU

~~Woody Vine Stratum (Plot size: ______)~~	Absolute % Cover	Dominant Species?	Indicator Status
~~1.~~ 14. Dichanthelium boreale	5		FAC
~~2.~~ 15. Rhinanthus minor	1		
~~3.~~ 16. Festuca filiformis	1		
4.			
Herb stratum = Total Cover	157		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
_X_ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No _X_

Remarks: (Include photo numbers here or on a separate sheet.)

COFL 78.5/31.4

SOIL Sampling Point: Area 15 Upl 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	10yr 4/3	100					Sandy clay loam	
9-18	10yr 5/4	88	7.5 yr 5/8	12	C	m	loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: firm layer

Depth (inches): 18"

Hydric Soil Present? Yes ___ No X

Remarks:

Slope 4%

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 6/28/12

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: N3 Wet 1

Investigator(s): Norman Famous & Sam Attvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Salt Marsh Local relief (concave, convex, none): None Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 44.65304 Long: -67.27148 Datum: WGS 84

Soil Map Unit Name: Scantic Silt loam NWI classification: EEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____ Hydric Soil Present? Yes X No ____ Wetland Hydrology Present? Yes X No ____	Is the Sampled Area within a Wetland? Yes X No ____ If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): Tidal

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Flooded by higher high tides.

VEGETATION – Use scientific names of plants.

Sampling Point: N3 Wet1

Tree Stratum (Plot size: 30 ft. radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft. radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 10 x 10 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juncus gerardi	30	✓	OBL
2. Carex paleacea	20	✓	OBL
3. Argentina anserina	15	✓	OBL
4. Elytrigia pungens	10		FACW
5. Festuca rubra	5		FACU
6. Triglochin maritima	5		OBL
7. Spartina alterniflora	5		OBL
8. Aster novi-belgii	5		FACW
9. Hordeum jubatum	5		
10. Salicornia europaea	1		OBL
11. Spartina patens	2		OBL
12. Atriplex glabriuscula	2		FACW
	~~= Total Cover~~		

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
13. Eleocharis parvula	10		OBL
2.			
3.			
4.			
Herb Stratum	115 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Root mat 5"
intertidal over marine clay (Presumpscot Formation)
Slope 0%

SOIL

Sampling Point: N3 Wet1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-24	1Gley 5/10Y	90	7.5yr 5/8	10	C	m	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ground water

Depth (inches): 0"

Hydric Soil Present? Yes X No ___

Remarks:

Slope 0%

root Mat 5"

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 6/27/12
Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: N3 Upl 2
Investigator(s): Norman Famous & Sam Altvater Section, Township, Range: N/A
Landform (hillslope, terrace, etc.): Hillside Local relief (concave, convex, none): None Slope (%): 5%
Subregion (LRR or MLRA): LRR R Lat: 44.65326 Long: -67.27205 Datum: WGS 84
Soil Map Unit Name: Scantic silt loam NWI classification: Upland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X
If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No primary or secondary wetland hydrology indicators present.

VEGETATION – Use scientific names of plants.

Sampling Point: N3 Up12

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Spiraea alba	70	✓	FAC
2.	20	✓	FAC
3.			
4.			
5.			
6.			
7.			
	90	= Total Cover	
Herb Stratum (Plot size: 10 x 10 ft.)			
1. Aster novi-belgii	10		FACW
2. Spiraea alba	25	✓	FAC
3. Calamagrostis canescens	40	✓	FACW
4. Aster umbullatus	5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Adjacent to slope with road. Likely on sandy fill. Formerly connected to intertidal emergent marsh, graded into wetland.

SOIL

Sampling Point: N3 Upl2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5y 3/2	100					Sandy loam	
8-18	2.5y 3/2	100					loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L,** R)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: firm

Depth (inches): 18"

Hydric Soil Present? Yes ___ No X

Remarks:

5% slope
More organic
no mottling
no saturation

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 6/29/12

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NS Wet 2

Investigator(s): Norman Famous & Sam Altvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Basin (broad) Local relief (concave, convex, none): None Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 44.64557 Long: -67.27801 Datum: WGS 84

Soil Map Unit Name: Rawsonville-Hogback complex, 3-8% slopes NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ___	**Is the Sampled Area within a Wetland?** Yes X No ___
Hydric Soil Present?	Yes ___	No ___	
Wetland Hydrology Present?	Yes ___	No ___	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)	
___ High Water Table (A2)	___ Aquatic Fauna (B13)	
X Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: NS Wet 2

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft. radius)			
1. Salix discolor	15		FACU
2.			
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		
Herb Stratum (Plot size: 10 x 10 ft.)			
1. Calamagrostis canescens	5		FACW
2. Carex lanuginosa scabrous	15		OBL
3. Fragaria virginensis	15		FACU
4. Carex nigra	30		OBL
5. Onoclea sensibilis	20		FACW
6. Aster novi-belgii	15		FACW
7. Salix discolor	15		FACW
8. Salix petiolaris silver	10		FACW
9. Equisetum arvense	5		FAC
10. Rubus idaeus	5		FAC
11. Carex stricta	2		OBL
12. Carex echinata	1		OBL
13. Agrostis stolonifera	2	~~= Total Cover~~	
~~Woody Vine Stratum (Plot size: ______)~~			
~~1.~~ 14. Aster umbellatus	3		FACW
~~2.~~ 15. Glyceria striata	3		OBL
3.			
4.			
Herb stratum	146 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Saturated to surface
SWSP

73/28.8

SOIL

Sampling Point: NS Wet 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5yr 3/1	100					Silty clay loam	
4-12	5y 4/1	93	7.5y 5/8	7	C	m	Sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- X Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ground water

Depth (inches): 6"

Hydric Soil Present? Yes X No ___

Remarks:

Slope 0%

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 6/29/12

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: N5 Upl2

Investigator(s): Norman Famous & Sam Attvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Stronger Slope Local relief (concave, convex, none): None Slope (%): 7%

Subregion (LRR or MLRA): LRR R Lat: 44.64540 Long: -67.27800 Datum: WGS 84

Soil Map Unit Name: Rawsonville-Hogback complex, 3-8% slopes NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

VEGETATION – Use scientific names of plants.

Sampling Point: N5 Upl2

Tree Stratum (Plot size: 30 ft. radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft. radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.	20	✓	FAC
2.	5	✓	FACW
3.			
4.			
5.			
6.			
7.			
	25 = Total Cover		

Herb Stratum (Plot size: 10 x 10 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Spiraea alba	40	✓	FAC
2. Fragaria virginiana	20	✓	FACU
3. Equisetum arvense	20	✓	FAC
4. Aster novi-belgii	15		FACW
5. Hieracium piloselloides	15		FACU
6. Leucanthemum vulgare	5		
7. Populus tremuloides	5		
8. Stellaria graminea	5		
9. Potentilla simplex	5		
10. Trifolium pratense	5		
11. Oenothera perennis	5		
12. Hieracium x floribundum	5		
13. Rhinanthus minor	2	~~= Total Cover~~	FACU

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
~~1.~~ 14. Anthoxanthum odoratum	5		FACU
~~2.~~ 15. Phleum pratense	2		FACU
~~3.~~ 16. Hieracium aurantiacum	1		FACU
~~4.~~ 17. Luzula multiflora	2		FACU
Herb stratum	157 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	8	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	62.5	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- __ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- __ 3 - Prevalence Index is ≤3.0[1]
- __ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Hieracium piloselloides with many sterile basal rosettes.

SOIL

Sampling Point: N5 Upl 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10yr 3/2	100					sandy loam	
3-10	2.5y 4/3	98	7.5yr 5/8	2	C	m	sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: firm
Depth (inches): 8"

Hydric Soil Present? Yes ___ No X

Remarks:
Slope 7%

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 6/20/12

Applicant/Owner: NAVFAC-MIDLANT State: ME Sampling Point: N8 Wet 2

Investigator(s): Norman Famous & Sam Altvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Fringe around pond Local relief (concave, convex, none): None Slope (%): 0.5%

Subregion (LRR or MLRA): LRR R Lat: 44.64923 Long: -67.29176 Datum: WGS 84

Soil Map Unit Name: Scantic silt loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** Yes X No ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1-3 inches

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology -
Surface water and saturation both within 10 x 10 ft. plot, water marks on Typha, saturation visible on aerial maps.

VEGETATION – Use scientific names of plants.

Sampling Point: N8 Wet 2

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 10 x 10 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Typha latifolia	95	✓	OBL
2. Sium suave	5		OBL
3. Hypericum ellipticum	5		OBL
4. Stellaria alsine	1		FAC
5. Galium trifidum	2		FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	107 = Total Cover		

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Homogeneous, slope 2%, permanently flooded

SOIL Sampling Point: N8 Wet2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5yr 3/1	100					mucky	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- X Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: very firm
Depth (inches): 5"

Hydric Soil Present? Yes X No ___

Remarks:
Full saturation, groundwater to the surface.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 7/20/12

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: N8 Wet4

Investigator(s): Norman Famous & Sam Attvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Tidal pond edge Local relief (concave, convex, none): Below perimeter Rd Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 44.64926 Long: -67.29261 Datum: WGS 84

Soil Map Unit Name: Scantic silt loam NWI classification: EUS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___ Hydric Soil Present? Yes X No ___ Wetland Hydrology Present? Yes X No ___	**Is the Sampled Area within a Wetland?** Yes X No ___ If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)	___ Water-Stained Leaves (B9)
___ High Water Table (A2)	___ Aquatic Fauna (B13)
___ Saturation (A3)	___ Marl Deposits (B15)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)
___ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): Tidal

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: N8 Wet4

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 10 x 10 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Poa palustris	20	✓	FACW
2. Schoenoplectus tabernaemontani	15	✓	OBL
3. Eleocharis parvula	5		OBL
4. Typha angustifolia	5		OBL
5. Atriplex	5		
6. Solidago sempervirens	5		FACW
7. Ranunculus cymbalaria	5		OBL
8. Bolboschoenus maritimus	+		OBL
9. Juncus arcticus	+		
10. Dead Fucus & Ascophyllum present			
11.			
12.			
	60 = Total Cover		

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: N8 Wet4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10yr 4/4	100					Sand	
6-24		100					Silty clay	loam no mod, year round saturation

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- X Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: firm

Depth (inches): 24"

Hydric Soil Present? Yes X No ___

Remarks:

groundwater 13"
slope 0%

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 6/20/12

Applicant/Owner: NAVFAC- MIDLANT State: ME Sampling Point: NB Upl 1

Investigator(s): Norman Famous & Sam Altvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): None Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 44.64917 Long: -67.29159 Datum: WGS 84

Soil Map Unit Name: Scantic Silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

VEGETATION – Use scientific names of plants. Sampling Point: N8 Upl 1

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	______ = Total Cover		

Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	______ = Total Cover		

Herb Stratum (Plot size: 10 x 10 ft.)			
1. Leucanthemum vulgare	5	✓	UPL
2. Spiraea alba	10	✓	FAC
3. Aronia melanocarpa	5	✓	FACW
4. Fragaria virginiana	5	✓	FACU
5. Rhinanthus minor	5	✓	FACU
6. Festuca rubra	25	✓	FACU
7. Carex sp.	5	✓	FACU
8. Aster novi-belgii	5	✓	FACW
9. Achillea millefolium	3		UPL
10. Potentilla simplex	2		FACU
11. Stellaria graminea	2		FACU
12.			
	72 = Total Cover		

Woody Vine Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
	______ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 12.5% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	______	x 1 =	______
FACW species	______	x 2 =	______
FAC species	______	x 3 =	______
FACU species	______	x 4 =	______
UPL species	______	x 5 =	______
Column Totals:	______ (A)		______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: N8 Up11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10yr 4/4	100					sandy loam	till no mods

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: firm

Depth (inches): 5"

Hydric Soil Present? Yes ___ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 6/27/12

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: N12 Wet2

Investigator(s): Norman Famous & Sam Altvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Gentle hillside slope Local relief (concave, convex, none): None Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 44.65818 Long: -67.28646 Datum: WGS 84

Soil Map Unit Name: Scantic silt loam NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): Surface

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: N12 Wet2

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft. radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rugosa	20	✓	FACW
2. Spiraea alba	10	✓	FAC
3. Salix discolor	5		FACW
4. Salix petiolaris	5		FACW
5.			
6. 50% 20			
7. 20% 8			
	40 = Total Cover		

Herb Stratum (Plot size: 10x10 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Calamagrostis canadensis	60	✓	FACW
2. Equisetum arvense	5		FAC
3. Scirpus microcarpus	5		OBL
4. Onoclea sensibilis	5		FACW
5. Typha latifolia	15		OBL
6. Rumex longifolius	5		FAC
7. Spiraea alba	15		FAC
8. Carex scoparia	3		FACW
9. Carex crinita	3		OBL
10.			
11. 50/20 –			
12. 58/23.2			
	116 = Total Cover		

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Standing water
Calamagrostis sod
Rumex basal leaves only
Onoclea more dense nearby
Typha evenly distributed

SOIL

Sampling Point: N12 Wet2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10 yr 3/1	100					muck	
8-15	10yr 5/1	90	7.5yr 5/8	10	c	m	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- X Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, **MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (LRR R, **MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ground water

Depth (inches): 0"

Hydric Soil Present? Yes X No ___

Remarks:

Slope 0%

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler City/County: Cutler/Washington Co. Sampling Date: 6/27/12

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: N12 Upl1

Investigator(s): Norman Famous & Sam Altvater Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillside Local relief (concave, convex, none): None Slope (%): 5%

Subregion (LRR or MLRA): LRR R Lat: 44.65803 Long: -67.28616 Datum: WGS 84

Soil Map Unit Name: Brayton fine sandy loam, 0-15%, very stony NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	Is the Sampled Area within a Wetland? Yes ___ No X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)	
___ High Water Table (A2)	___ Aquatic Fauna (B13)	
___ Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: N12 Upl1

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 10 x 10 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Aster umbellatus	5		FACW
2. Hieracium×floribundum	15	✓	FACU
3. Rhinanthus minor	10	✓	FACU
4. Fragaria virginiana	35	✓	FACU
5. Stellaria graminea	10		FACU
6. Festuca rubra	10	✓	FACU
7. Phleum pratense	5		FACU
8. Festuca filiformis	10	✓	FACU
9. Potentilla simplex	5		FACU
10. Poa pratensis	10	✓	FACU
11. Euthamia graminifolia	5		FACW
12. Luzula multiflora	5		FACU
13. Alnus sp.	5	~~= Total Cover~~	FAC
14. UNID Dicot opposite leaved			FACU
~~Woody Vine Stratum (Plot size:)~~			
15. Oenothera perennis	5		FACU
16. Rosa carolina	3		FACU
17. Hieracium piloselloides	3		FACU
18. Vaccinium angustifolium	2		FACU
19. Cirsum vulgare	+		
	= Total Cover		

Herb Stratum = 143

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Weedy flora, mowed, orange hawkweed

SOIL

Sampling Point: N12 Upl1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5yr 3/2	100					Sandy loam	
8-12	2.5y 4/2	93	2.5yr 5/8	7	c	m	silty clay	12" limit of test pit

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: firm
Depth (inches): 8"

Hydric Soil Present? Yes _____ No X

Remarks:
5% slope

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 4/22/2013

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: BW2-Wet1

Investigator(s): L. Stockwell, L. Gilpatrick. S. Grove Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): slight slope depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR or MLRA): LRR-R Lat: 44.66274541 Long: -67.29798219 Datum: WGS 84

Soil Map Unit Name: Bucksport and Wonsqueak (BW) - hydric NWI classification: PFO/PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Past site disturbance (60+ years ago), soils stripped off, replaced. Fill material around roads and tower pads and cable sites throughout site.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 2

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BW2-Wet1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	65	x	FAC
2. Picea rubens	25		FACU
3.			
4.			
5.			
6.			
7.			
	90	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ilex verticillata	80	x	FACW
2. Abies balsamea	15		FAC
3. Betula alleghaniensis	10		FAC
4.			
5.			
6.			
7.			
	105	= Total Cover	

Herb Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhododendron groenlandicum	50	x	OBL
2. Calamagrostis canadensis	15	x	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65	= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

Calamagrostis found throughout both wetland and upland areas on this site. Generally a questionable indicator, but other OBL present and soils clearly hydric.

Too early in season for most herb species.

SOIL

Sampling Point: BW2-Wet1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	95					Lm/Sa	
6-12	10YR 5/2	90	10YR 5/6	20	C	PL	Lm/Sa	gravelly

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 4/22/2013

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: BW2-Up1

Investigator(s): L. Stockwell, L. Gilpatrick, S. Grove Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR or MLRA): ______ Lat: 44.662606 Long: -67.297864 Datum: WGS 84

Soil Map Unit Name: Bucksport and Wonsqueak (BW) - hydric NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

Past site disturbance (60+ years ago), soils stripped off, replaced.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: BW2-Up1

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Sorbus cf. decora	43	X	FACU
2. Betula papyrifera	43	X	FACU
3. Prunus serotina	14		FACU
4.			
5.			
6.			
7.			
	100	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Spirea alba	75	X	FACU
2. Rubus sp.	25	X	FAC
3.			
4.			
5.			
6.			
7.			
	100	= Total Cover	

Herb Stratum (Plot size: 10' sq)	Absolute % Cover	Dominant Species?	Indicator Status
1. Solidago rugosa	30	X	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

unnatural berms, fill throughout area

SOIL Sampling Point: BW2-Up1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/3	95					Sa/Lm	
7-11	10YR 4/4	90					Sa/Lm	gravelly
11-14	10YR 5/4	85	7.5 YR 5/6	5	C	M	Sa/Cl	gravelly

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:
soils gravelly, fill material throughout site.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 8/10/2013

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA11-Wet1

Investigator(s): J. Sweitzer/B. Griffith Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): toe of slope Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): LRR R Lat: 44.630426 Long: -67.282015 Datum: WGS 84

Soil Map Unit Name: Brayton Fine Sandy Loam (BnB) NWI classification: PEM1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Sampling point meets all three criteria for a wetland. Past site disturbance (60+ years ago), soils stripped off, replaced, site mowed annually.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)
X High Water Table (A2)	___ Aquatic Fauna (B13)
X Saturation (A3)	___ Marl Deposits (B15)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)
___ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturation present. Multiple indicators of wetland hydrology present.

VEGETATION – Use scientific names of plants. Sampling Point: NWA11-Wet1

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix discolor	5	Y	FACW
2. Spirea alba var latifolia	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
	25	= Total Cover	

Herb Stratum (Plot size: 5'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Scirpus microcarpus	60	Y	OBL
2. Scirpus atrocinctus	50	Y	FACW
3. Scirpus cyperinus	10	N	FACW
4. Euthamia graminifolia	5	N	FAC
5. grass sp	5	N	--
6. grass sp	5	N	--
7. Symphiotrichum novi-belgii	2	N	FACW
8. Epilobum strictum	1	N	OBL
9.			
10.			
11.			
12.			
	138	= Total Cover	

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation present. Vegetation passes indicator 1 (rapid test) and indicator 2 (dominance test)

SOIL

Sampling Point: NWA11-Wet1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	90	10YR 5/1	10	D	M	Sa/Lm	Auger Refusal at 10"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- X Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: gravel/cobble

Depth (inches): 10"

Hydric Soil Present? Yes X No ______

Remarks:

Augur refusal at 10" due to gravel/cobble. Soil meets hydric indicator (F7).

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 8/6/13

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA11-Up1

Investigator(s): J. Sweitzer, B. Griffith Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0-1

Subregion (LRR or MLRA): LRR R Lat: 44.630092 Long: -67.281713 Datum: WGS 84

Soil Map Unit Name: Brayton Fine Sandy Loam (BnB) NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation x, Soil x, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point does not meet definition of wetland because only 1 of 3 indicators of a wetland are present. Sample point was found to meet hydrophytic vegetation criteria. Past site disturbance (60+ years ago), soils stripped off, replaced, site mowed annually.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

VEGETATION – Use scientific names of plants.

Sampling Point: NWA11-Up1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1. Alnus viridis	10	Y	FAC
2. Spiraea alba var latifolia	10	Y	FACW
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Herb Stratum (Plot size: 5' sq)			
1. Anthozanthum odoratum	60	Y	FACU
2. Phleum pratense	30	N	FACU
3. Rhinanthus crista-galli	40	Y	FAC
4. Fragraria virginica	30	N	FAC
5. Trifolium pratense	20	N	FACU
6. Erigeron anuus	5	N	FACU
7. Leucanthemum vulgare	5	N	UPL
8.			
9.			
10.			
11.			
12.			
	190	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Photo 2418

Vegetation passes dominance test and meets hydrophytic vegetation criteria. This is common throughout this coastal and formerly disturbed site.

SOIL

Sampling Point: NWA11-Up1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/2	100					sandy loam	
2-4	10YR 3/3	100					loamy sand	gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

Photo: 2422

Sample point does not meet criteria for hydric soils. Fill material throughout area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 8/10/13

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA11-Wet2

Investigator(s): J. Sweitzer, B. Griffith Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): N/A Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): LRR R Lat: 44.635658 Long: -67.282938 Datum: WGS 84

Soil Map Unit Name: Brayton Fine Sandy Loam, 0-5% NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

If yes, optional Wetland Site ID: NWA11

Remarks: (Explain alternative procedures here or in a separate report.)

Sampling point meets criteria for designation as wetland. Past site disturbance (60+ years ago), soils stripped off, replaced, much of site mowed annually. This area not mowed in some time, shrubs becoming established.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 2420

Sample point meets one indicator of wetland hydrology (A3)

VEGETATION – Use scientific names of plants.

Sampling Point: NWA11-Wet 2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1. Myrica gale	70	Y	OBL
2. Spirea tomentosa	2	N	FACW
3. Spirea alba var latifolia	30	N	FACW
4. Vaccinium macrocarpum	50	Y	OBL
5. Salix sp.	2	N	FACW
6. Alnus viridis	1	N	FAC
7.			
	155	= Total Cover	
Herb Stratum (Plot size: 5' R)			
1. Scirpus atrocinctus	2	N	FACW
2. Doelingeria umbellatus	10	N	FACW
3. Euthamia graminifolia	10	N	FAC
4. Agrostis alba	20	N	FACW
5. Onoclea sensibilis	5	N	FACW
6. Phleum pratense	2	N	FACU
7. Potentilla simplex	60	Y	FACU
8.			
9.			
10.			
11.			
12.			
	109	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling point meets hydrophytic vegetation criteria and passes dominance test.

SOIL

Sampling Point: NWA11-Wet2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	□	Color (moist)	□	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3□2	100					sandy loam	
3-12	2.5Y 6□2	80	2.5Y 5□6	20	C	PL	loamy sand	gravel

[1]Type: C□Concentration, D□Depletion, RM□Reduced Matrix, MS□Masked Sand Grains. [2]Location: PL□Pore Lining, M□Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: gravel

Depth (inches): 12

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Soils meet indicator (S5) sandy redox. Many redox concentrations present.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 8/7/13

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA11-Up2

Investigator(s): J. Sweitzer, B. Griffith Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): None Slope (%): 2-3

Subregion (LRR or MLRA): LRR R Lat: 44.635365 Long: -67.283090 Datum: WGS 84

Soil Map Unit Name: Brayton Fine Sandy Loam (0-5%) BnB NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation x, Soil x, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

No wetland indicators observed. Past site disturbance (60+ years ago), soils stripped off, replaced, site mowed annually.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches):
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology observed.

VEGETATION – Use scientific names of plants.

Sampling Point: NWA11-Up2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1. Alnus viridis	5	Y	FAC
2. Spirea alba var latifolia	5	Y	FACW
3. Vaccinium angustifolium	5	Y	FACU
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size: 5 ft sq)			
1. Anthozanthum odoratum	80	Y	FACU
2. Rhinanthus crista-galli	20	N	FAC
3. Grass 1	2	N	UNKN
4. Grass 2	2	N	UNKN
5. Grass 3	2	N	UNKN
6. Fragraria virginica	5	N	FAC
7. Phleum pratense	10	N	FACU
8. Potentilla simplex	20	N	FACU
9. Achillea millefolium	2	N	FACU
10. Hieraceum caespitosum	5	N	NI
11. Trifolium prantense	5	N	FACU
12. Hypericum perforatum	2	N	UPL
	152	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant Species Across All Strata: ______ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation does not dominate sampling plot. Hydrophytic vegetation criteria not met.

SOIL

Sampling Point: NWA11-Up2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel

Depth (inches): 6

Hydric Soil Present? Yes ______ **No** X

Remarks:

No indicators of hydric soils present. Fill/gravel material throughout area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 6/20/2014

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA43-Wet1

Investigator(s): J. Sweitzer, B. Griffith Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Beaver Pond Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): LRR R Lat: 44.628958 Long: -67.270278 Datum: WGS1984

Soil Map Unit Name: Bucksport and Wonsqueak soils NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Data plot taken at edge of beaver impoundment along the banks of the outer perimeter road. Wetland meets all three criteria.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X No ___	Depth (inches): 12	
Water Table Present?	Yes X No ___	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes X No ___	Depth (inches): ___	**Wetland Hydrology Present? Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology affected by road impoundment and beaver activity. Several indicators of wetland hydrology observed.

VEGETATION – Use scientific names of plants.

Sampling Point: NWA43-Wet1

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1. Spiraea alba	10	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5' sq)			
1. Typha angustifolia	80	Y	OBL
2. Typha x glauca	5	N	OBL
3. Carex canescens	2	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	87	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation passes rapid test for hydrophytic vegetation

SOIL

Sampling Point: NWA43-Wet1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	□	Color (moist)	□	Type[1]	Loc[2]	Texture	Remarks
0-18□		95					Fibric Peat	
	10YR3□1	5					Silt W□Gravel	

[1]Type: C□Concentration, D□Depletion, RM□Reduced Matrix, MS□Masked Sand Grains. [2]Location: PL□Pore Lining, M□Matrix.

Hydric Soil Indicators:

X Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
X Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel

Depth (inches): 20

Hydric Soil Present? Yes X No ______

Remarks:

Hydrogen sulfide odor detected. Fibric peat to 18□ inches. Two hydric soil indicators observed: Histosol (A1) and Hydrogen Sulfide (A4).

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 06/20/2014

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA43-UP1

Investigator(s): J. SWEITZER, B. GRIFFITH Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): ROAD FILL Local relief (concave, convex, none): NONE Slope (%): 2

Subregion (LRR or MLRA): LRR R Lat: 44° 37' 44.05" N Long: 67° 16' 12.68" W Datum: WGS 1984

Soil Map Unit Name: Bucksport and Wonsqueak (BW) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	Is the Sampled Area within a Wetland? Yes ___ No ✓
Hydric Soil Present?	Yes ___ No ✓	
Wetland Hydrology Present?	Yes ___ No ✓	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Upland plot located in roadside fill seperating NWA43 from Big Holly Cove

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)
___ High Water Table (A2)	___ Aquatic Fauna (B13)
___ Saturation (A3)	___ Marl Deposits (B15)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)
___ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches):

Water Table Present? Yes ___ No ✓ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches):

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

CRITERIA FOR WETLAND HYDROLOGY NOT MET. NO INDICATORS OF WETLAND HYDROLOGY OBSERVED

VEGETATION – Use scientific names of plants.

Sampling Point: NW443-UP1

Tree Stratum (Plot size: 30' R)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1. SPIRAEA LATIFOLIA	30	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 10' SQ)			
1. CALAMAGROSTIS CANADENSIS	5	N	OBL
2. TRIFOLIUM PRATENSE	2	N	FACU
3. POTENTILLA SIMPLEX	20	Y	FACU
4. RHINANTHUS MINOR	5	N	FAC
5. CERASTIUM MONTANUM	5	N	FACU
6. LATHRUS JAPONICUS	10	N	FACU
7. EUTHAMIA GRAMINIFOLIA	2	N	FAC
8. VALERIANA VULGARE	5	N	NI
9.			
10.			
11.			
12.			
	54	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION FAILS DOMINANCE TEST AND HYDROPHYTIC VEGETATION IS NOT DOMINANT.

SOIL

Sampling Point: NWA45-UP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8'	10 YR 3/3	100					Sandy Loam	
8	AUGER REFUSAL							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surface (S7) (**LRR R, MLRA 149B**)
- __ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- __ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- __ Loamy Mucky Mineral (F1) (**LRR K, L**)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- __ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- __ Coast Prairie Redox (A16) (**LRR K, L, R**)
- __ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- __ Dark Surface (S7) (**LRR K, L, M**)
- __ Polyvalue Below Surface (S8) (**LRR K, L**)
- __ Thin Dark Surface (S9) (**LRR K, L**)
- __ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- __ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- __ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- __ Red Parent Material (F21)
- __ Very Shallow Dark Surface (TF12)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: GRAVEL / COBBLE

Depth (inches): 8.0

Hydric Soil Present? Yes ____ No ✓

Remarks:

SOILS DO NOT MEET CRITERIA FOR HYDRIC SOILS DUE TO HIGH CHROMA MATRIX. UPLAND PLOT LOCATED ON EDGE OF ROAD FILL DUE TO ABSENCE OF OTHER UPLANDS IN VICINITY OF THE WETLAND PLOT.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 6/23/13

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA45-Wet1

Investigator(s): S. Grove, G. Stanowicz Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): LRR R Lat: 44.661384 Long: -67.317879 Datum: WGS84

Soil Map Unit Name: Colton Gravelly Sandy Loam, 3-8% NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: NWA45-Wet1

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)	
___ High Water Table (A2)	___ Aquatic Fauna (B13)	
X Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ______

Water Table Present? Yes ___ No ___ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): ______

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Pit/Mound, hummocky standing water in pits. Shallow soils throughout. 4-10" High water table visible throughout wetland.

VEGETATION – Use scientific names of plants.

Sampling Point: NWA45-Wet1

Tree Stratum (Plot size: 30'R)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea rubens	25	Y	FACU
2. Abies balsamea	15	Y	FAC
3. Sorbus americanus	2	N	FAC
4.			
5.			
6.			
7.			
	42	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' R)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	20	Y	FAC
2. Picea rubens	5	N	FACU
3. Betula payrifera	5	N	FACU
4. Sorbus americanus	2	N	FAC
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5' sq)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Sphagnum	95		
2. Cornus canadensis	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5	= Total Cover	

Woody Vine Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (Include photo numbers here or on a separate sheet.)

Dense sphagnum 5-10" deep throughout. Sphagnum generally considered a wetland plant. Picea hybrid likely.

SOIL

Sampling Point: NWA45-Wet1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-28	10YR2/1	99					Hemic	Organic

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- X Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______ Some shallow bedrock

Depth (inches): ______ throughout wetland at 5-10"

Hydric Soil Present? Yes X No ___

Remarks:

8" Sphagnum layer. Spodosols throughout upland and some wetlands.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 6/23/14

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA45-Up1

Investigator(s): S. Grove, G. Stanowicz Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 5

Subregion (LRR or MLRA): LRR R Lat: 44.6612967 Long: -67.317826 Datum: WGS84

Soil Map Unit Name: Colton Gravelly Sandy Loam, 3-8% slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___	
Water Table Present?	Yes ___	No X	Depth (inches): ___	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___	**Wetland Hydrology Present? Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hummocky area. Pit/Mound. No standing water in pits in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: NWA45-Up1

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula papyrifera	50	Y	FACU
2. Picea rubens	20	N	FACU
3. Abies balsamea	30	Y	FAC
4. Sorbus americanus	10	N	FAC
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Sorbus americanus	30	Y	FAC
2. Abies balsamea	5		FAC
3.			
4.			
5.			
6.			
7.			
	35	= Total Cover	

Herb Stratum (Plot size: 5' sq)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cornus canadensis	30	Y	FAC
2. Solidago rugosa	10	Y	FAC
3. Sorbus americanus	2	N	FAC
4.			
5. Dicranum and Luecobryum mosses			--
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	32	= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: NWA45-Up1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR4/2	97					Lm	Some organic content
3-4	10YR8/1	100					Si/Sa	E Horizon - whitish
4-10	7.5YR3/4	99					Lm/Sa	Coated grains

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ **No** X

Remarks:

2" Duff, dry tip up pits no water unlike spruce/fir. Spodosols found throughout wetlands and uplands in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 6/21/14

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA46-Wet1

Investigator(s): S.Grove/G. Stanowicz Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): LRR R Lat: 44.664228 Long: -67.324776 Datum: WGS84

Soil Map Unit Name: Lamoine Silt Loam, 0-6% Slopes NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)	
X High Water Table (A2)	___ Aquatic Fauna (B13)	
X Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 9
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water present in tip up mound pits. Some upland included in pit mound mosaic due to difficulty in demarcating line in hummocks

VEGETATION – Use scientific names of plants.

Sampling Point: NWA46-Wet1

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula papyrifera	10	N	FACU
2. Abies balsamea	5	N	FAC
3. Sorbus americana	15	Y	FAC
4. Picea rubens	25	Y	FACU
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' R)			
1. Sorbus americana	20	Y	FAC
2. Picea rubens	10	Y	FACU
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5' sq)			
1. Cornus canadensis	50	Y	FAC
2. Sphagnum	40		
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: NWA46-Wet1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	□	Color (moist)	□	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR3□1	97					Fibric	Organic Layer
4-7	7.5YR5□1	95	10YR5□6	4	C	M	Si□Lm	
7-14	7.5YR6□1	80	10YR5□6	15	C	M	Cl□Lm	

[1]Type: C□Concentration, D□Depletion, RM□Reduced Matrix, MS□Masked Sand Grains. [2]Location: PL□Pore Lining, M□Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Bedrock restriction observed at 5-10" throughout wetland

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Thick 5-8" Sphagnum, hummocky area. Some upland soil□spp on mounds.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 6/21/14

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWA46-Up1

Investigator(s): S. Grove, G. Stanowicz Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 5

Subregion (LRR or MLRA): LRR R Lat: 44.664178 Long: -67.324999 Datum: WGS84

Soil Map Unit Name: Lamoine Silt Loam, 0-8% Slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hummocky pit/mound no water in pits

VEGETATION – Use scientific names of plants.

Sampling Point: NWA46-Up1

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula papyrifera	40	Y	FACU
2. Abies balsamea	30	Y	FAC
3. Sorbus americanus	5	N	FAC
4.			
5.			
6.			
7.			
	75	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Sorbus americanus	10	Y	FAC
2. Picea rubens	5	Y	FACU
3. Abies balsamea	1	N	FAC
4.			
5.			
6.			
7.			
	16	= Total Cover	

Herb Stratum (Plot size: 5' sq)	Absolute % Cover	Dominant Species?	Indicator Status
1. Lysimachia borealis	2	Y	FAC
2. Sorbus americanus	2	Y	FAC
3. Abies balsamea	2	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	6	= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Challenging area. Hummocky series of upland and wetland features throughout. Plants similar in uplands and wetlands - coastal moisture

SOIL

Sampling Point: NWA46-Up1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR3/2	95						LM
10-14	7.5YR4/3	90	7.5YR6/3	1	RM	M	SiLm	Streaking Faint

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

1" Duff layer, rich dark soils

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 06/20/2014

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWB18-Wet1

Investigator(s): J. Sweitzer, B. Griffith Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): N/A Local relief (concave, convex, none): None Slope (%): 1-2

Subregion (LRR or MLRA): LRR R Lat: 44.630211 Long: -67.261425 Datum: WGS1984

Soil Map Unit Name: Rawsonville - Hogback - Abram complex, 3-15% slopes NWI classification: PSS

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Wetland plot associated with paired upland/wetland plots at wetland NWB18

Photo 4416

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)	
X High Water Table (A2)	___ Aquatic Fauna (B13)	
X Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
X Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Several indicators of wetland hydrology observed

VEGETATION – Use scientific names of plants.

Sampling Point: NWB18-Wet1

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Larix laracina	3	Y	FACW
2. Populus tremuloides	5	Y	FACU
3. Picea mariana	5	Y	FACW
4.			
5.			
6.			
7.			
	13	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	2	Y	FACW
2. Larix laricina	7	Y	FACW
3. Picea rubens	6	Y	FACU
4. Betula papyrifera	1	N	FACU
5. Spiraea alba	10	Y	FACW
6. Alnus viridis	2	N	FAC
7. Salix bebbiana	1	N	FACW
	29	= Total Cover	

Herb Stratum (Plot size: 5' sq)	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhododendron groenlandicum	20	N	OBL
2. Rhododendron canadense	60	Y	FACW
3. Vaccinium oxycoccus	60	Y	OBL
4. Cornus canadensis	15	N	FAC
5. Maianthemum trifolium	20	N	OBL
6. Eriophorum vaginatum	10	N	OBL
7. Vaccinium angustifolium	3	N	FACU
8.			
9.			
10.			
11.			
12.			
	188	= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 78 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation meets criteria for hydrophytic vegetation and passes dominance test.

SOIL

Sampling Point: NWB18-Wet1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR2/1	100					Fibric Peat	
6-18	10YR2/1	100					Mucky Peat	
18-30	10YR2/1	100					Muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

X Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Bedrock

Depth (inches): 30

Hydric Soil Present? Yes X No ___

Remarks:

Soils meet criteria for one hydric soil indicator, Histosol (A1). Soil probed to a depth of 30 with refusal at bedrock.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCAMSLANT DET CUTLER City/County: CUTLER/WASHINGTON Sampling Date: 06/20/2014

Applicant/Owner: NAVFAC - MIDLANT State: ME Sampling Point: NWB18-Up1

Investigator(s): J. Sweitzer, B. Griffith Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 2-3

Subregion (LRR or MLRA): LRR R Lat: 44.630233 Long: 67.261806 Datum: WGS1984

Soil Map Unit Name: Rawsonville-Hogback-Abram complex, 3-5% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes X	No ___	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Upland plot associated with paired upland wetland plots at wetland NWB18.

Photo 4447

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)
___ High Water Table (A2)	___ Aquatic Fauna (B13)
X Saturation (A3)	___ Marl Deposits (B15)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)
___ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 8"

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturation present within 8." Wetland hydrology criteria met.

VEGETATION – Use scientific names of plants. Sampling Point: NWB18-Up1

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula papyrifera	30	Y	FACU
2. Populus tremuloides	5	N	FACU
3.			
4.			
5.			
6.			
7.			
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1. Alnus viridis	80	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	80	= Total Cover	
Herb Stratum (Plot size: 5' sq)			
1. Solidago rugosa	10	N	FAC
2. Oclemena acuminata	70	Y	FACU
3. Rubus idaeus	5	N	FACU
4. Carex sp.	5	N	-
5. Maianthemum canadense	5	N	FACU
6. Cornus canadense	5	N	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species	95	x 3 = 285
FACU species	115	x 4 = 460
UPL species		x 5 =
Column Totals:	210 (A)	745 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation fails dominance test and hydrophytic vegetation is not dominant

SOIL

Sampling Point: NWB18-Up1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2	10YR2/1	100					sapric	organic material
2-4	5Y6/1	60					loamy fine sand	
	7.5YR3/4	40					loamy find sand	
4-12	7.5YR3/4	100					loamy fine sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel/Bedrock

Depth (inches): 12"

Hydric Soil Present? Yes ______ No X

Remarks:

No indicators of hydric soils observed

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler HF Site City/County: Cutler, Washington Co. Sampling Date: 5-21-13

Applicant/Owner: NAVFAC-MIDLANT State: Maine Sampling Point: HF Wet 1

Investigator(s): Norman Famous Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Raised Plateau Bog Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR Lat: 4950855.432 Long: 636325.852 Datum: UTM19N WGS

Soil Map Unit Name: SG - Sebago-Moosebec NWI classification: PEM-Persistent

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

The wetland basin is concave, although the surface of the wetland is raised above the surrounding upland due to the perched water table in the peat deposit, hence it is called a raised bog.

The Dominance type is Trachiphorum cespitosus-Empetrum nigrum (Hare's tail sedge-Black crowberry).
The plot is located immediately south of Antenna V-4.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)	___ Water-Stained Leaves (B9)
___ High Water Table (A2)	___ Aquatic Fauna (B13)
___ Saturation (A3)	___ Marl Deposits (B15)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)
___ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1-2 inches

Water Table Present? Yes ___ No ___ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ______

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water was present in the game trails. Otherwise, the water table was high and much of the acrotelm was saturated. The acrotelm is the upper layer of peat, including the living surface, where the water table depth fluctuates. The peat is fibric, light in color and poorly decomposed. The catotelm, by contrast, is located below the acrotelm where the water table depth does not fluctuate and the peat is more decomposed and darker in color, but still fibric in texture. The von Post value of the acrotelm is 1 to 3 while the von Post scale for most of the catotelm is usually 4 to 5 in raised bogs.

The depth of the water table varies within the acrotelm during the summer, but does not drop into the catotelm. The thickness of the acrotelm varies between about 18 inches as measured from the top of the higher Sphagnum mounds to about 6 inches (or as low as about 4 inches) when measured from the surface of the lower hollows between mounds.

VEGETATION – Use scientific names of plants.

Sampling Point: HF Wet 1

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 10 x 10 feet)			
1. Kalmia angustifolia	10		FAC
2. Kalmia polyfolia	2		OBL
3. Chamaedaphne calyculata	15		OBL
4. Picea mariana	15		FACW
5. Larix laricena	5		FACW
6. Rhododendron groenlandicum	5		OBL
7. Empetrum nigrum	55	Yes	FACW
8. Rubus chamaemorus	15		OBL
9. Trichophorum caespitosum	60	Yes	OBL
10. Eriophorum angustifolium	1		OBL
11. Eriophorum vaginatum ssp. spissum	5		OBL
12. Sarracenia purpurea	1		OBL
	196	= Total Cover	
Woody Vine Stratum (Plot size: Herbs continu)			
1. 13. Drosera rotundifolia			OBL
2. 14. Carex pauciflora			OBL
3. 15. Solidago uliginosa			OBL
4. 16. Calopogon tuberosus			OBL
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ______

Remarks: (Include photo numbers here or on a separate sheet.)

Herbaceous species continued

17. Gaylussacia dumosa v, bigeloviana	5	OBL
18. Vaccinium oxycoccus	2	OBL
Sphagnum mosses	90%	
Reindeer mosses	5	

Herbaceous 50/20 Total cover = 189% 50% = 94.5 20% = 37.8

SOIL Sampling Point: HF Wet 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y 6/4	100					Fibric	Von Post 2; acrotelm
20-48	5YR4/3	100					Fibric	Von Post 4-6; catotelm

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

X Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: Marine silt and clay
Depth (inches): Greater than 48 inches

Hydric Soil Present? Yes X No ______

Remarks:

The matrix values below 20 inches (Catotelm) varied between 5YR4/3 and 10YR 4/3 with no clear breaking point. Retrieving clean samples below 20 inches was problematic without a peat coring device. These data are not necessary for hydric soil determination.

This is a raised bog comprised mostly of Fibric peat or organic soils with a depth of over 10 feet in the deeper sections. No effort to core the bog was taken. Raised plateau-shaped bogs are fairly common within a half mile of the coast of Washington County, eastern Hancock County and along the western Bay of Fundy coast of New Brunswick, Canada.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler/HF Site   City/County: Cutler, Washington Co.   Sampling Date: 5-21-13

Applicant/Owner: NAVFAC-MIDLANT   State: Maine   Sampling Point: HF UP 1

Investigator(s): Norman Famous   Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Raised Plateau Bog   Local relief (concave, convex, none): Concave   Slope (%): 0

Subregion (LRR or MLRA): LRR   Lat: 4950890.164   Long: 636341.515   Datum: UTM19N WGS

Soil Map Unit Name: N/A (Land fill/on SG - Sebago-Moosebec)   NWI classification: Upland

Are climatic /hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation Yes, Soil Yes, or Hydrology Yes significantly disturbed?   Are "Normal Circumstances" present? Yes ______ No X

Are Vegetation No, Soil No, or Hydrology No naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ______ No X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

This upland plot was placed in the nearest upland to the bog vegetation plots. The upland paired wetland determination plot was located on an antenna (Antenna V-4) pad comprised of coarse sand and gravel fill with a convex surface. The vegetation has been periodically removed from the central part of the antenna pad (within the support wires, where this plot was located). Also, vehicular traffic on the pad crushes and periodically destroys the vegetation. The soils were artificial, the vegetation was weedy and adventive and the hydrology was completely changed by the added fill,

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: HF UP 1

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 10 x 10 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Potentilla simplex	15	YES	FACU
2. Fragaria virginiana	10	YES	FACU
3. Danthonia spicata	5	□	FACU
4. Agrostis hyemalis	3	□	FAC
5. Aralia hispida	2	□	UPL
6. Solidago puberula	1	□	FACU
7. Dichanthelium acuminatum	1	□	FAC
8. Spiraea tomentosa	□	□	FACW
9. Oneothera biennis	5		FACU
10.			
11.			
12.			
	47	= Total Cover	

Woody Vine Stratum (Plot size: Herbs continu)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Herbaceous Layer 50/20   Total cover = 47%   50% = 23.5   20% = 9.4

SOIL

Sampling Point: HF UP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2.5 in	2.5 YR 5/2						Sandy	Sand and gravel fill
2.5 -6 in	2.5 YR 4/4						Sandy	Sand and gravel fill
6-10 in	2.5 YR 3.5/2						Sandy	Sand and gravel fill

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

The nearest upland to the bog vegetation plots was an antenna pad (Antenna V-4) comprised of coarse sand and gravel fill with a convex surface. There appeared to be a subsurface moisture gradient between the center of the pad and the raised bog to the south where the water table was higher nearest the bog. By contrast, the water table was lower toward the north edge of the pad away from the raised bog (the former bog surface sloped downward north to south below the pad). The Munsell values for this section of the gravel pad were similar to those presented for upland wetland determination plot HF UP-3.

Redox features were not quantitatively documented because they were difficult to distinguish with accuracy, in part, because they are relatively young soils and they lacked any visible organic component (total vegetation cover was very low). Many sand and gravel grains below five inches were covered with a pale translucent coating, which increased in percent of grains covered with depth. No organic material was present to mask the sand grains. No Munsell color values of redox features were taken.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler/HF Site City/County: Cutler, Washington Co. Sampling Date: 5-21-13

Applicant/Owner: NAVFAC-MIDLANT State: Maine Sampling Point: HF Wet 2

Investigator(s): Norman Famous Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Raised Plateau Bog Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR Lat: 4950923.962 Long: 636350.536 Datum: UTM19N WGS

Soil Map Unit Name: SG - Sebago-Moosebec NWI classification: PSS-2

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

The wetland basin under the bog is concave, although the surface of the wetland is convex, raised above the surrounding landscape due to the perched water table in the peat deposit, hence it is called a raised bog.

This plot was located immediately south of Antenna V-4.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 1-2 inches
Water Table Present?	Yes ___	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches): ___

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water was present in the game trails. Otherwise, the water table was high and much of the acrotelm was saturated. The acrotelm includes the living surface where the water table depth fluctuates. The peat is fibric, light in color and poorly decomposed. The catotelm, by contrast, is located below the acrotelm where the water table depth does not fluctuate and the peat is more decomposed and darker in color, but still fibric in texture. The von Post value of the acrotelm is 1 to 3 while the von Post scale for most of the catotelm is usually 4 to 5 in raised bogs.

The depth of the water table varies within the acrotelm during the summer, but does not drop into the catotelm. The thickness of the acrotelm varies between about 18 inches as measured from the top of the higher Sphagnum mounds to about 6 inches (or less) when measured from the surface of the lower hollows between mounds.

VEGETATION – Use scientific names of plants.

Sampling Point: HF Wet 2

Tree Stratum (Plot size: N□A)	Absolute □ Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		□ Total Cover	
Sapling□Shrub Stratum (Plot size: 15 ft radius cir)			
1. Larix laricina	20	YES	FACW
2. Picea mariana	15	YES	FACW
3.			
4.			
5.			
6.			
7.			
	35	□ Total Cover	
Herb Stratum (Plot size: 10 x 10 feet)			
1. Kalmia angustifolia	35	YES	FAC
2. Kalmia polyfolia	1	□	OBL
3. Chamaedaphne calyculata	30	YES	OBL
4. Picea mariana	25	□	FACW
5. Larix laricina	20	□	FACW
6. Rhododendron groenlandicum	10	□	OBL
7. Empetrum nigrum	70	Yes	FACW
8. Rubus chamaemorus	15	□	OBL
9. Trichophorum caespitosum	10	□	OBL
10. Eriophorum angustifolium	1	□	OBL
11. Eriophorum vaginatum ssp. spissum	5	□	OBL
12. Sarracenia purpurea	1	□	OBL
	234	□ Total Cover	
Woody Vine Stratum (Plot size: Herbs continu)			
1. 13. Drosera rotundifolia	□	□	OBL
2. 14. Gaylussacia baccata	5	□	FACU
3. 15. Gaylussacia dumosa v, bigeloviana	5	□	OBL
4. 16. Vaccinium oxycoccus	1	□	OBL
	N□A	□ Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100□ (A□B)

Prevalence Index worksheet:

Total □ Cover of:		Multiply by:
OBL species		x 1 □
FACW species		x 2 □
FAC species		x 3 □
FACU species		x 4 □
UPL species		x 5 □
Column Totals:	(A)	(B)

Prevalence Index □B□A □

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is □50□
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree □Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub □Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb □All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines □All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (Include photo numbers here or on a separate sheet.)

Sphagnum mosses	85□	N□A
Reindeer mosses	5	N□A

Shrub 50□30	Total cover □ 35□	50□ □17.5	20□ □7
Herbaceous 50□20	Total cover □234□	50□ □117	20□ □46.8

SOIL

Sampling Point: HF Wet 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	□	Color (moist)	□	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR7□2	100					Fibric pea	Von Post 2; acrotelm
18- 48	7.5 YR 4□4	100					Fibric pea	Von Post 4-6□catotelm

[1]Type: C□Concentration, D□Depletion, RM□Reduced Matrix, MS□Masked Sand Grains. [2]Location: PL□Pore Lining, M□Matrix.

Hydric Soil Indicators:

X Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Marine silt□clay; not seen

Depth (inches): Greater than 48 inches

Hydric Soil Present? Yes X No ______

Remarks:

This is a raised bog comprised mostly of Fibric peat or organic soils with a depth of over 10 feet in the deeper sections. No effort to core the bog was taken. Raised plateau-shaped bogs are fairly common within a half mile of the coast of Washington County, eastern Hancock County and along the western Bay of Fundy coast of New Brunswick, Canada.

The first layer in the soil profile description (acrotelm) contained a range of similar values and were related to the height of the Sphagnum moss mounds. I presented a value for the maximum depth.

There are no redox features in fully saturated histosols.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Cutler Naval Station HF site City/County: Cutler, Washington Co. Sampling Date: 5-21-13

Applicant/Owner: US Department of Defense State: Maine Sampling Point: HF UP 2

Investigator(s): Norman Famous Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Raised Plateau Bog Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR Lat: 4950891.3146 Long: 636351.3933 Datum: UTM19N WGS

Soil Map Unit Name: N/A (Land fill on SG - Sebago-Moosebec) NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ______ No X

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No X
Hydric Soil Present?	Yes ______	No X
Wetland Hydrology Present?	Yes ______	No X

Is the Sampled Area within a Wetland? **Yes** ______ **No** X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

This upland plot was placed in the nearest upland to the bog vegetation plots. The upland paired plot was located on an antenna pad comprised of coarse sand and gravel fill with a convex surface. The vegetation was periodically removed from the central part of the antenna pad (within the support wires, where this plot was located). Also, vehicular traffic on the pad crushes and periodically destroys the vegetation. The soils were artificial, the vegetation was weedy and adventive and the hydrology was completely changed by the added fill,

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No X	Depth (inches): ______
Water Table Present?	Yes ______	No X	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No X	Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: HF UP 2

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 10 x 10 feet)			
1. Potentilla simplex			FACU
2. Fragaria virginiana	10	YES	FACU
3. Danthonia spicata	5	YES	FACU
4. Agrostis perennans	5	YES	FACU
5. Equicetum arvense	5	YES	FAC
6. Sibbaldiopsis tridentata			FACU
7. Dichanthelium acuminatum	5	YES	FAC
8. Spireae alba	2		FAC
9. Oneothera biennis	3	YES	FACU
10. Aralia hispida			UPL
11. Kalmia angustifolia	10	YES	FAC
12. Pyrolla elliptica			FACU
	40	= Total Cover	

Woody Vine Stratum (Plot size: Herbs continu)			
1. Antennaria neglecta	1		UPL
2. Solidago puburla			FACU
3. Achella millifolium			UPL
4. Symphyotrichum novi-belgii			FACW
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 43% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	1	x 2 =	2
FAC species	5	x 3 =	15
FACU species	8	x 4 =	32
UPL species	3	x 5 =	15
Column Totals:	17 (A)		64 (B)

Prevalence Index = B/A = 3.76

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Agrostis hyemalis FAC

SOIL

Sampling Point: HF UP 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2.5 in	2.5 YR 5/2						Sandy	Sand and gravel fill
2.5 -6 in	2.5 YR 4/4						Sandy	Sand and gravel fill
6-10 in	2.5 YR 3.5/2						Sandy	Sand and gravel fill

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ **No** X

Remarks:

Redox features were not quantitatively documented because they were difficult to distinguish with accuracy, in part, because they are relatively young soils and they lacked any visible organic component (total vegetation cover was very low). Many sand and gravel grains below five inches were covered with a pale translucent coating, which increased in percent of grains covered with depth. No organic material was present to mask the sand grains. No Munsell color values of redox features were taken.

The nearest upland to the bog vegetation plots was an antenna pad comprised of coarse sand and gravel fill with a convex surface. There appeared to be a subsurface moisture gradient between the center of the pad and the raised bog to the south where the water table was higher nearest the bog. By contrast, the water table was lower toward the north edge of the pad away from the bog.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler/HF Site City/County: Cutler, Washington Co. Sampling Date: 5-21-13

Applicant/Owner: NAVFAC-MIDLANT State: Maine Sampling Point: HF Wet 3

Investigator(s): Norman Famous Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Raised Plateau Bog Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR Lat: 4950886.787 Long: 63614.318 Datum: UTM19N WGS

Soil Map Unit Name: SG - Sebago-Moosebec NWI classification: PFO-2

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** Yes X No ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

The wetland basin is concave in shape, although the surface of the wetland is convex, raised above the surrounding upland due to the perched water table in the peat deposit, hence it is called a raised bog. The plot was located on the edge of the plateau or just off the plateau in the forested edge next to the west side of the antenna pad.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)	___ Water-Stained Leaves (B9)	
___ High Water Table (A2)	___ Aquatic Fauna (B13)	
___ Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X No ___	Depth (inches): 1-2 inches	
Water Table Present?	Yes ___ No ___	Depth (inches): ___	
Saturation Present? (includes capillary fringe)	Yes ___ No ___	Depth (inches): ___	**Wetland Hydrology Present?** Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water was present in the game trails. Otherwise, the water table was high and much of the acrotelm was saturated. The acrotelm is the upper layer of peat, including the living surface, where the water table depth fluctuates. The peat is fibric, light in color and poorly decomposed. The catotelm, by contrast, is located below the acrotelm where the water table depth does not fluctuate and the peat is more decomposed and darker in color, but still fibric in texture. The von Post value of the acrotelm is 1 to 3 while the von Post value for most of the catotelm is usually 4 to 5 in raised bogs.

The depth of the water table varies within the acrotelm during the summer, but does not drop into the catotelm. The thickness of the acrotelm varies between about 18 inches as measured from the top of the higher Sphagnum mounds to 6 inches or less when measured from the lower hollows between mounds.

VEGETATION – Use scientific names of plants.

Sampling Point: HF Wet 3

Tree Stratum (Plot size: 30 X 60)

		Absolute □ Cover	Dominant Species?	Indicator Status
1.	Larix laricena	15	YES	FACW
2.	Picea mariana	10	YES	FACW
3.				
4.				
5.				
6.				
7.				
		25	□ Total Cover	

Sapling□Shrub Stratum (Plot size: 15 ft radius cir)

1.	Larix laricena	20	YES	FACW
2.	Picea mariana	20	YES	FACW
3.				
4.				
5.				
6.				
7.				
		40	□ Total Cover	

Herb Stratum (Plot size: 10 x 10 feet)

1.	Kalmia angustifolia	25	YES	FAC
2.	Kalmia polyfolia	2	□	OBL
3.	Chamaedaphne caylaculata	25	YES	OBL
4.	Picea mariana	10	□	FACW
5.	Larix laricena	10	□	FACW
6.	Rhododendron groenlandicum	15	□	OBL
7.	Empetrum nigrum	30	YES	FACW
8.	Vaccinium myrtilloides	□	□	FACW
9.	Rhododendron canadense	3	□	OBL
10.	Eriichophorum angustifolium	1	□	OBL
11.	Eriophorum vaginatum ssp. spissum	□	□	OBL
12.	Sarracenia purpurea	□	□	OBL
		128	□ Total Cover	

Woody Vine Stratum (Plot size: Herbs continu)

1.	13. Drosera rotundifolia	□	□	OBL
2.	14. Trachiphorum cespitosum	1	□	OBL
3.	15. Gaylussacia dumosa v, bigeloviana	5	□	OBL
4.	16. Vaccinium oxycoccus	1	□	OBL
		N□A	□ Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100□ (A□B)

Prevalence Index worksheet:

Total □ Cover of:		Multiply by:
OBL species		x 1 □
FACW species		x 2 □
FAC species		x 3 □
FACU species		x 4 □
UPL species		x 5 □
Column Totals:	(A)	(B)

Prevalence Index □B□A □

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is □50□

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree □Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub □Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb □All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines □All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Sphagnum mosses	80□	N□A
Reindeer mosses	5	N□A

50□20 test values	50□	20 □
Tree	12.5□	5□
Shrub	20□	8□
Herb	64□	25.6□

The tree plot shape was rectangular due to space constraints.

SOIL Sampling Point: HF Wet 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR7/2	100					Fibric	Von Post 2; acrotelm
18- 48	7.5 YR 4/3	100					Fibric	Von Post 4-6; catotelm

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- X Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes X **No** ______

Remarks:

This is a raised bog comprised mostly of Fibric peat or organic soils with a depth of over 10 feet in the deeper sections. No effort to core the bog was taken. Raised plateau-shaped bogs are fairly common within a half mile of the coast of Washington County, eastern Hancock County and along the western Bay of Fundy coast of New Brunswick, Canada.

The first layer in the soil profile description (acrotelm) contained a range of similar values and were related to the height of the Sphagnum moss mounds. I presented a value for the maximum depth.

There are no redox features in raised bog histosols.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NCTAMSLANT DET Cutler/HF Site City/County: Cutler, Washington Co. Sampling Date: 5-21-13

Applicant/Owner: NAVFAC-MIDLANT State: Maine Sampling Point: HF UP 3

Investigator(s): Norman Famous Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Raised Plateau Bog Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR Lat: 4950892.3239 Long: 636325.16 Datum: UTM19N WGS

Soil Map Unit Name: N/A (LSB - Lamoine-Scantic-Colonel Complex) NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation Yes, Soil Yes, or Hydrology Yes significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

This upland plot was placed in the nearest upland to the bog vegetation plots. The upland paired plot was located on an antenna pad comprised of coarse sand and gravel fill with a convex surface. The vegetation was periodically removed from the central part of the antenna pad (Antenna V-4; within the support wires, where this plot was located). Also, vehicular traffic on the pad crushes and periodically destroys the vegetation. The soils were artificial, the vegetation was weedy and adventive and the hydrology was completely changed by the added fill,

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)
___ High Water Table (A2)	___ Aquatic Fauna (B13)
___ Saturation (A3)	___ Marl Deposits (B15)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)
___ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ______
Water Table Present?	Yes ___	No X	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ______

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: HF UP 3

Tree Stratum (Plot size: N□A)	□ Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		□ Total Cover	

Sapling□Shrub Stratum (Plot size: N□A)	Absolute □ Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		□ Total Cover	

Herb Stratum (Plot size: 10 x 10 feet)	Absolute □ Cover	Dominant Species?	Indicator Status
1. Potentilla simplex	3	□	FACU
2. Fragaria virginiana	15	YES	FACU
3. Danthonia spicata	10	YES	FACU
4. Agrostis perennans	5	YES	FACU
5. Equisetum arvense	2	□	FAC
6. Sibbaldiopsis tridentata	10	YES	FACU
7. Dichanthelium acuminatum	1	□	FAC
8. Spiraea alba	10	YES	FAC
9. Oneothera biennis	5	YES	FACU
10. Picea rubens	□	□	FACU
11. Kalmia angustifolia	10	YES	FAC
12. Empetrum nigrum	15	YES	FACW
	91	□ Total Cover	

Woody Vine Stratum (Plot size: Herbs continu)	Absolute □ Cover	Dominant Species?	Indicator Status
1. 13. Larix laricina	1		FACW
2. 14. Solidago puberula	□	□	FACU
3. 15. Rhododendron groenlandicum	3	□	OBL
4. 16. Vaccinium angustifolium	1	□	FACU
		□ Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 37.5□ (A□B)

Prevalence Index worksheet:

Total □ Cover of:		Multiply by:
OBL species		x 1 □
FACW species		x 2 □
FAC species		x 3 □
FACU species		x 4 □
UPL species		x 5 □
Column Totals:	(A)	(B)

Prevalence Index □B□A □

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is □50□
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree □Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub □Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb □All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines □All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: (Include photo numbers here or on a separate sheet.)

50□20 test 50□ □45.5□ 20□ □18.2□

The two species with 15□ cover and four species tied with 10□ cover were needed to reach the 50□ value. The six dominant species were divided evenly between upland (UPL and FACU) and wetland (OBL, FACW and FAC) indicators. Because of the tie, the two species with 5□ cover were added as dominants. Both were FACU giving a 37.5□ dominance value for OBL, FACW and WET species, thus failing to meet the hydric vegetation criteria.

SOIL Sampling Point: HF UP 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2.5 in	2.5 YR 5/2	100					Sandy	Sand and gravel fill
2.5 -6 in	2.5 YR 4/4	100					Sandy	Sand and gravel fill
6-10 in	2.5 YR 3.5/2	100					Sandy	Sand and gravel fill

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ **No** X

Remarks:

The nearest upland to the bog vegetation plots was an antenna pad comprised of coarse sand and gravel fill with a convex surface. There appeared to be a subsurface moisture gradient between the center of the pad and the raised bog to the south where the water table was higher nearest the bog. By contrast, the water table was lower toward the north edge of the pad away from the raised bog (the former bog surface sloped downward north to south below the pad). The Munsell values for this section of the gravel pad were similar to those presented for upland wetland determination plot HF UP-1 and 2.

Redox features were not quantitatively documented because they were difficult to distinguish with accuracy, in part, because they are relatively young soils and they lacked any visible organic component (total vegetation cover was very low). Many sand and gravel grains below five inches were covered with a pale translucent coating, which increased in percent of the grains covered with depth. No organic material was present to mask the sand grains. No Munsell color values of redox features were taken.

APPENDIX G

SPECIES LISTS

ENCLOSURES

- **NSA Cutler Plant List**
- **NSA Cutler Bird Species Occurrence Table**
- **NSA Cutler Terrestrial Fauna List**
- **NSA Cutler Marine Fauna List**

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Abies balsamea	Balsam fir	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Abies balsamea	Balsam fir	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	X	X
Acer pensylvanicum	Striped maple	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Acer pensylvanicum	Striped maple	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Acer rubrum	Red maple	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Acer rubrum	Red maple	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	X	X
Acer rubrum	Red maple	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	X	X
Acer rubrum	Red maple	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	X	X
Acer spicatum	Mountain maple	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	X	X
Acer spicatum	Mountain maple	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	X	X
Acer spicatum	Mountain maple	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	X	X
Acer spicatum	Mountain maple	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	X	X
*Achillea millifolium**	Common yarrow	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Agrostis capillaris**	Colonial bentgrass	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Agrostis gigantea**	Redtop	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Agrostis perennans	Upland bentgrass	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Agrostis scabra	Rough bentgrass	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Agrostis scabra	Rough bentgrass	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
*Agrostis stolonifera**	Tickle-grass	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Alisma triviale	Northern water plantain	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Alnus incana ssp. *rugosa*	Speckled alder	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Alnus incana ssp. *rugosa*	Speckled alder	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Alnus viridis or *Alnus viridis* ssp. *crispa*	Green alder	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Ambrosia artemisiifolia	Annual ragweed	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Ambrosia artemisiifolia	Annual ragweed	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Amelanchier arborea	Common serviceberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Amelanchier arborea	Common serviceberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Amelanchier arborea	Common serviceberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Amelanchier arborea	Common serviceberry	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Amelanchier bartramiana	Serviceberry	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Amelanchier laevis	Serviceberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Amelanchier laevis	Serviceberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Amelanchier laevis	Serviceberry	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Amelanchier laevis	Serviceberry	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	~
Amelanchier stolonifera	Serviceberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Ammophila breviligulata	American beachgrass	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Anaphalis margaritacea	Pearly ever- lasting	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Anaphalis margaritacea	Pearly ever- lasting	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	~
Andromeda polifolia var. *Glaucophylla*	Bog rosemary	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Andromeda polifolia var. *Glaucophylla*	Bog rosemary	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Angelica lucida	Seacoast angelica	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Antennaria howellii ssp. *neodioica*	Howell's pussytoes	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed, Developed-Low Intensity	~	~
Antennaria neglecta	Field pussytoes	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed, Developed-Low Intensity	~	~
Anthoxanthum odoratum	Sweet vernal grass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Apios americana	Groundnut	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Apios americana	Groundnut	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Apios americana	Groundnut	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Apocynum androsaemifolium	Spreading dogbane	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Apocynum androsaemifolium	Spreading dogbane	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Aralia hispida	Bristly sarsaparilla	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Aralia nudicaulis	Wild sarsaparilla	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Aralia nudicaulis	Wild sarsaparilla	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Aralia nudicaulis	Wild sarsaparilla	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
*Arctium minus**	Common burdock	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Arethusa bulbosa (includes *A.b.* forma *albiflora* and *A.b.* forma *subcearulea*)	Dragon's mouth	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Argentina anserina**	Silverweed cinquefoil*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
Aronia melanocarpa	Black chokeberry	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Aronia melanocarpa	Black chokeberry	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Artemisia vulgaris**	Common wormwood	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Asclepius syriaca	Common milkweed	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Asclepius syriaca	Common milkweed	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Atriplex acadiensis	Acadian blite or orach	Beach Strand; Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Northern Atlantic Coastal Plain Sandy Beach, Acadian Coastal Salt Marsh	~	~
Atriplex glabriuscula	Sea-blite	Beach Strand; Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Northern Atlantic Coastal Plain Sandy Beach, Acadian Coastal Salt Marsh	~	~
Atriplex prostrata	Hastate orach	Beach Strand; Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Northern Atlantic Coastal Plain Sandy Beach, Acadian Coastal Salt Marsh	~	~
*Barbarea vulgaris**	Winter-cress	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Betula cordifolia	Heart-leaved paper birch	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Betula papyrifera	White birch	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Betula populifolia	Gray birch	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Betula X *caerulea* (*cordifolia* X *populifolia*)	Blue birch	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Bidens cernua	Nodding beggarticks	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Bidens frondosa	Devil's beggar-ticks	Mixed Graminoid-Shrub Marsh		Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Bolboschoenus maritimus	Bulrush	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Botrychium matricariifolium	Daisy-leaf moonwort	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Botrychium matricariifolium	Daisy-leaf moonwort	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Botrychium multifidum	Leathery grape-fern	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~
Botrychium multifidum	Leathery grape-fern	Not applicable, no NCT assigned to this habitat type		Developed-Open Space	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Botrychium multifidum	Leathery grape-fern	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Botrychium multifidum	Leathery grape-fern	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Botrychium simplex	Leathery grape-fern	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Botrychium simplex	Least moonwort	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Brachyelytrum septentrionale	Short-husk grass	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Brachyelytrum septentrionale	Short-husk grass	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
*Brassica nigra**	Black mustard*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Bromus inermis**	Smooth brome*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Bulbostylis capillaris	Vagabond sedge	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Butomus umbellatus	Flowering rush	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	X
Cabomba caroliniana	Fanwort	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Cakile edentula	Sea-rocket	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Calamagrostis canadensis	Blue-joint grass	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Calamagrostis canadensis	Blue-joint grass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Callitriche palustris	Vernal water- starwort	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Callitriche palustris	Vernal water- starwort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Calopogon tuberosus	Grass pink orchid	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Campanula aparinoides	Marsh bellflower	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Campanula rotundifolia	Round-leaved harebell	Mixed Graminoid-Shrub Marsh		Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Capsella bursa- pastoris**	Sheperd's purse	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Cardamine pensylvanica	Common bitter cress	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Cardamine pensylvanica	Common bitter cress	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Carex aquatilis	Water sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex aquatilis	Water sedge	Mixed Graminoid-Shrub Marsh		Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex aquatilis	Water sedge	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	X	X
Carex brunnescens	Brownish sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex brunnescens	Brownish sedge	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	X	X
Carex canescens ssp. disjuncta	Silvery sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex canescens ssp. disjuncta	Silvery sedge	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	X	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Carex conoidea	Field sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex conoidea	Field sedge	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	X	X
Carex crinita	Fringed sedge	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex debilis	White-edge sedge	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex disperma	Two-seeded sedge	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	X	X
Carex flava	Yellow sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex flava	Yellow sedge	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	X	X
Carex hormathodes	Seashore sedge	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	X	X
Carex intumescens	Inflated sedge	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex intumescens	Inflated sedge	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex magellanica	Depauperate sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex nigra	Black sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex paleacea	Saltmarsh sedge	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	X	X
Carex pallescens	Pale sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex pallescens	Pale sedge	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	X	X
Carex scoparia	Broom sedge	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex stipata	Weak-stemmed sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex stipata	Weak-stemmed sedge	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	X	X
Carex stipata	Weak-stemmed sedge	Mixed Graminoid-Shrub Marsh		Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex tenera	Drooping sedge	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Carex trisperma	Three-seeded sedge	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
*Carum carvi**	Caraway*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Centaurea maculosa (C. biebersteinii)*	Spotted knapweed*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Centaurea nigra**	Black knapweed*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Cerastium vulgatum**	Mouse-ear chickweed*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Chamaenerion angustifolium	Fireweed	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Chamaenerion angustifolium	Fireweed	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Chamaenerion angustifolium	Fireweed	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Chamaenerion angustifolium	Fireweed	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Chamaenerion angustifolium	Fireweed	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Chelone glabra	Turtlehead	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Chenopodium berlandieri var. *macrocalycium*	Berlandier's goosefoot	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Cicuta bulbifera	Bulblet-bearing water- hemlock	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Cicuta bulbifera	Bulblet-bearing water- hemlock	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Cicuta maculata	Spotted water hemlock	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Circaea alpina	Enchanter's- nightshade	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
*Cirsium arvense**	Canada thistle	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	X	X
*Cirsium vulgare**	Bull thistle	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Clintonia borealis	Blue-bead lily	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Comarum palustre	Marsh cinquefoil	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Comptonia peregrina	Sweet fern	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Conopholis americana	Cancer root	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
*Conyza canadensis**	Horseweed	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
Coptis trifolia ssp. *groenlandica*	Goldthread	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Corallorhiza trifida	Yellow coralroot	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Cornus canadensis	Bunchberry	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	X	X
Cornus rugosa	Round-leaved dogwood	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Cornus rugosa	Round-leaved dogwood	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Cornus sericea	Silky dogwood	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Cystopteris fragilis	Fragile fern	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
*Dactylis glomerata**	Barnyard grass	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Danthonia spicata	Poverty oatgrass	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
*Daucus carota**	Queen Ann's lace	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
Dennstaedtia punctilobula	Eastern hayscented fern	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Deschampsia flexuosa	Hair-grass	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Deschampsia flexuosa	Hair-grass	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Dichanthelium acuminatum ssp. *implicatum*	Acuminate panic-grass	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Dichanthelium boreale	Northern panic grass	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Diervilla lonicera	Bush honeysuckle	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Distichlis spicata	Salt-grass	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Doellingeria umbellata	Flat-topped white aster	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Drosera intermedia	Spoonleaf sundew	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Drosera rotundifolia	roundleaf sundew	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Dryopteris campyloptera	Mountain woodfern	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Dryopteris campyloptera	Mountain woodfern	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Dulichium arundinaceum	Threeway sedge	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Egeria densa	Brazilian waterweed (giant waterweed)	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Eichhornia crassipes	Water hyacinth	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Eleocharis acicularis	Needle spike-rush	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	X
Eleocharis erythropoda	Red-stemmed spike-rush	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	X
Eleocharis obtusa	Blunt spikerush	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Eleocharis obtusa	Blunt spikerush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Eleocharis palustris	Common spikerush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Eleocharis parvula	Low spike-rush	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	X
Eleocharis tenuis	Spike-rush	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Eleocharis tenuis	Spike-rush	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	X
Eleocharis tenuis	Spike-rush	Mixed Graminoid-Shrub Marsh		Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Elymus virginicus var. *halophilus*	Wild rye	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Elymus virginicus var. *halophilus*	Wild rye	Hardwood River Terrace Forest; Hudson River Beach; Silver Maple Floodplain Forest	Streamshore	Laurentian-Acadian Floodplain Forest	~	~
Empetrum nigrum	Black crowberry	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	X	X
Epigaea repens	Trailing arbutus	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Epigaea repens	Trailing arbutus	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Epilobium ciliatum	Glandular willow-herb	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Epilobium ciliatum	Glandular willow-herb	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Epilobium coloratum	Purple-veined willow-herb	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Epilobium coloratum	Purple-veined willow-herb	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Epilobium strictum	Willow-herb	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Epilobium strictum	Willow-herb	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Equisetum arvense	Field horsetail	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Equisetum arvense	Field horsetail	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Equisetum fluviatile	Water horsetail	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Equisetum sylvaticum	Wood horsetail	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Equisetum sylvaticum	Wood horsetail	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Equisetum sylvaticum	Wood horsetail	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Equisetum varigatum	Variegated scouring-rush	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Equisetum varigatum	Variegated scouring-rush	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Erechtites hieraciifolia	Pilewort	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Erechtites hieraciifolia	Pilewort	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Erechtites hieraciifolia	Pilewort	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Erechtites hieraciifolia	Pilewort	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Erigeron annuus	Eastern daisy fleabane	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Erigeron philadelphicus	Philadelphia fleabane	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Eriophorum angustifolium	Tall cotton-grass	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Eriophorum vaginatum var. *spissum*	Tussock cottongrass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Eriophorum virginicum	Tawny cottongrass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
*Erysimum cheiranthoides**	Wormseed wallflower	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Eupatorium perfoliatum	Common boneset	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Euphrasia nemorosa**	Common eyebright	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Euphrasia randii	Rand's eyebright	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Eurybia macrophylla (formerly Aster macrophyllus)	Large-leaved aster	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Eurybia macrophylla (formerly Aster macrophyllus)	Large-leaved aster	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Eurybia macrophylla (formerly Aster macrophyllus)	Large-leaved aster	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Eurybia macrophylla (formerly Aster macrophyllus)	Large-leaved aster	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Eurybia radula	rough wood-aster	Black Ash Swamp; Northern White Cedar Swamp	Appalachian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Eurybia radula	rough wood-aster	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Euthamia graminifolia	Flat-top goldenrod	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	X	X
*Festuca filiformis**	fineleaf sheep fescue	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Festuca rubra	Red fescue	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Festuca rubra ssp pruinosa	Coastal red fescue	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	X
*Festuca rubra ssp. Commutata**	Chewing's fescue*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Fragaria vesca	Woodland strawberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Fragaria virginiana	Wild strawberry	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Fragaria virginiana	Wild strawberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Fragaria virginiana	Wild strawberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Fragaria virginiana	Wild strawberry	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Fragaria virginiana	Wild strawberry	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Fragaria virginiana	Wild strawberry	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Fragaria virginiana ssp. glauca	Glabrate wild strawberry	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Fragaria virginiana ssp. *glauca*	Glabrate wild strawberry	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Fragaria virginiana ssp. *glauca*	Glabrate wild strawberry	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Fragaria virginiana ssp. *glauca*	Glabrate wild strawberry	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
*Galeopsis tetrahit**	Brittlestem hempnettle	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
*Galium mollugo**	False baby's breath	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Galium palustre	Common marsh bedstraw	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Galium tinctorium	Stiff marsh bedstraw	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Galium trifidum	Threepetal bedstraw	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Galium triflorum	Fragrant bedstraw	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~
Gaultheria hispidula	Creeping snowberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Gaultheria hispidula	Creeping snowberry	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Gaultheria hispidula	Creeping snowberry	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Gaultheria procumbens	Wintergreen	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Gaultheria procumbens	Wintergreen	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Gaultheria procumbens	Wintergreen	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Gaylussacia baccata	Black huckleberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Gaylussacia dumosa var. *bigeloviana*	Dwarf huckleberry	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Geum rivale	Sea milkwort	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Geum rivale	Sea milkwort	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Geum rivale	Sea milkwort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Glaux maritima	Manna-grass	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Glaux maritima	Manna-grass	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Glyceria melicaria	Melic mannagrass	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	X	X
Glyceria melicaria	Melic mannagrass	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	X	X
Glyceria striata	Fowl mannagrass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Gnaphalium uliginosum	Low cudweed	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Gymnocarpium dryopteris	Western oakfern	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Heracleum maximum	Cow parsley	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
*Hieracium caespitosum**	Yellow king-devil*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Hieracium canadense	Canada hawkweed	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	X
Hieracium paniculatum	Allegheny hawkweed	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
*Hieracium piloselloides**	Tall hawkweed	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Hieracium scabrum	Rough hawkweed	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
*Hieracium X flagellare**	Yellow king-devil*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Hierochloe odorata	Sweet meadow grass	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Hierochloe odorata	Sweet meadow grass	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Hierochloe odorata	Sweet meadow grass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Hippuris vulgaris	Mare's-tail	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Honckenya peploides	Seabeach sandwort	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
*Hordeum jubatum**	Squirrel-tail*	Not applicable, no NCT assigned to this habitat type		Agriculture - Cultivated Crops and Irrigated Agriculture	~	~
*Hordeum jubatum**	Squirrel-tail*	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Houstonia caerulea	Azure bluet	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Huperzia lucidula	Shining clubmoss	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
*Hydrilla verticillata**	Hydrilla*	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
*Hydrocharis morsus-ranae**	European frogbit*	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Hypericum boreale	Northern St. Johnswort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Hypericum canadense	Lesser Canadian St. Johnswort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Hypericum ellipticum	Pale St. Johnswort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Hypericum mutilum	Dwarf St. Johns-wort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Hypericum mutilum	Dwarf St. Johns-wort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Hypericum perforatum**	St. John's wort*	exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Ilex mucronatus (now *Nemophnthus mucronatus*)	Mountain holly	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Ilex mucronatus (now *Nemophnthus mucronatus*)	Mountain holly	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	X	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Ilex mucronatus (now *Nemophnthus mucronatus*)	Mountain holly	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Ilex verticillata	Winterberry	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Impatiens capensis	Jewelweed	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Impatiens capensis	Jewelweed	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Impatiens glandulifera**	Himalayan balsam*	exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Iris setosa var. *canadensis*	Hooker's iris	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	X
Iris versicolor	Blueflag	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Iris versicolor	Blueflag	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Juncus balticus	Baltic rush	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	X
Juncus balticus	Baltic rush	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	X
Juncus brevicaudatus	Narrowpanicle rush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Juncus bufonius	Toad rush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Juncus canadensis	Canada rush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Juncus effusus	Soft rush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Juncus filiformis	Thin rush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Juncus gerardii	Saltmarsh rush	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	X
Juncus pelocarpus	Brown-fruited rush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Juncus tenuis	Path rush	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	X
Juniperus communis	Common juniper	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Juniperus horizontalis	Creeping juniper	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Kalmia angustifolia	Sheep laurel	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Kalmia angustifolia	Sheep laurel	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Kalmia angustifolia	Sheep laurel	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Kalmia polifolia	Bog laurel	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Lactuca biennis	Blue lettuce	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Lactuca canadensis var. *longifolius*	Yellow lettuce	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Lactuca canadensis var. *longifolius*	Yellow lettuce	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Lactuca canadensis var. *longifolius*	Yellow lettuce	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Larix laricina	Tamarack	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	X	X
Larix laricina	Tamarack	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	X	X
Lathyrus japonicus	Beach pea	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	X
*Leontodon autumnalis**	Fall dandelion	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Leucanthemum vulgare**	Oxeye daisy	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Leymus mollis	Lyme-grass	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Ligusticum scothicum	Scotch lovage	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	X
Ligusticum scothicum	Scotch lovage	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	X
Limonium carolinianum	Sea-lavender	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
*Linaria vulgaris**	Butter-and-eggs*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Linnaea borealis	Twin flower	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~
Linnaea borealis	Twin flower	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Lobelia inflata	Indian-tobacco	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
Lobelia inflata	Indian-tobacco	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
*Lolium perenne**	Italian ryegrass*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Lonicera villosa var. *tonsa*	Mountain Fly-honeysuckle	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	X	~
Lonicera villosa var. *tonsa*	Mountain Fly-honeysuckle	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	X	~
Lonicera villosa var. *tonsa*	Mountain Fly-honeysuckle	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	~
Lonicera villosa var. *tonsa*	Mountain Fly-honeysuckle	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	~
*Lotus corniculatus**	Birdfoot deervetch	exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Ludwigia palustris	Marsh seedbox	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Lupinus polyphyllus**	Western lupine*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Luzula acuminata	Spring wood-rush	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Luzula campestris	Wood-rush	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Luzula campestris	Wood-rush	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Lycopodiella inundata	Bog clubmoss	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Lycopodium hickeyi	Hickey's clubmoss	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Lycopus americanus	American water- horehound	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Lycopus uniflorus	Northern bugleweed	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~
Lysimachia terrestris	Earth loosestrife	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Lythrum salicaria**	Purple loosestrife	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Maianthemum canadense	Canada mayflower	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Maianthemum canadense	Canada mayflower	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Maianthemum canadense	Canada mayflower	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Maianthemum canadense	Canada mayflower	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Maianthemum racemosum	False Solomon's Seal	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Maianthemum trifolium	Threeleaf false lily of the valley	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Malus pumila**	Apple*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Marsilea quadrifolia**	European waterclover*	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
*Matricaria matricarioides**	Pineapple-weed*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
*Medicago lupulina**	Black medic*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
*Medicago sativa**	Medic*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Melampyrum lineare	Narrowleaf cowwheat	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
*Melilotus officinalis**	Yellow sweetclover	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Mentha canadensis	Common mint	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Mertensia maritima	Oysterleaf	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Minuartia lateriflora	Lateral-flowered sandwort	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~
Mitchella repens	Partridge berry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Monotropa uniflora	Indianpipe	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Monotropa uniflora	Indianpipe	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Monotropa uniflora	Indianpipe	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Monotropa uniflora	Indianpipe	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Myrica gale	Sweetgale	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Myriophyllum aquaticum	Parrotfeather	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Myriophyllum heterophyllum	Variable-leaf watermilfoil	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
*Myriophyllum spicatum**	Eurasian watermilfoil*	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Najas minor	Brittle water-nymph (slender- leaved naiad, slender naiad)	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Nasturtium officinale (Rorippa nasturtium-aquaticum)	Watercress	Not applicable, no NCT assigned to this habitat type		Open Water (fresh, flowing)	~	X
Nuphar lutea ssp. *variegata*	Varigated yellow pond- lily	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Nuttallanthus canadensis	Canada toadflax	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
*Nymphoides peltata**	Yellow floating heart*	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Oclemena acuminata	Whorled wood aster	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Oclemena nemoralis	Bog aster	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
*Odontites serotine**	Red bartsia*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Oenothera biennis	Common evening primrose	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Oenothera parviflora	Evening primrose	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Oenothera parviflora	Evening primrose	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Oenothera perennis	Sun-drops	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Onoclea sensiblis	Sensitive fern	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Onoclea sensiblis	Sensitive fern	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Orthilia secunda	Sidebells wintergreen	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Osmunda cinnamomea	Cinnamon fern	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Osmunda claytoniana	Interrupted fern	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~
Osmunda regalis	Royal fern	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Osmunda regalis	Royal fern	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Osmunda regalis	Royal fern	Hardwood River Terrace Forest; Hudson River Beach; Silver Maple Floodplain Forest	Streamshore	Laurentian-Acadian Floodplain Forest	~	~
Oxalis montana	Wood sorrel	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	~
*Oxalis stricta**	Yellow wood-sorrel*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
Packera schweinitziana	Robbin's ragwort	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Packera schweinitziana	Robbin's ragwort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Pentaphylloides floribunda	Shrubby cinquefoil	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Pentaphylloides floribunda	Shrubby cinquefoil	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Pentaphylloides floribunda	Shrubby cinquefoil	Hardwood River Terrace Forest; Hudson River Beach; Silver Maple Floodplain Forest	Streamshore	Laurentian-Acadian Floodplain Forest	~	~
Pentaphylloides floribunda	Shrubby cinquefoil	Not applicable, no NCT assigned to this habitat type		Agriculture - Pasture/Hay	~	~
Persicaria amphibia var. stipulacea	Water Smartweed	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Persicaria hydropiper	Water pepper	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Persicaria hydropiper	Water pepper	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Persicaria lapathifolia	Knotweed	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Persicaria pensylvanica	Pink smartweed	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Persicaria pensylvanica	Pink smartweed	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
*Phalaris arundinacea**	Reed canarygrass	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	X	X
Phegopteris connectilis	Long beechfern	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
*Phleum pratense**	Timothy	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Phragmites australis**	Common reed	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
*Phragmites australis**	Common reed	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Picea glauca	White spruce	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
Picea mariana	Black spruce	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Picea mariana x *P. rubens*	Hybrid spruce	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
Picea rubens	Red spruce	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
Picea rubens	Red spruce	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	X
*Pilosella aurantiaca**	Paint-brush*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Pilosella officinalis**	Mouse-ear hawkweed*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Pinus strobus	White pine	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Pinus strobus	White pine	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	~
Pistia stratiotes	Water lettuce	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
*Plantago major**	Common plantain	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
Plantago maritima	Seaside plantain	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	X
Plantago maritima	Seaside plantain	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	X
Platanthera clavallata	Club-spur rein orchis	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Platanthera clavallata	Club-spur rein orchis	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Platanthera lacera	Ragged rein orchid	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Poa annua**	Annual bluegrass	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Poa compressa**	Canada bluegrass	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Poa glauca	Glaucus bluegrass	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Poa palustris	Fowl bluegrass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Pogonia ophioglossoides	Rose pogonia	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Polygonum aviculare**	Prostrate knotweed*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Polygonum cuspidatum** (also known as *Reynoutria japonica* and *Fallopia japonica*)	Japanese knotweed*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Polygonum fowleri	Fowler's knotweed	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Polygonum sagittatum	Tearthumb	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Pontederia cordata	Pickerel weed	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Populus balsamifera	Balsam poplar	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Populus grandidentata	Bigtooth aspen	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Populus tremuloides	Quaking aspen	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
*Potamogeton crispus**	curly-leaf pondwed	Not applicable, no NCT assigned to this habitat type		Open Water (fresh)	~	X
Potamogeton epihydrus	Ribbonleaf pondweed	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Potamogeton natans	Floating pondweed	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Potamogeton pusillus var. *tenuissimus*	Pondweed	Not applicable, no NCT assigned to this habitat type		Open Water (fresh)	~	~
*Potentiall recta**	Sulfur cinquefoil*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Potentilla argentea**	Silver cinquefoil*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Potentilla norvegica**	Norwegian cinquefoil	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
Potentilla simplex	Common cinquefoil	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Prenanthes trifoliolata	Gall of the earth	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Prunella vulgaris	Self-heal	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	~
Prunus pensylvanica	Fire cherry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Prunus pensylvanica	Fire cherry	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Prunus serotina	Black cherry	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Prunus virginiana	Choke cherry	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Pteridium aquilinum var. *latiusculum*	Western brackenfern	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Pteridium aquilinum var. *latiusculum*	Western brackenfern	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Pteridium aquilinum var. *latiusculum*	Western brackenfern	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Pteridium aquilinum var. *latiusculum*	Western brackenfern	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	~
Puccinellia tenella (also knonw as *Puccinellia pumila*)	Alkali-grass	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Pyrola rotundifolia	Round-leaved pyrola	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Pyrola rotundifolia	Round-leaved pyrola	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
*Radiola linoides**	Dwarf flax*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Ranunculus acris**	Tall buttercup	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Ranunculus cymbalaria	Seaside crowfoot	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Ranunculus flammula var. *reptans*	Creeping spearwort	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Ranunculus flammula var.*filiformis*	Spear-wort	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
*Ranunculus repens**	Creeeping buttercup*	Bluebell - Balsam Ragwort Shoreline Outcrop; Hardwood River Terrace Forest; Hudsonia River Beach; Silver Maple Floodplain Forest	Streamshore	Non-Specific Disturbed; Laurentian-Acadian Floodplain Forest	~	X
*Raphanus raphanistrum**	Wild radish	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Rhinanthus minor**	Yellow-rattle*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
Rhodiola rosea	Roseroot sedum	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
Rhododendron (formerly *Ledum*) *groenlandicum*	Bog Labrador tea	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Rhododendron canadense	Rhodora	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Rhododendron canadense	Rhodora	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Rhus hirta	Staghorn sumac	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Rhus hirta	Staghorn sumac	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Rhynchospora alba	White beaksedge	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Rhynchospora fusca	Dusky beak-rush	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Rhynchospora fusca	Dusky beak-rush	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Rhynchospora fusca	Dusky beak-rush	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Ribes glandulosum	Skunk currant	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~
Ribes glandulosum	Skunk currant	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Ribes hirtellum	Hairy-stem gooseberry	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Ribes hirtellum	Hairy-stem gooseberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Ribes hirtellum	Hairy-stem gooseberry	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~
Ribes hirtellum	Hairy-stem gooseberry	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Ribes lacustre	Swamp current	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Ribes lacustre	Swamp current	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Ribes lacustre	Swamp current	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Rorippa palustris	Yellow cress	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Rorippa palustris	Yellow cress	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	~	~
Rosa nitida	Swamp rose	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Rosa rugosa**	Rugosa rose*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Rosa virginiana	Virginia rose	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Rosa virginiana	Virginia rose	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Rubus allegheniensis	Allegheny blackberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
Rubus allegheniensis	Allegheny blackberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Rubus allegheniensis	Allegheny blackberry	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Rubus allegheniensis	Allegheny blackberry	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	X
Rubus canadensis	Smooth blackberry	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Rubus canadensis	Smooth blackberry	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Rubus chamaemorus	Baked-apple berry	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Rubus flagellaris	Northern dewberry	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Rubus flagellaris	Northern dewberry	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Rubus hispidus	Bristle dewberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	X	~
Rubus hispidus	Bristle dewberry	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	X	~
Rubus hispidus	Bristle dewberry	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	~
*Rubus idaeus**	American red raspberry	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	X	X
Rubus odoratus	Flowering raspberry	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Rubus odoratus	Flowering raspberry	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Rubus pensilvanicus	Pennsylvania blackberry	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Rubus pensilvanicus	Pennsylvania blackberry	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Rubus pubescens	Dwarf red raspberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Rubus pubescens	Dwarf red raspberry	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Rubus pubescens var. *pilosifolius*	Dwarf raspberry	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	X
Rubus pubescens var. *pilosifolius*	Dwarf raspberry	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	X
Rubus recurvicaulis	Blanchard's dewberry	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Rubus recurvicaulis	Blanchard's dewberry	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Rubus vermontanus	Vermont blackberry	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Rudbeckia hirta	Black-eyed Susan	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Rudbeckia hirta	Black-eyed Susan	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
*Rumex acetosa**	Meadow sorrel*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Rumex acetosella**	Common sheep sorrel	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Rumex brittanicus	Great water-dock	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Rumex crispus**	Curly dock	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Rumex pallidus	Pale dock	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Ruppia maritima	Widgeon-grass	Not applicable, no NCT assigned to this habitat type		Open Water (marine or estuarine)	~	~
Saggitaria latifolia	Broadleaf arrowhead	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Salix bebbiana	Bebb willow	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Salix bebbiana	Bebb willow	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Salix discolor	Pussy willow	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Salix discolor	Pussy willow	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Salix humilis	Prairie willow	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	X	X
Salix humilis	Prairie willow	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	X	X
Salix humilis	Prairie willow	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	X	X
Salix lucida	Shining willow	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Salix lucida	Shining willow	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Salix petiolaris	Meadow willow	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Salix pyrifolia	Balsam willow	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Salix pyrifolia	Balsam willow	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
*Salvinia molesta**	Salvinia*	Not applicable, no NCT assigned to this habitat type		Open Water	~	X
Sambucus racemosa ssp. *pubens*	Stinking elder	Aspen-Birch Woodland/Forest Complex; Maritime Spruce - Fir Forest; Spruce - Fir - Broom - Moss Forest; Spruce - Northern Hardwoods Forest	Maritime forest; Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Schoenoplectus acutus	Hardstem bulrush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Schoenoplectus tabernaemontani	Softstem bulrush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Scirpus atrocintus	Black-girdled woolgrass	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	X
Scirpus atrocintus	Black-girdled woolgrass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Scirpus cyperinus	Woolgrass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Scirpus hattorianus	Mosquito bulrush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Scirpus microcarpus	Panicled bulrush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Scirpus microcarpus	Panicled bulrush	Not applicable, no NCT assigned to this habitat type		Open Water (shallows)	X	X
Scirpus pedicellatus	Stalked bulrush	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Scirpus pedicellatus	Stalked bulrush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Scutellaria galericulata	Common skullcap	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Scutellaria galericulata	Common skullcap	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Senecio sylvaticus**	Ragwort*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Setaria viridis**	Fox-tail grass*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
Sibbaldiopsis tridentata	Three-toothed cinquefoil	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
*Silene latifolia**	White campion*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Silene vulgaris**	Bladder campion*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	~
*Sisymbrium officinale**	Hedge mustard*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Sium suave	Hemlock waterparsnip	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Solanum dulcamara**	Climbing nightshade	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Solidago bicolor	White goldenrod	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Solidago canadensis	Canada goldenrod	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Solidago gigantea	Giant goldenrod	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Solidago gigantea	Giant goldenrod	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Solidago juncea	Early goldenrod	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Solidago nemoralis	Gray goldenrod	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Solidago puberula	Downy goldenrod	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	X
Solidago rugosa	Rough-stemmed goldenrod	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	X
Solidago rugosa	Rough-stemmed goldenrod	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed	~	X
Solidago sempervirens	Seaside goldenrod	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Solidago uliginosa var. *linoides*	Bog goldenrods	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	X
Solidago uliginosa var. *terrenovae*	Bog goldenrods	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	X
*Sonchus arvensis**	Sow-thistle*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Sonchus asper**	Sow-thistle*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Sorbus americana	American mountain-ash	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Sparganium angustifolium	Narrowleaf burreed	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Sparganium emersum	Green bur-reed	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Sparganium emersum	Green bur-reed	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
Spartina alternifolia	Cord-grass	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Spartina patens	Cord-grass	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
Spartina pectinata	Prairie cordgrass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Spergula arvensis**	Corn-cockle*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Spergularia maritima**	Sea spurry*	Beach Strand	Coastal Dune - Marsh	Northern Atlantic Coastal Plain Sandy Beach	~	~
Sphagnum spp.	*Sphagnum* moss	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Sphagnum spp.	*Sphagnum* moss	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	X	X
Spiraea alba	Meadowsweet	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Spiraea alba ssp. *latifolia*	Meadowsweet	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Spiraea tomentosa	Steeplebush	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Spiranthes cernua	Nodding lady's-tresses	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Spiranthes cernua	Nodding lady's-tresses	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Spiranthes romanzoffiana	Lady's-tresses	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Spiranthes romanzoffiana	Lady's-tresses	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Stellaria calycantha	Northern starwort	Black Ash Swamp; Northern White Cedar Swamp	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	~	~
*Stellaria graminea**	Stitchwort*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Stellaria media**	Common chickweed*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Streptopus lanceolatus	Twisted stalk	Aspen - Birch Woodland/Forest Complex; Beech - Birch - Maple - Forest; Hardwood Seepage Forest; Maple Basswood - Ash Forest; Semi-Rich Northern Hardwood Forest	Appalachian - Acadian Basin Swamp; Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Symphyotrichium cordifolium (formerly *Aster cordifolius*)	Heart-leaved aster	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Symphyotrichium cordifolium (formerly *Aster cordifolius*)	Heart-leaved aster	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Symphyotrichium lanceolatum (formerly *Aster lanceolatus*)	White panicle aster	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Symphyotrichium lanceolatum (formerly *Aster lanceolatus*)	White panicle aster	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Symphyotrichium lateriflorum (formerly *Aster laterifloris*)	Calico aster	Not applicable, no NCT assigned to this habitat type		Harvested forest-herbaceous regeneration	~	~
Symphyotrichium lateriflorum (formerly *Aster laterifloris*)	Calico aster	Not applicable, no NCT assigned to this habitat type		Ruderal Forest	~	~
Symphyotrichum (formerly *Aster*) *novi-belgii*	New York aster	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Symphyotrichum puniceum (formerly *Aster puniceus*)	Purple-stemmed aster	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Symphyotrichum puniceum (formerly *Aster puniceus*)	Purple-stemmed aster	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Symphyotrichum puniceum (formerly *Aster puniceus*)	Purple-stemmed aster	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
*Syringa vulgaris**	Lilac*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Taraxacum officinale**	Common dandelion	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Thalictrum pubescens	King of the meadow	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Thuja occidentalis	Northern white cedar	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Torreyochloa pallida var. *fernaldii*	Fernald's false mannagrass	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Torreyochloa pallida var. *fernaldii*	Fernald's false mannagrass	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Toxicodendron rydbergii	Western poison ivy	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Toxicodendron rydbergii	Western poison ivy	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	~
Toxicodendron rydbergii	Western poison ivy	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Toxicodendron rydbergii	Western poison ivy	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	~

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
Trapa natans	Water chestnut	Not applicable, no NCT assigned to this habitat type		Open Water (fresh)	~	X
Triadenum fraseri	Pink St. John's-wort	Alder Floodplain; Alder Shrub Thicket; Bluejoint Meadow; Mixed Graminoid - Shrub Marsh; Sweetgale Mixed Shrub Fen; Tussock Sedge Meadow	Appalacian-Acadian Basin Swamp; Appalacian-Acadian Rivershore; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Trichophorum caespitosum	Deer's-hair	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Trientalis borealis	Starflower	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	~
Trientalis borealis	Starflower	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
*Trifolium arvense**	White clover	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Trifolium hybridum**	Alsike*	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Trifolium pratense**	Red clover	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Trifolium repens**	White clover	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Triglochin maritimum	Arrow-grass	Mixed Graminoid - Forb Saltmarsh; Spartina Saltmarsh	Coastal Dune - Marsh; Tidal Marsh Estuary	Acadian Coastal Salt Marsh	~	~
*Tussilago farfara**	Coltsfoot	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Typha latifolia	Broadleaf cattail	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	X	X
Ulmus americana	American elm	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Utricularia cornuta	Horned bladderwort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Utricularia intermedia	Flatleaf bladderwort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Utricularia macrorhiza	Common bladderwort	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Vaccinium angustifolium	Lowbush blueberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
Vaccinium macrocarpon	Cranberry	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	X
Vaccinium macrocarpon	Cranberry	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
Vaccinium myrtilloides	Velvetleaf huckleberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X
Vaccinium myrtilloides	Velvetleaf huckleberry	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Vaccinium oxycoccos	Small cranberry	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	X
Vaccinium vitis- idaea ssp. *minus*	Northern mountain cranberry	Aspen - Birch Woodland/Forest Complex; Hemlock Forest; Oak - Pine Forest; Red Oak - Northern Hardwoods - White Pine Forest	Central Hardwoods Oak Forest; Spruce-Fir-Northern Hardwood Forest; White Pine - Mixed Hardwood	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	~	X

APPENDIX G
Vegetation Observed at NSA Cutler

Scientific Name	Common Name	Maine Natrual Community Types	Maine Ecosystem Types	NVC Ecological System	HF	VLF
*Verbascum thapsus**	Common mullein	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
*Veronica officinalis**	Common speedwell	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Veronica scutellata	Skullcap speedwell	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Veronica serpyllifolia	Thymeleaf speedwell	Aspen-Birch Woodland/Forest Complex	Spruce-Fir-Northern Hardwood Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	~	X
Veronica serpyllifolia	Thymeleaf speedwell	Hemlock Forest	White Pine-Mixed Hardwood	Laurentian-Acadian Northern Hardwood Forest	~	X
Viburnum nudum var. *cassinoides*	Withe-rod	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	X
*Vicia cracca**	Bird vetch	Not applicable, exotic species - not associated with and not indicative of any particular community type		Non-Specific Disturbed	~	X
Viola blanda var. *palustriformis*	Sweet white violet	Alder Shrub Thicket	Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Viola blanda var. *palustriformis*	Sweet white violet	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Viola cucullata	Marsh blue violet	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Viola lanceolata	Bog white violet	Bog Moss Lawn; Leatherleaf Boggy Fen; Sheep Laurel Dwarf Shrub Bog; Spruce - Larch Wooded Bog	Domed Bog; Eccentric Bog; Unpatterned Fen (most likely) or several other peatland ecosystem types; Unpatterned Fen, Patterned Fen, or other peatland types; Unpatterned Fen	Boreal-Laurentian Bog	~	~
Viola lanceolata	Bog white violet	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Viola macloskeyi ssp. *pallens*	Smooth white violet	Mixed Graminoid-Shrub Marsh	Appalacian-Acadian Basin Swamp; Streamshore	Laurentian-Acadian Wet Meadow-Shrub Swamp	~	~
Viola sororia	Dooryard violet	Beech-Birch-Maple Forest	Spruce-Fir-Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest	~	~
Viola sororia	Dooryard violet	Not applicable, no NCT assigned to this habitat type		Non-Specific Disturbed, Developed-Low Intensity	~	~
Zannichellia palustris	Horned pondweed	Not applicable, no NCT assigned to this habitat type		Open Water (fresh or brackish)	~	~
Zostera marina var. stenophylla	Eelgrass	Not applicable, no NCT assigned to this habitat type		Open Water (marine or estuarine)	~	~

APPENDIX G

NSA Cutler Bird Species Occurrence Table

Bird Species		Yearly[1]	Species Occurrence[2]						Seasonal Status[3]					Migrant[4]	Conservation[5]
			VLF			HF									
Common Name	**Scientific Name**	**Status**	**List**	**2009**	**2015**	**List**	**2009**	**2015**	**S**	**S**	**F 1**	**F 2**	**W**	**Type**	**Concerns**
Alder Flycatcher	*Empidonax alnorum*	B	X	X	X	X	X	X	C	C	C	U	~	N	~
American Bittern	*Botaurus lentiginosus*	B	X	X	~	~	~	~	U	U	U	U	R	S	**BCC**
American Black Duck	*Anas rubripes*	pB	X	X	X	X	X	X	A	U	U	A	C	P/S	**PIF2**
American Crow	*Corvus brachyrhynchos*	pB	X	X	X	X	X	X	A	A	A	A	A	P/S	~
American Golden Plover	*Pluvialis dominica*	M	X	X	~	~	~	~	R	R	O	O	~	N	**SHP1/IBA**
American Goldfinch	*Carduelis tristis*	pB	X	X	~	X	X	~	C	C	A	A	C	S	~
American Kestrel	*Falco sparverius*	B	X	X	~	X	X	~	U	U	U	U	O	S	~
American Redstart	*Setophaga ruticilla*	B	X	X	X	X	X	X	A	A	A	U	~	N	**SSC/PIF2**
American Robin	*Turdus migratorius*	B	X	X	X	X	X	X	A	A	A	A	O	S	~
American Tree Sparrow	*Spizella arborea*	W	X	X	~	X	X	~	C	~	~	C	C	S	~
American Wigeon	*Anas americana*	M	X	X	~	~	~	~	U	~	O	U	O	S	~
American Woodcock	*Scolopax minor*	B	X	X	X	X	X	X	C	C	C	C	~	S	**SHP1/PIF1**
Arctic Tern	*Sterna paradisaea*	SV	X	X	~	~	~	~	U	U	U	~	~	N	**Sthr/BCC**
Atlantic Puffin	*Fratercula arctica*	P	X	X	~	~	~	~	U	U	U	U	U	S	**Sthr**
Baird's Sandpiper	*Calidris bairdii*	M	X	X	~	~	~	~	R	R	U	U	~	N	~
Bald Eagle	*Haliaeetus leucocephalus*	pB	X	X	X	X	X	X	C	C	C	C	C	P/S	**Sthr/BCC (breeding)**
Baltimore Oriole	*Icterus galbula*	B	X	X	~	~	~	~	U	U	U	U	~	N	**PIF2**
Bank Swallow	*Riparia riparia*	B	X	X	~	~	~	~	U	U	U	O	~	N	**PIF3**
Barn Swallow	*Hirundo rustica*	B	X	X	~	X	X	~	C	C	C	U	~	N	**PIF3**
Barred Owl	*Strix varia*	pB	X	X	~	~	~	~	U	U	U	U	U	P	~
Barrow's Goldeneye	*Bucephala islandica*	W	X	X	~	~	~	~	U	~	~	U	U	S	**Sthr**
Bay-breasted Warbler	*Setophaga [formerly Dendroica] castanea*	B	X	X	~	~	~	~	A	C	C	C	~	N	**BCC/PIF1**
Belted Kingfisher	*Ceryle alcyon*	B	X	X	X	X	X	~	C	U	U	C	O	S	**PIF2**
Bicknell's Thrush	*Catharus bicknelli*	B?	~	~	~	~	~	~	O	R	O	O	~	N	**BCC/SSC/PIF1**
Black Brant	*Branta nigricans*	M	X	X	~	~	~	~	R	~	~	~	~	S	~
Black Guillemot	*Cepphus grylle*	P	X	X	X	~	~	~	C	C	A	A	C	P	~
Black Scoter	*Melanitta nigra*	W	X	X	X	~	~	~	U	O	U	U	U	S	~
Black Tern	*Chlidonias niger*	M	X	~	~	~	~	~	R	R	R	R	~	N	~
Black-and-white Warbler	*Mniotilta varia*	B	X	X	X	X	X	X	A	A	C	C	~	N	**SSC/PIF3**
Black-backed Woodpecker	*Picoides arcticus*	pB	X	X	~	X	X	~	U	U	U	U	U	P	**PIF3**
Black-bellied Plover	*Pluvialis squatarola*	M	X	X	X	~	~	~	C	U	A	A	O	N	**IBA**
Black-billed Cuckoo	*Coccyzus erythropthalmus*	B	X	X	~	~	~	~	O	O	O	O	~	N	**PIF2**
Blackburnian Warbler	*Setophaga [formerly Dendroica] fusca*	B	X	X	~	X	X	~	A	A	A	C	~	N	**PIF3**
Black-capped Chickadee	*Poecile atricapillus*	pB	X	X	X	X	X	X	C	C	C	C	C	P/S	~
Black-crowned Night Heron	*Nycticorax nycticorax*	SV	X	~	~	~	~	~	U	U	U	U	~	S	**Sthr**
Black-headed Gull	*Larus ridibundus*	M	X	X	~	~	~	~	O	R	O	O	O	S	~

APPENDIX G

NSA Cutler Bird Species Occurrence Table

Bird Species		Yearly[1]	Species Occurrence[2]						Seasonal Status[3]					Migrant[4]	Conservation[5]
			VLF			HF									
Common Name	**Scientific Name**	**Status**	**List**	**2009**	**2015**	**List**	**2009**	**2015**	**S**	**S**	**F 1**	**F 2**	**W**	**Type**	**Concerns**
Black-legged Kittiwake	*Rissa tridactyla*	W	X	X	~	~	~	~	U	O	O	U	U	S	~
Blackpoll Warbler	*Setophaga striata [formerly Dendroica pinus]*	B	X	X	~	~	~	~	C	U	C	C	~	N	**PIF3**
Black-throated Blue Warbler	*Setophaga [formerly Dendroica]caerulescens*	B	X	X	~	X	X	~	U	U	U	U	~	N	
Black-throated Green Warbler	*Setophaga [formerly Dendroica] virens*	B	X	X	X	X	X	~	A	A	A	C	~	N	**PIF3**
Blue Jay	*Cyanocitta cristata*	B	X	X	X	X	X	X	U	U	U	U	U	S	~
Blue-Grosbeak	*Guiraca caerulea*	M	X	~	~	~	~	~	R	~	R	R	~	N	~
Blue-headed Vireo	*Vireo solitarius*	B	X	X	X	X	X	X	C	C	C	C	~	N	~
Blue-winged Teal	*Anas discors*	M	X	X	X	~	~	~	U	U	U	U	R	N	~
Bobolink	*Dolichonyx oryzivorus*	B	X	X	~	~	~	~	U	U	U	U	~	N	**PIF2**
Bohemian Waxwing	*Bombycilla garrulus*	W	X	X	~	~	~	~	O	~	~	O	O	S	~
Bonaparte's Gull	*Larus philadelphia*	M	X	X	~	~	~	~	U	O	A	A	O	S	**SSC (breeding)**
Boreal Chickadee	*Poecile hudsonica*	pB	X	X	~	X	X	~	U	U	U	U	U	P	**PIF3**
Brant	*Branta bernicla*	M	X	X	~	~	~	~	U	~	~	R	O	S	~
Broad-winged Hawk	*Buteo platypterus*	B	X	X	X	X	X	X	O	~	O	U	~	N	~
Brown Creeper	*Certhia americana*	pB	X	X	~	~	~	~	U	U	U	U	U	S	**PIF3**
Brown Thrasher	*Toxostoma rufum*	B	X	X	~	~	~	~	O	O	U	U	~	S	**SSC**
Brown-headed Cowbird	*Molothrus ater*	B	X	X	~	X	X	~	C	U	U	C	~	S	~
Buff-breasted Sandpiper	*Tryngites subruficollis*	M	X	X	~	~	~	~	~	~	R	R	~	N	**SHP1**
Bufflehead	*Bucephala albeola*	W	X	X	X	~	~	~	A	R	R	C	A	S	~
Canada Goose	*Branta canadensis*	pB	X	X	X	X	X	X	C	U	U	C	U	P/S	~
Canada Warbler	*Wilsonia canadensis*	B	X	X	X	X	X	~	C	U	C	U	~	N	**BCC/SSC/PIF1**
Cape May Warbler	*Setophaga [formerly Dendroica] tigrina*	BNB	X	X	~	~	~	~	U	U	U	U	~	N	**PIF2**
Cattle Egret	*Bubulcus ibis*	M	X	~	~	~	~	~	R	R	O	R	~	S	~
Cedar Waxwing	*Bombycilla cedrorum*	B	X	X	X	X	X	X	C	C	C	U	O	S	~
Chestnut-sided Warbler	*Setophaga [formerly Dendroica] pensylvanica*	B	X	X	X	X	X	~	A	A	A	C	~	N	**SSC/PIF2**
Chimney Swift	*Chaetura pelagica*	M	X	~	~	~	~	~	O	O	O	R	~	N	**SSC/PIF2**
Chipping Sparrow	*Spizella passerina*	B	X	X	~	X	X	~	C	C	C	C	~	S	~
Clay-colored Sparrow	*Spizella pallida*	M	X	~	~	~	~	~	R	R	R	O	~	S	~
Cliff Swallow	*Hirundo pyrrhonota*	BNB	X	~	~	~	~	~	U	U	U	O	~	N	~
Common Eider	*Somateria mollissima*	P	X	X	X	~	~	~	A	A	A	A	A	P/S	~
Common Goldeneye	*Bucephala clangula*	W	X	X	X	~	~	~	A	R	R	C	A	S	~
Common Grackle	*Quiscalus quiscula*	B	X	X	~	X	X	~	C	C	C	C	~	S	~
Common Loon	*Gavia immer*	P	X	X	X	~	~	~	A	C	C	A	A	P/S	~
Common Merganser	*Mergus merganser*	M	X	X	X	~	~	~	O	O	O	O	O	S	~
Common Murre	*Uria aalge*	P	X	~	~	~	~	~	U	O	U	U	U	p	**SSC**

APPENDIX G

NSA Cutler Bird Species Occurrence Table

Bird Species		Yearly[1]	Species Occurrence[2]						Seasonal Status[3]					Migrant[4]	Conservation[5]
			VLF			HF									
Common Name	**Scientific Name**	**Status**	**List**	**2009**	**2015**	**List**	**2009**	**2015**	**S**	**S**	**F 1**	**F 2**	**W**	**Type**	**Concerns**
Common Nighthawk	*Chordeiles minor*	B	X	X	~	X	X	~	U	U	U	O	~	N	~
Common Raven	*Corvus corax*	pB	X	X	X	X	X	X	C	C	C	C	C	P	~
Common Redpoll	*Carduelis flammea*	W	X	X	~	X	X	~	C	~	~	U	C	S	~
Common Ringed Plover	*Charadrius hiaticula*	M	X	~	~	~	~	~	~	~	~	R	~	N	~
Common Tern	*Sterna hirundo*	SV	X	X	~	~	~	~	U	C	C	O	~	N	**SSC**
Common Yellowthroat	*Geothlypis trichas*	B	X	X	X	X	X	X	A	A	A	C	~	N	~
Connecticut Warbler	*Oporornis agilis*	M	X	~	~	~	~	~	R	R	R	R	~	N	~
Cooper's Hawk	*Accipiter cooperii*	M	X	X	~	~	~	~	O	O	O	O	O	S	~
Curlew Sandpiper	*Calidris ferruginea*	M	X	~	~	~	~	~	~	R	R	R	~	N	~
Dark-eyed Junco	*Junco hyemalis*	pB	X	X	X	X	X	X	A	A	A	A	U	S	~
Dickcissel	*Spiza americana*	M	X	X	~	X	X	~	R	~	R	R	~	N	~
Double-crested Cormorant	*Phalacrocorax auritis*	SV	X	X	X	~	~	~	C	A	A	A	O	S	~
Dovekie	*Alle alle*	W	X	~	~	~	~	~	O	~	~	U	U	S	~
Downy Woodpecker	*Picoides pubescens*	pB	X	X	~	X	X	~	C	C	C	C	C	P	~
Dunlin	*Calidris alpina*	M	X	X	X	~	~	~	U	O	C	C	O	N	**SHP1**
Eastern Bluebird	*Sialia sialis*	B	X	X	~	~	~	~	U	O	O	U	~	S	~
Eastern Kingbird	*Tyrannus tyrannus*	B	X	X	~	X	X	~	U	U	U	U	~	N	**SSC/PIF3**
Eastern Meadowlark	*Sturnella magna*	B?	X	X	~	~	~	~	U	U	U	U	~	S	**SSC**
Eastern Phoebe	*Sayornis phoebe*	B	X	X	X	~	~	~	U	U	U	U	~	S	~
Eastern Towhee	*Pipilo erythrophthalmus*	B?	X	X	~	~	~	~	O	O	O	O	~	S	**SSC/PIF3**
Eastern Wood-Pewee	*Contopus virens*	B	X	X	~	~	~	~	U	U	U	U	~	N	**SSC/PIF3**
Eurasian Widgeon	*Anas penelope*	M	X	~	~	~	~	~	~	~	R	~	~	S	~
European Starling	*Sturnus vulgaris*	pB	X	X	~	~	~	~	A	A	A	A	C	P/S	~
Evening Grosbeak	*Coccothraustes vespertinus*	pB	X	X	~	X	X	~	U	U	U	U	U	S	**SSC (breeding)**
Field Sparrow	*Spizella pusilla*	B?	X	~	~	~	~	~	O	O	O	O	~	S	~
Forster's Tern	*Sterna forsteri*	M	X	~	~	~	~	~	~	~	R	R	~	N	~
Fox Sparrow	*Passerella iliaca*	M	X	X	~	~	~	~	C	~	U	C	O	S	**SSC**
Franklin's Gull	*Larus pipixcan*	M	X	~	~	~	~	~	~	~	~	R	~	S	~
Gadwall	*Anas strepera*	M	X	X	~	~	~	~	R	~	R	O	R	S	~
Glaucous Gull	*Larus hyperboreus*	W	X	X	~	~	~	~	O	~	~	O	O	S	~
Glossy Ibis	*Plegadis falcinellus*	M	X	~	~	~	~	~	~	~	~	R	~	S	~
Golden-crowned Kinglet	*Regulus satrapa*	B	X	X	X	X	X	X	A	A	A	A	C	P/S	~
Grasshopper Sparrow	*Ammodramus savannarum*	B?	X	X	~	~	~	~	R	R	R	R	~	S	**Send**
Gray Catbird	*Dumetella carolinensis*	B	X	X	~	X	X	~	C	C	C	U	~	S	**PIF3**
Gray Jay	*Perisoreus canadensis*	pB	X	~	~	X	~	~	O	O	O	O	O	P	**PIF3**
Great Black-backed Gull	*Larus marinus*	P	X	X	X	X	X	X	A	A	A	A	A	P	~
Great Blue Heron	*Ardea herodias*	SV	X	X	~	X	X	~	C	C	C	C	O	S	**SSC**
Great Cormorant	*Phalacrocorax carbo*	W	X	X	~	~	~	~	C	O	O	C	C	S	**BCC/Sthr**
Great Egret	*Ardea alba*	M	X	~	~	~	~	~	O	O	O	R	~	S	~
Great Horned Owl	*Bubo virginianus*	pB	X	X	~	X	~	~	U	U	U	U	U	P	~
Great-crested Flycatcher	*Myiarchus crinitus*	B	X	X	~	~	~	~	U	U	U	U	~	N	~
Greater Scaup	*Aythya marila*	W	X	X	~	~	~	~	U	~	~	O	O	S	**SSC**

APPENDIX G

NSA Cutler Bird Species Occurrence Table

Bird Species		Yearly[1]	Species Occurrence[2]						Seasonal Status[3]					Migrant[4]	Conservation[5]
			VLF			HF									
Common Name	**Scientific Name**	**Status**	**List**	**2009**	**2015**	**List**	**2009**	**2015**	**S**	**S**	**F 1**	**F 2**	**W**	**Type**	**Concerns**
Greater Shearwater	*Puffinus gravis*	SV	X	X	~	~	~	~	~	R	R	R	~	n	**BCC**
Greater Yellowlegs	*Tringa melanoleuca*	M	X	X	X	X	X	X	C	U	C	C	R	N	**IBA**
Green Heron	*Butorides virescens*	B	X	~	~	~	~	~	U	U	U	O	~	S	~
Green-winged Teal	*Anas crecca*	B	X	X	~	X	X	~	U	U	U	U	O	S	~
Grey-cheeked Thrush	*Catharus minimus*	M	X	~	~	~	~	~	U	R	U	U	~	N	~
Gyrfalcon	*Falco rusticolus*	M	X	X	~	~	~	~	r	~	~	R	R	S	~
Hairy Woodpecker	*Picoides villosus*	pB	X	X	X	X	X	~	C	C	C	C	C	P	**PIF2**
Harlequin Duck	*Histrionicus histrionicus*	W	X	X	~	~	~	~	O	~	~	O	O	S	**Sthr**
Hermit Thrush	*Catharus guttatus*	B	X	X	X	X	X	X	A	A	A	C	~	S	~
Herring Gull	*Larus argentatus*	P	X	X	X	X	X	X	A	A	A	A	A	P	~
Hoary Redpoll	*Carduelis hornemanni*	W	X	~	~	~	~	~	R	~	~	R	R	S	~
Hooded Merganser	*Lophodytes cucullatus*	M	X	X	~	~	~	~	U	R	O	U	O	S	~
Hooded Warbler	*Wilsonia citrina*	V	X	~	~	~	~	~	R	R	R	R	~	N	~
Horned Grebe	*Podiceps auritus*	W	X	X	X	~	~	~	C	~	O	C	C	S	**BCC**
Horned Lark	*Eremophila alpestris*	M	X	X	~	X	X	~	U	R	R	U	U	S	**SSC (breeding)/PIF3**
House Finch	*Carpodacus mexicanus*	pB	X	~	~	~	~	~	O	O	O	O	O	S	~
Hudsonian Godwit	*Limosa haemastica*	M	X	~	~	~	~	~	~	~	O	O	~	N	**BCC/SHP1**
Iceland Gull	*Larus glaucoides*	W	X	X	~	~	~	~	U	~	~	U	U	S	~
Indigo Bunting	*Passerina cyanea*	BNB	X	~	~	~	~	~	U	U	U	U	~	N	~
Killdeer	*Charadrius vociferus*	B	X	X	X	X	X	X	C	U	U	U	O	S	~
King Eider	*Somateria spectabilis*	W	X	X	~	~	~	~	O	~	~	O	O	S	~
Lapland Longspur	*Calcarius lapponicus*	M	X	X	~	~	~	~	U	~	~	U	R	S	~
Lark Sparrow	*Chondestes grammacus*	M	X	~	~	~	~	~	R	~	R	O	~	N	~
Laughing Gull	*Larus atricilla*	SV	X	X	~	~	~	~	U	U	C	C	~	S	**SSC**
Leach's Storm-Petrel	*Oceanodroma leucorhoa*	SV	X	~	~	~	~	~	U	U	U	U	R	n	~
Least Flycatcher	*Empidonax minimus*	B	X	X	X	X	X	X	U	U	U	U	~	N	**SSC/PIF3**
Least Sandpiper	*Calidris minutilla*	M	X	X	X	X	X	X	C	O	A	A	~	N	~
Least Tern	*Sterna antillarum*	M	X	~	~	~	~	~	R	R	R	~	~	N	**Send**
Lesser Black-backed Gull	*Larus fuscus*	W	X	X	~	~	~	~	R	~	~	R	R	S	~
Lesser Scaup	*Aythya affinis*	M	X	X	~	~	~	~	R	~	~	R	R	S	~
Lesser Yellowlegs	*Tringa flavipes*	M	X	X	X	~	~	~	U	U	C	U	~	N	**BCC**
Lincoln's Sparrow	*Melospiza lincolnii*	B	X	X	~	X	X	~	U	U	U	U	~	N	~
Little Gull	*Larus minutus*	M	X	~	~	~	~	~	O	R	O	O	O	S	~
Long-billed Dowitcher	*Limnodromus scolopaceus*	M	X	X	~	~	~	~	~	~	~	R	~	N	~
Long-eared Owl	*Asio otus*	pB	X	~	~	~	~	~	R	R	R	R	R	S	~
Long-tailed Duck	*Clangula hyemalis*	W	X	X	~	~	~	~	A	O	O	C	A	S	~
Magnolia Warbler	*Setophaga [formerly Dendroica] magnolia*	B	X	X	X	X	X	~	A	A	A	C	~	N	~
Mallard	*Anas platyrhynchos*	pB	X	X	X	X	~	~	U	U	U	U	U	P/S	~
Manx Shearwater	*Puffinus puffinus*	SV	X	~	~	~	~	~	O	O	O	R	~	S	~
Marbled Godwit	*Limosa fedoa*	M	X	~	~	~	~	~	~	~	r	r	~	N	**SHPE**
Marsh Wren	*Cistothorus palustris*	B?	X	X	~	~	~	~	O	O	O	~	~	S	~

APPENDIX G

NSA Cutler Bird Species Occurrence Table

Bird Species		Yearly[1]	Species Occurrence[2]						Seasonal Status[3]					Migrant[4]	Conservation[5]
			VLF			HF									
Common Name	**Scientific Name**	**Status**	**List**	**2009**	**2015**	**List**	**2009**	**2015**	**S**	**S**	**F 1**	**F 2**	**W**	**Type**	**Concerns**
Merlin	*Falco columbarius*	pB	X	X	X	X	X	X	U	U	U	U	O	S	~
Mourning Dove	*Zenaida macroura*	pB	X	X	~	X	X	~	C	C	A	C	U	S	~
Mourning Warbler	*Oporornis philadelphia*	BNB	X	~	~	~	~	~	O	O	O	O	~	N	~
Nashville Warbler	*Vermivora ruficapilla*	B	X	X	X	X	X	~	A	A	A	C	~	N	**PIF3**
Nelson's Gull	*Larus* spp.	W	X	X	~	~	~	~	R	~	~	R	R	S	**Hybrid Gull**
Nelson's Sharp-tailed Sparrow	*Ammodramus nelsoni*	B	X	X	~	~	~	~	O	O	O	O	~	S	**BCC/SSC**
Northern Cardinal	*Cardinalis cardinalis*	M	X	X	~	~	~	~	O	O	O	O	O	S	~
Northern Flicker	*Colaptes auratus*	B	X	X	X	X	X	X	C	C	C	C	O	S	**PIF3**
Northern Fulmar	*Fulmarus glacialis*	M	X	~	~	~	~	~	R	~	~	R	R	S	~
Northern Gannet	*Morus bassanus*	M	X	X	~	~	~	~	O	O	O	O	O	S	~
Northern Goshawk	*Accipiter gentilis*	pB	X	X	~	X	X	~	U	U	U	U	U	P/S	**PIF1**
Northern Harrier	*Circus cyaneus*	B	X	X	X	X	X	X	U	U	U	U	O	S	**SSC/PIF3**
Northern Mockingbird	*Mimus polyglottos*	M	X	X	~	~	~	~	O	O	O	U	~	S	~
Northern Parula	*Parula americana*	B	X	X	X	X	X	~	A	A	A	C	~	N	~
Northern Pintail	*Anas acuta*	M	X	X	~	~	~	~	O	~	O	O	O	S	~
Northern rough- winged Swallow	*Stelgidopteryx serripennis*	pB	X	~	~	~	~	~	O	O	O	~	~	N	**SSC**
Northern Saw-whet Owl	*Aegolius acadicus*	pB	X	X	~	X	~	~	U	O	O	U	U	S	~
Northern Shoveler	*Anas clypeata*	M	X	~	~	~	~	~	R	~	~	R	R	S	~
Northern Shrike	*Lanius excubitor*	W	X	X	~	X	~	~	U	~	~	U	U	S	~
Northern Waterthrush	*Seiurus noveboracensis*	B	X	X	~	X	X	~	U	U	C	U	~	N	~
Olive-sided Flycatcher	*Contopus cooperi*	B	X	X	~	X	X	~	U	U	U	U	~	N	**BCC/SSC/PIF2**
Orange-crowned Warbler	*Vermivora celata*	M	X	~	~	~	~	~	R	R	R	R	~	N	~
Osprey	*Pandion haliaetus*	B	X	X	X	X	X	X	C	C	C	C	~	N	~
Ovenbird	*Seiurus aurocapillus*	B	X	X	X	X	X	~	C	C	C	U	~	N	**PIF3**
Palm Warbler	*Setophaga palmarum*	B	X	X	X	X	X	~	A	U	A	A	~	S	**PIF3**
Parasitic Jaeger	*Stercorarius parasiticus*	M	X	~	~	~	~	~	O	R	O	O	~	N	~
Pectoral Sandpiper	*Calidris melanotos*	M	X	X	X	X	X	X	U	R	U	U	~	N	~
Peregrine Falcon	*Falco peregrinus*	M	X	X	~	X	~	~	U	O	U	U	O	S	**Send (breeding)/BCC (breeding)**
Philadelphia Vireo	*Vireo philadelphicus*	M	X	~	~	~	~	~	U	O	U	O	~	N	~
Pied-billed Grebe	*Podilymbus podiceps*	M	X	X	~	~	~	~	O	O	O	O	R	S	**BCC**
Pileated Woodpecker	*Dryocopus pileatus*	pB	X	X	~	X	X	~	U	U	U	U	U	p	~
Pine Grosbeak	*Pinicola enucleator*	B?	X	X	~	X	X	~	U	O	U	U	U	S	**PIF3**
Pine Siskin	*Carduelis pinus*	pB	X	X	~	X	X	~	C	C	C	C	C	S	~
Pine Warbler	*Dendrocia pinus*	M	X	X	~	~	~	~	U	O	U	U	~	S	~
Piping Plover	*Charadrius melodus*	M	X	~	~	~	~	~	R	~	R	R	~	N	**Fthr/Send/SHPE**
Pomarine Jaeger	*Stercorarius pomarinus*	M	X	~	~	~	~	~	O	R	R	O	~	N	~
Prairie Falcon	*Falco mexicanus*	M	X	~	~	~	~	~	~	~	~	R	~	~	~
Prairie Warbler	*Setophaga [formerly Dendroica] discolor*	M	X	~	~	~	~	~	R	R	R	R	~	N	**SSC**

APPENDIX G

NSA Cutler Bird Species Occurrence Table

Bird Species		Yearly[1]	Species Occurrence[2]						Seasonal Status[3]					Migrant[4]	Conservation[5]
			VLF			HF									
Common Name	Scientific Name	Status	List	2009	2015	List	2009	2015	S	S	F 1	F 2	W	Type	Concerns
Purple Finch	*Carpodacus purpureus*	pB	X	X	X	X	X	~	C	C	C	C	U	S	**PIF2**
Purple Martin	*Progne subis*	M	X	~	~	~	~	~	R	R	R	R	~	N	**SSC**
Purple Sandpiper	*Calidris maritima*	W	X	X	~	~	~	~	U	O	O	U	U	S	**BCC/SHP1**
Razorbill	*Alca torda*	P	X	X	~	~	~	~	U	U	U	U	U	P	**Sthr**
Red Crossbill	*Loxia curvirostra*	pB	X	X	~	~	~	~	U	U	U	U	U	S	~
Red Knot	*Calidris canutus rufa*	M	X	X	~	~	~	~	U	U	U	U	~	N	**Fthr/BCC/SHPE/SSC**
Red Phalarope	*Phalaropus fulicaria*	M	X	~	~	~	~	~	O	O	O	O	~	N	~
Red-bellied Woodpecker	*Melanerpes carolinus*	M	X	~	~	~	~	~	R	R	R	R	R	S	~
Red-breasted Merganser	*Mergus serrator*	B	X	X	~	~	~	~	A	O	O	A	A	P/S	~
Red-breasted Nuthatch	*Sitta canadensis*	pB	X	X	X	X	X	X	C	C	C	C	C	P/S	~
Red-eyed Vireo	*Vireo olivaceus*	B	X	X	~	X	X	~	C	C	C	U	~	N	~
Red-Headed Woodpecker	*Melanerpes erythrocephalus*	M	X	~	~	~	~	~	O	R	O	O	R	S	~
Red-necked Grebe	*Podiceps grisegena*	W	X	X	~	~	~	~	C	O	O	U	C	S	~
Red-necked Phalarope	*Phalaropus lobatus*	M	X	~	~	~	~	~	O	O	O	O	~	N	**SSC**
Red-shouldered Hawk	*Buteo lineatus*	M	X	X	~	~	~	~	O	R	O	O	R	S	~
Red-tailed Hawk	*Buteo jamaicensis*	M	X	X	~	~	~	~	U	R	R	U	O	S	~
Red-throated Loon	*Gavia stellata*	W	X	X	~	~	~	~	U	~	R	U	U	S	**BCC**
Red-winged Blackbird	*Agelaius phoeniceus*	B	X	X	X	X	X	X	O	C	C	C	~	S	~
Ring-billed Gull	*Larus delawarensis*	P	X	X	X	~	~	~	C	U	C	C	C	S	~
Ring-necked Duck	*Aythya collaris*	M	X	X	~	~	~	~	O	~	O	O	R	S	~
Ring-Necked Pheasant	*Phasianus colchicus*	BNB	X	~	~	~	~	~	~	~	~	~	~	P	~
Rock Pigeon	*Columba livia*	B	X	X	~	~	~	~	C	C	C	C	C	P	~
Roseate Tern	*Sterna dougallii*	SV	X	~	~	~	~	~	O	O	O	O	~	N	**Fend/Send**
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	B	X	X	~	~	~	~	U	U	C	U	~	N	**PIF2**
Rough-legged Hawk	*Buteo lagopus*	W	X	X	~	X	~	~	U	~	~	U	U	S	**IBA**
Rough-winged Swallow	*Stelgidopteryx serripennis*	B?	X	X	~	~	~	~	O	O	O	O	~	N	~
Ruby-crowned Kinglet	*Regulus calendula*	B	X	X	X	X	X	X	C	C	C	U	~	S	~
Ruby-throated Hummingbird	*Archilochus colubris*	B	X	X	~	X	X	~	U	U	U	O	~	N	~
Ruddy Duck	*Oxyura jamaicensis*	M	X	~	~	~	~	~	O	~	O	O	R	S	~
Ruddy Turnstone	*Arenaria interpres*	M	X	X	~	~	~	~	U	U	C	C	O	N	**SHP1/IBA**
Ruff	*Philomachus pugnax*	M	X	~	~	~	~	~	~	~	R	R	~	N	~
Ruffed Grouse	*Bonasa umbellus*	pB	X	X	X	~	~	~	O	O	O	O	O	P	**PIF2**
Rusty Blackbird	*Euphagus carolinus*	M	X	X	~	~	~	~	U	~	U	U	~	S	**BCC/SSC/PIF1**
Sanderling	*Calidris alba*	M	X	X	X	~	~	~	U	U	U	U	O	N	**SHP1**
Savannah Sparrow	*Passerculus sandwichensis*	B	X	X	X	X	X	X	A	A	A	A	~	S	~
Scarlet Tanager	*Piranga olivacea*	B	X	X	~	~	~	~	U	U	U	U	~	N	**PIF2**
Sedge Wren	*Cistothorus platensis*	B?	X	X	~	~	~	~	R	R	R	~	~	S	**Send**
Semipalmated Plover	*Charadrius semipalmatus*	M	X	X	X	~	~	~	U	U	A	C	~	N	**IBA**
Semipalmated Sandpiper	*Calidris pusilla*	M	X	X	X	~	~	~	C	U	A	A	~	N	**BCC/SSC/IBA**
Sharp-shinned Hawk	*Accipiter striatus*	pB	X	X	~	X	X	~	U	U	U	U	U	S	~
Short-billed Dowitcher	*Limnodromus griseus*	M	X	X	X	~	~	~	U	O	C	U	~	N	**SHP1/IBA**

APPENDIX G

NSA Cutler Bird Species Occurrence Table

Bird Species		Yearly[1]	Species Occurrence[2]						Seasonal Status[3]					Migrant[4]	Conservation[5]
			VLF			HF									
Common Name	**Scientific Name**	**Status**	**List**	**2009**	**2015**	**List**	**2009**	**2015**	**S**	**S**	**F 1**	**F 2**	**W**	**Type**	**Concerns**
Short-eared Owl	*Asio flammeus*	B	X	X	~	X	~	~	O	O	O	O	O	S	**Sthr~**
Skua sp.	*Catharacta* spp.	SV	X	~	~	~	~	~	R	R	R	R	R	S/N	~
Snow Bunting	*Plectrophenax nivalis*	W	X	X	~	X	X	~	U	~	~	C	U	S	~
Snow Goose	*Chen caerulescens*	M	X	~	~	~	~	~	R	~	O	O	O	S	~
Snowy Egret	*Egretta thula*	M	X	X	~	~	~	~	O	O	O	R	~	S	**BCC**
Snowy Owl	*Bubo scandiacus*	W	X	X	~	X	X	~	O	~	~	O	O	S	~
Solitary Sandpiper	*Tringa solitaria*	M	X	X	~	X	X	~	U	O	U	U	~	N	**BCC/SHP1**
Song Sparrow	*Melospiza melodia*	B	X	X	X	X	X	X	A	A	A	A	O	S	~
Sooty Shearwater	*Puffinus griseus*	SV	X	X	~	~	~	~	~	R	R	R	~	n	~
Sora	*Porzana carolina*	B?	X	X	~	~	~	~	O	O	O	O	~	S	~
Spotted Sandpiper	*Actitis macularia*	B	X	X	X	~	~	~	C	C	C	U	~	N	~
Spruce Grouse	*Dendragapus canadensis*	pB	X	~	~	~	~	~	U	U	U	U	U	P	**PIF2**
Stilt Sandpiper	*Calidris himantopus*	M	X	~	X	~	~	~	~	~	O	O	~	N	~
Surf Scoter	*Melanitta perspicillata*	W	X	X	X	~	~	~	A	U	U	C	A	P/S	~
Swainson's Thrush	*Catharus ustulatus*	B	X	X	X	X	X	X	C	A	A	U	~	N	~
Swamp Sparrow	*Melospiza georgiana*	B	X	X	~	X	X	~	U	U	U	C	~	S	~
Tennessee Warbler	*Vermivora peregrina*	BNB	X	X	~	~	~	~	U	U	U	U	~	N	**SSC**
Thayer's Gull	*Larus thayeri*	W	X	~	~	~	~	~	R	~	~	R	R	S	~
Thick-billed Murre	*Uria lomvia*	W	X	~	~	~	~	~	O	R	O	O	U	S	~
Three-toed Woodpecker	*Piscoides dorsalis*	P	X	~	~	~	~	~	R	R	R	R	R	P	~
Tree Swallow	*Tachycineta bicolor*	B	X	X	~	X	X	~	C	U	C	U	~	N	**SSC**
Tufted Titmouse	*Baeolophus bicolor*	M	X	~	~	~	~	~	O	O	O	O	~	S	~
Turkey Vulture	*Cathartes aura*	M	X	X	X	~	~	~	O	O	O	O	~	S	~
Upland Sandpiper	*Bartramia longicauda*	B?	X	X	~	~	~	~	O	R	O	O	~	N	**Sthr/BCC/SHP1/IBA**
Veery	*Catharus fuscescens*	B	X	X	~	~	~	~	U	U	U	O	~	N	**SSC/PIF2**
Vesper Sparrow	*Pooecetes gramineus*	M	X	X	~	~	~	~	U	O	U	U	~	S	~
Virginia Rail	*Rallus limicola*	B?	X	X	~	~	~	~	O	U	U	O	~	S	~
Warbling Vireo	*Vireo gilvus*	B	X	X	~	~	~	~	U	O	U	O	~	N	~
Water Pipit	*Anthus spinoletta*	M	X	X	~	~	~	~	U	R	U	U	~	S	~
Western Kingbird	*Tyrannus verticalis*	M	X	~	~	~	~	~	O	~	O	O	~	N	~
Western Sandpiper	*Calidris mauri*	M	X	X	~	~	~	~	O	R	O	O	~	N	**SHP1**
Whimbrel	*Numenius phaeopus*	M	X	X	X	X	~	~	O	R	U	U	~	N	**SHP1/BCC/SSC/IBA**
Whip-poor-will	*Caprimulgus vociferus*	B?	X	~	~	~	~	~	O	O	O	R	~	N	**SSC**
White-breasted Nuthatch	*Sitta carolinensis*	M	X	X	~	~	~	~	U	O	O	U	O	S	~
White-crowned Sparrow	*Zonotrichia leucophrys*	M	X	X	~	X	X	~	C	~	O	A	~	S	~
White-rumped Sandpiper	*Calidris fuscicollis*	M	X	X	~	~	~	~	O	R	C	C	R	N	**IBA**
White-throated Sparrow	*Zonotrichia albicollis*	B	X	X	X	X	X	X	A	A	A	A	O	S	**SSC**

APPENDIX G

NSA Cutler Bird Species Occurrence Table

Bird Species		Yearly[1]	Species Occurrence[2]						Seasonal Status[3]					Migrant[4]	Conservation[5]
			VLF			HF									
Common Name	**Scientific Name**	**Status**	**List**	**2009**	**2015**	**List**	**2009**	**2015**	**S**	**S**	**F 1**	**F 2**	**W**	**Type**	**Concerns**
White-winged Crossbill	*Loxia leucoptera*	pB	X	X	~	X	X	~	C	C	C	C	C	P/S	~
White-winged Scoter	*Melanitta fusca*	W	X	X	~	~	~	~	U	O	O	U	U	S	~
Willet	*Caroptrophrus semipalmatus*	M	X	X	~	X	X	~	O	O	O	O	~	N	~
Willow Flycatcher	*Empidonax traillii*	B	X	X	~	~	~	~	O	O	O	O	~	N	~
Wilson's Plover	*Charadrius wilsonia*	M	X	~	~	~	~	~	~	~	~	R	~	N	**SHP1**
Wilson's Snipe	*Gallinago delicata*	B	X	X	~	X	X	~	U	U	U	U	~	S	~
Wilson's Storm-Petrel	*Oceanites oceanicus*	SV	X	~	~	~	~	~	O	U	U	O	~	n	~
Wilson's Warbler	*Wilsonia pusilla*	B	X	X	~	X	X	~	U	U	C	U	~	N	~
Winter Wren	*Troglodytes troglodytes*	B	X	X	~	X	X	~	C	C	C	C	R	S	~
Wood Duck	*Aix sponsa*	M	X	X	~	~	~	~	O	R	R	O	R	S	~
Wood Thrush	*Hylocichla mustelina*	M	X	~	~	~	~	~	O	O	O	R	~	N	**BCC/SSC/PIF1**
Yellow Warbler	*Setophaga [formerly Dendroica] petechia*	B	X	X	X	X	X	~	C	C	C	C	~	N	**SSC**
Yellow-bellied Flycatcher	*Empidonax flaviventris*	B	X	X	~	X	X	~	U	U	U	U	~	N	**PIF3**
Yellow-bellied Sapsucker	*Sphyrapicus varius*	B	X	X	~	X	X	~	U	U	U	U	~	S	**PIF2**
Yellow-billed Cuckoo	*Coccyzus americanus*	M	X	~	~	~	~	~	O	U	O	U	~	N	**SSC**
Yellow-breasted Chat	*Icteria virens*	M	X	~	~	~	~	~	~	~	R	R	~	N	~
Yellow-rumped Warbler	*Setophaga [formerly Dendroica] coronata*	B	X	X	X	X	X	~	A	A	A	A	R	S	~

Yearly status[1]

B = Breeding
B? = Probable Breeder M = Migrant
pB = Breeding Permanent Resident (Non migratory)
BNB = Breeder not breeding in 2009
P = Nonbreeding Permanent Resident SV = Nonbreeding Summer Visitant W = Winter Resident
V = Vagrant

Species Occurrence[2]

X = Observed
~ = Not Present
List = Species detected on NSA Cutler since 1978
2009 = Species detected in 2009
2015 = Species detected during recent MAPS Surveys, Shorebird Surveys,
Avian and Bat Surveys

Seasonal Status[3]

Season (S-S-F-F-W) = SPRING (mid March-May), SUMMER (June-mid July),
FALL-1, Early (mid July-mid Sept), FALL-2, Late (mid Sept-Nov), WINTER (Dec-mid March) A = Abundant
Found in high numbers during the proper season
C = Common
U = Uncommon Tallied each year but may not be recorded daily during the proper season or population numbers are low.
O = Occasional May not be present each year and are always few in number.
R = RARE

Migration Type[4]

n = Neotropical migrant wintering primarily south of US
s = Short distant migrant wintering primarily in the US and Canada

Conservation Concerns[5]

Fend = Federally Endangered
Fthr = Federally Threatened
Send = State Endangered
Sthr = State Threatened
SSC = Species of Special Concern
BCC = Birds of Conservation Concern

Shorebird Conservation Plan	SHPE - Populations Imperiled
	SHP1 - High Priority
PIF (Partners in Flight)	PIF1 - Extremely High Priority
	PIF2 - High Priority
	PIF3 - Moderately High Priority
IBA Criteria	Maine Important Bird Areas Program-High population of statewide significance

APPENDIX G
Terrestrial Fauna Observed at NSA Cutler

Common Name	Scientific Name	Grouping	VLF	HF
Spotted salamander	*Ambystoma maculatum*	Amphibian	X	--
Eastern American toad	*Anaxyrus americanus americanus*	Amphibian	X	--
Gray treefrog	*Hyla versicolor*	Amphibian	X	--
Northern green frog	*Lithobates clamitans melanota*	Amphibian	X	--
Wood frog	*Lithobates sylvatica (sylvaticus)*	Amphibian	X	--
Red-spotted newt	*Notophthalmus viridescens viridescens*	Amphibian	X	--
Spring peeper	*Pseudacris crucifer*	Amphibian	X	--
Marsh bluet	*Enallagma erbium*	Invertebrates - Coenagrionidae	--	X
Eastern forktail	*Ischnura verticalis*	Invertebrates - Coenagrionidae	--	X
Long dash	*Polites mystic*	Invertebrates - Hesperiidae	X	--
Peck's skipper	*Polites peckius*	Invertebrates - Hesperiidae	X	--
Belted whiteface	*Leucorrhinia frigida*	Invertebrates - Libellulidae	X	X
Twelve-spotted skimmer	*Libellula incest*	Invertebrates - Libellulidae	X	--
Boreal spring azure	*Celastrina lucia*	Invertebrates - Lycaenidae	X	X
Harris' checkerspot	*Chlosyne harrisii*	Invertebrates - Nymphalidae	X	--
Inornate ringlet	*Coenonympha tullia*	Invertebrates - Nymphalidae	X	X
Northern pearl crescent	*Phyciodes cocyta*	Invertebrates - Nymphalidae	X	--
Great spangled fritillary	*Speyeria cybele*	Invertebrates - Nymphalidae	X	--
American lady	*Vanessa virginiensis*	Invertebrates - Nymphalidae	X	--
Pink-edged sulphur	*Colias interior*	Invertebrates - Pieridae	X	--
Cabbage white	*Pieris rapae*	Invertebrates - Pieridae	X	--
Moose	*Alces alces*	Mammal	X	X
Short-tailed shrew	*Blarina brevicauda*	Mammal	X	Indeterminate
Eastern coyote	*Canis latrans*	Mammal	X	X
American beaver	*Castor canadensis*	Mammal	X	X
Redback vole	*Clethrionomys gapperi*	Mammal	X	Indeterminate
Big brown bat	*Eptesicus fuscus*	Mammal	--	--
Common porcupine	*Hystrix cristata*	Mammal	X	X
Eastern red bat	*Lasiurus borealis*	Mammal	--	--
Hoary bat	*Lasiurus cinereus*	Mammal	--	--
Snowshoe hare	*Lepus americanus*	Mammal	X	X
Silver-haired bat	*Lsionycteris noctivagans*	Mammal	--	--
Canada lynx	*Lynx canadensis*	Mammal	X	--
Bobcat	*Lynx rufus*	Mammal	X	X
Pine martin	*Martes martes*	Mammal	X	Indeterminate
Striped skunk	*Mephitis mephitis*	Mammal	X	Indeterminate
Meadow vole	*Microtus pennsylvanicus*	Mammal	X	X
Weasel	*Mustela frenata*	Mammal	X	X
Mink	*Mustela vison*	Mammal	X	X
Eastern small-footed bat	*Myotis leibii*	Mammal	--	--
Little brown bat	*Myotis lucifugus*	Mammal	--	--
Northern long-eared bat	*Myotis septentrionalis*	Mammal	--	--
White-tailed deer	*Odocoileus virginianus*	Mammal	X	X
Common muskrat	*Ondatra zibethicus*	Mammal	X	Indeterminate
Tricolored bat	*Perimyotis subflavus*	Mammal	--	--
Deer mouse	*Peromyscus maniculatus*	Mammal	X	Indeterminate
Raccoon	*Procyon lotor*	Mammal	X	X
Red squirrel	*Sciurus vulgaris*	Mammal	X	X
Masked shrew	*Sorex cinereus*	Mammal	X	Indeterminate
Chipmunk	*Tamias striatus*	Mammal	X	Indeterminate
Black bear	*Ursus americanus*	Mammal	X	X
Red fox	*Vulpes vulpes*	Mammal	X	X
Jumping mouse	*Zapus hudsonius*	Mammal	X	Indeterminate
Northern red-bellied snake	*Storeria occipitomaculata occipitomaculata*	Reptile	X	--
Eastern garter snake	*Thamnophis sirtalis sirtalis*	Reptile	X	--

Notes:
Final NSA Cutler Avian and Bat Survey Report_Jan 2014: Tetra Tech. 2014. Acoustic and Avian Radar Surveys for Birds and Bats, NCTAMSLANT DET Cutler. NAVFAC Atlantic
Invert Survey Report 2016: Tetra Tech. 2016. Baseline Invertebrate Survey Technical Memorandum, NCTAMSLANT DET Cutler. NACFAC Atlantic Biological Resource Services.
Baseline Herp Survey_Maine_final: Petersen, Chris and Ian Trefry. 2013. Baseline Survey for Amphibians and Reptiles at Three Navy Installations in Maine. Naval Facilities Engineering
VLF = very low frequency area
HF: high frequency area
"--" = indicates no data available

APPENDIX G
Marine Fauna Observed at NSA Cutler

Common Name	Scientific Name	Grouping
Gammarid Amphipoc	*Ampelisca vadorum*	Arthropods - Amphipoda
--	*Argissa hamatipes*	Arthropods - Amphipoda
--	*Batea catherinensis*	Arthropods - Amphipoda
--	*Cerapus tubularis*	Arthropods - Amphipoda
--	*Corophium* sp.	Arthropods - Amphipoda
Amphipod	*Leptocheirus pinguis*	Arthropods - Amphipoda
--	*Listriella clymenellae*	Arthropods - Amphipoda
--	*Metopella angusta*	Arthropods - Amphipoda
--	*Microprotopus raneyi*	Arthropods - Amphipoda
--	*Monoculodes sp*	Arthropods - Amphipoda
Ghost Shrimp	*Paracaprella tenuis*	Arthropods - Amphipoda
Amphipod	*Phoxocephalus holbolli*	Arthropods - Amphipoda
Gammarid Amphipoc	*Pleusymtes glaber*	Arthropods - Amphipoda
Amphipod	*Pontogeneia inermis*	Arthropods - Amphipoda
Amphipod	*Unciola irrorata*	Arthropods - Amphipoda
--	*Diastylis sculpta*	Arthropods - Cumacea
--	*Eudorella* sp.	Arthropods - Cumacea
--	*Leucon americanus*	Arthropods - Cumacea
Arthropod	*Oxyurostylis smithi*	Arthropods - Cumacea
Rock Crab	*Cancer irroratus*	Arthropods - Decapoda
Hermit Crab	*Pagurus acadianus*	Arthropods - Decapoda
--	*Pagurus* sp.	Arthropods - Decapoda
--	*Pinnixa* sp.	Arthropods - Decapoda
--	*Porcellanidae* sp.	Arthropods - Decapoda
Mounded-back Isopod	*Edotea triloba*	Arthropods - Isopoda
--	*Idoteidae* sp.	Arthropods - Isopoda
--	*Mysidopsis bigelowi*	Arthropods - Mysidacea
--	*Neomysi americana*	Arthropods - Mysidacea
--	*Balanus* spp.	Arthropods - Sessilia
Tanaids	*Tanaissus psammophilus*	Arthropods - Tanaidacea
Sea spider	*Achelia spinosa*	Benthic Invertebrates
--	*Actinaria* sp.	Benthic Invertebrates
Brittle star	*Amphiodia atra*	Benthic Invertebrates
Sanddollar	*Echinarachnius parma*	Benthic Invertebrates
--	*Gobiosoma* sp.	Benthic Invertebrates
--	*Harpacticoid copepod* sp.	Benthic Invertebrates
--	*Nematoda* spp.	Benthic Invertebrates
--	*Nemertinea* spp.	Benthic Invertebrates
Flatworm	*Notoplana atomata*	Benthic Invertebrates
Oligochaetes	*Oligochaeta* spp.	Benthic Invertebrates
Sea spider	*Phoxichilidium femoratum*	Benthic Invertebrates
Alewife	*Alosa pseudoharengus*	Fish
American sand lance	*Ammodytes americanus*	Fish
Atlantic alligatorfish	*Aspidophoroides monopterygius*	Fish
Atlantic herring	*Clupea harengus*	Fish
Atlantic herring	*Clupea harengus*	Fish
Lumpfish	*Cyclopterus lumpus*	Fish
Smallmouth Flounder	*Etropus microstomus*	Fish
Atlantic cod	*Gadus morhua*	Fish
Skilletfish	*Gobiesox strumosus*	Fish
Sea raven	*Hemitripterus americanus*	Fish
Goosefish	*Lophius americanus*	Fish
Snakeblenny	*Lumpenus lampretaeformis*	Fish
Haddock	*Melanogrammus aeglefinus*	Fish
Atlantic silverside	*Menidia menidia*	Fish
Silver hake	*Merluccius bilinearis*	Fish
Grubby	*Myoxocephalus aenaeus*	Fish
Longhorn sculpin	*Myoxocephalus octodecemspinosus*	Fish
Shorthorn sculpin	*Myoxocephalus scorpius*	Fish
Rainbow smelt	*Osmerus mordax*	Fish
Rock gunnel	*Pholis gunnellus*	Fish
Rock Gunnel	*Pholis gunnellus*	Fish
Pollock	*Pollachius virens*	Fish
Winter flounder	*Pseudopleuronectes americanus*	Fish
Windowpane flounder	*Scophthalmus aquosus*	Fish
Tautog	*Tautoga onitis*	Fish
Cunner	*Tautogolabrus adspersus*	Fish
Sea robin	Triglidae	Fish
Red hake	*Urophycis chuss*	Fish
White hake	*Urophycis tenuis*	Fish
Landlady's wig	*Ahnfeltia plicata*	Intertidal Species
Winged kelp	*Alaria esculenta*	Intertidal Species
Sandworm	*Alitta virens*	Intertidal Species
Jingle shell	*Anomia simplex*	Intertidal Species
Knotted wrack	*Ascophyllum nodosum*	Intertidal Species
Common starfish	*Asterias rubens*	Intertidal Species
Filamentous diatom	Bacillariophyceae	Intertidal Species

APPENDIX G
Marine Fauna Observed at NSA Cutler

Common Name	Scientific Name	Grouping
Erect bryozoan	Bugulidae	Intertidal Species
White Atlantic cadlina	*Cadlina laevis*	Intertidal Species
Green crab	*Carcinus maenas*	Intertidal Species
Filamentous green algae	*Chaetomorpha sp.*	Intertidal Species
Unidentified green algae	Chlorophyta	Intertidal Species
Irish Moss	*Chondrus crispus*	Intertidal Species
Calcareous red algae	*Corallina officinalis*	Intertidal Species
Orange-striped green sea anemone	*Diadumene lineata*	Intertidal Species
Tanner keyhole limpet	*Diodora tanneri*	Intertidal Species
Green-leaf worm	*Eulalia viridis*	Intertidal Species
Forked rockweed	*Fucus edentatus*	Intertidal Species
Bladder wrack	*Fucus vesiculosus*	Intertidal Species
Scud	*Gammarus oceanicus*	Intertidal Species
Bloodworm	*Glycera dibranchiata*	Intertidal Species
Peanut worm	Golfingiida	Intertidal Species
Bread-crumb sponge	*Halichondria panicea*	Intertidal Species
Encrusting red algae	*Hildenbrandia rubra*	Intertidal Species
Northern lacuna	*Lacuna vincta*	Intertidal Species
Horsetail kelp	*Laminaria digitata*	Intertidal Species
Crustose red algae	*Lithothamnion graciale*	Intertidal Species
Common periwinkle	*Littorina littorea*	Intertidal Species
Flat periwinkle	*Littorina obtusata*	Intertidal Species
Rough periwinkle	*Littorina saxatilis*	Intertidal Species
Baltic clam	*Macoma balthica*	Intertidal Species
False Irish moss	*Mastocarpus stellatus*	Intertidal Species
Lacy crust bryozoan	*Membranipora membranacea*	Intertidal Species
Encrusting bryozoan	Membraniporoidea	Intertidal Species
Horse mussel	*Modiolus modiolus*	Intertidal Species
Soft-shell Clam	*Mya arenaria*	Intertidal Species
Blue mussel	*Mytilus edulis*	Intertidal Species
Dog whelk	*Nucella lapillus*	Intertidal Species
Wine glass hydroid	*Obelia bidentata*	Intertidal Species
Dulse	*Palmaria palmata*	Intertidal Species
Rock gunnel	*Pholis gunnellus*	Intertidal Species
Crustose red algae	*Phymatolithon* sp.	Intertidal Species
Greedy isopod	*Politolana polita*	Intertidal Species
Tuffed red algae	*Polysiphonia* sp.	Intertidal Species
Purple laver	*Porphyra umbilicalis*	Intertidal Species
Unidentified red algae	Rhodophyta	Intertidal Species
Acorn barnacle	*Semibalanus balanoides*	Intertidal Species
Gutweed	*Ulva intestinalis*	Intertidal Species
Sea lettuce	*Ulva lactuca*	Intertidal Species
Minke whale	*Balaenoptera acutorostrata*	Mammal
Finback whale	*Balaenoptera physalus*	Mammal
Right whale	*Eubalaena glacialis*	Mammal
Gray seal	*Halichoerus grypus*	Mammal
White-sided dolphin	*Lagenorhynchus obliquidens*	Mammal
Humpback whale	*Megaptera novaeangliae*	Mammal
Harbor seal	*Phoca vitulina*	Mammal
Harbor porpoise	*Phocoena phocoena*	Mammal
Transverse Ark	*Anadera transversa*	Mollusks - Bivalvia
Jingle Shell	*Anomia simplex*	Mollusks - Bivalvia
Bivalve	*Astarte undata*	Mollusks - Bivalvia
Northern Dwarf Cookie	*Cerastoderma pinnulatum*	Mollusks - Bivalvia
--	*Crenella glandula*	Mollusks - Bivalvia
--	*Cyclocardia borealis*	Mollusks - Bivalvia
--	*Donax fosser*	Mollusks - Bivalvia
American jack knife clam	*Ensis directus*	Mollusks - Bivalvia
Wrinkled Rock Borer	*Hiatella arctica*	Mollusks - Bivalvia
Glassy Lyonsia	*Lyonsia hyalina*	Mollusks - Bivalvia
--	*Macoma tenta*	Mollusks - Bivalvia
Dwarf Surfclam	*Mulinia lateralis*	Mollusks - Bivalvia
Soft-shell Clam	*Mya arenaria*	Mollusks - Bivalvia
Blue Mussel	*Mytilus edulis*	Mollusks - Bivalvia
Atlantic Nutclam	*Nucula proxima*	Mollusks - Bivalvia
--	*Nucula* spp. *tenuis/delphinodonta*	Mollusks - Bivalvia
--	*Nuculana tenuisulcata*	Mollusks - Bivalvia
--	*Pandora gouldiana*	Mollusks - Bivalvia
--	*Periploma* sp.	Mollusks - Bivalvia
--	*Pitar Morrhuana*	Mollusks - Bivalvia
--	*Spisula solidissima*	Mollusks - Bivalvia
--	*Tagleus* sp.	Mollusks - Bivalvia
Northern Dwarf Tellin	*Tellina agilis*	Mollusks - Bivalvia
--	*Thyasira trisinuata*	Mollusks - Bivalvia
--	*Yoldia limatula*	Mollusks - Bivalvia
Channeled Barrel-bubble	*Acteocina canaliculata*	Mollusks - Gastropoda
--	*Colus* sp.	Mollusks - Gastropoda

APPENDIX G
Marine Fauna Observed at NSA Cutler

Common Name	Scientific Name	Grouping
Common Atlantic Slippersnail	*Crepidula fornicata*	Mollusks - Gastropoda
Eastern White Slippersnail	*Crepidula plana*	Mollusks - Gastropoda
--	*Haminoea solitaria*	Mollusks - Gastropoda
Threeline Mudsnail	*ilyanassa trivittata*	Mollusks - Gastropoda
--	*Rictaxis punctostriatus*	Mollusks - Gastropoda
--	*Turbonilla* sp.	Mollusks - Gastropoda
--	*Chaetopleura apiculata*	Mollusks - Polyplacophora
Marine Bristleworm	*Ampharete arctica*	Polychaeta
Spionids	*Apoprionospio pygmaea*	Polychaeta
Bristle Worm	*Aricidea catherinae*	Polychaeta
--	*Asabellides oculata*	Polychaeta
--	*Asychis elongata*	Polychaeta
--	*Capitella* sp.	Polychaeta
--	*Capitellidae* spp.	Polychaeta
--	*Chone* sp.	Polychaeta
Orange Fringed Worm	*Cirriformia grandis*	Polychaeta
--	*Clymenella* spp.	Polychaeta
--	*Clymenella torquata*	Polychaeta
Bristle Worm	*Clymenella zonalis*	Polychaeta
--	*Cossura longocirrata*	Polychaeta
--	*Diopatra cuprea*	Polychaeta
--	*Drilonereis longa*	Polychaeta
--	*Eteone heteropoda*	Polychaeta
--	*Eteone lactea*	Polychaeta
--	*Eteone longa*	Polychaeta
Polychaete	*Eumida sanguinea*	Polychaeta
Polychaete	*Exogone dispar*	Polychaeta
--	*Glycera americana*	Polychaeta
--	*Glycinde solitaire*	Polychaeta
--	*Goniada maculata*	Polychaeta
--	*Goniadella gracilis*	Polychaeta
--	*Gyptis vittata*	Polychaeta
--	*Harmothoe* spp.	Polychaeta
--	*Lumbrineris fragilis*	Polychaeta
Bristle Worm	*Lumbrineris tenuis*	Polychaeta
--	*Microphthalmus* sp.	Polychaeta
Red-lined Worm	*Nephtys incisa*	Polychaeta
Red-lined Worm	*Nephtys picta*	Polychaeta
--	*Nereis grayi*	Polychaeta
--	*Nereis* sp.	Polychaeta
--	*Nereis succinea*	Polychaeta
--	*Ninoe nigripes*	Polychaeta
--	*Notomastus* sp.	Polychaeta
Bristle Worm	*Ophelina acuminata*	Polychaeta
--	*Orbinia kupfferi*	Polychaeta
--	*Paraonis gracilis*	Polychaeta
Polychaete	*Paraonis lyra*	Polychaeta
--	*Parapionosyllis longicirrata*	Polychaeta
--	*Pectinaria gouldi*	Polychaeta
Bristle Worm	*Pherusa affinis*	Polychaeta
Scaleworm	*Pholoe minuta*	Polychaeta
--	*Phyllodoce arenae*	Polychaeta
Paddleworm	*Phyllodoce maculata*	Polychaeta
Polychaete	*Platynereis dumerilli*	Polychaeta
--	*Podarke obscura*	Polychaeta
Bristle Worm	*Polycirrus eximius*	Polychaeta
--	*Polydora ligni*	Polychaeta
--	*Polydora* spp.	Polychaeta
Bristle Worm	*Polygordius jouinae*	Polychaeta
--	*Potamilla reniformis*	Polychaeta
--	*Prionospio pinatta*	Polychaeta
--	*Sabellaria vulgaris*	Polychaeta
--	*Scalibregma inflatum*	Polychaeta
Bristle Worm	*Schistomeringos caeca*	Polychaeta
Red-gilled Mud Worm	*Scolecolepides viridis*	Polychaeta
--	*Scolelepis squamata*	Polychaeta
--	*Scoloplos robustus*	Polychaeta
--	*Scoloplos* spp.	Polychaeta
--	*Sigambra tentaculata*	Polychaeta
--	*Sphaerosyllis hystrix*	Polychaeta
Bristle Worm	*Spio filicornis*	Polychaeta
Glassy Tube Worm	*Spiochaetopterus oculatus*	Polychaeta
Bee Spionid	*Spiophanes bombyx*	Polychaeta
--	*Spirorbis spirillum*	Polychaeta
--	*Sternaspis scutata*	Polychaeta
Barred-gilled Mud Worm	*Streblospio benedicti*	Polychaeta
--	*Syllides setosa*	Polychaeta

APPENDIX G
Marine Fauna Observed at NSA Cutler

Common Name	Scientific Name	Grouping
Syllid	*Syllis gracilis*	Polychaeta
--	*Terebellidae* sp.	Polychaeta
--	*Tharyx* spp.	Polychaeta

Notes:
Nearshore Report: Tetra Tech. 2016. Nearshore Surveys at NCTAMSLANT DET Cutler. NAVFAC Atlantic Biological Resource Services.
NCTAMSLANT DET Cutler INRMP 2012: Tetra Tech. 2012. Integrated Natural Resources Management Plan. NCTAMSLANT DET Cutler.
Aquatic mammals were observed at the VLF (very low frequency) area.
"--" indicates no data available

APPENDIX H

THREATENED AND ENDANGERED SPECIES
AND
SPECIES OF SPECIAL CONCERN

Appendix H - Special Status Species Identified as Occurring at NSA Cutler*

Common Name	Scientific Name	Federal Status	State Status	Comments/State Rank
Mammals				
Canada Lynx	*Lynx candensis*	Threatened	SSC	Observed in 2009 in the VLF area on roadway that leads from the tower field to Sprague Neck.
Tri-colored bat	*Perimyotis subflavus*	NA	SSC	Bat Acoustic Surveys - Occurs in the VLF and HF areas.
Invertebrates				
Crowberry Blue Butterfly	*Plebejus idas empetri*	NA	SSC	Observed in 2009 two peatland areas located in the northern section of the VLF area.
Plants of Conservation Concern				
Rare moonwort_1	*Botrychium spp.*	NA	Endangered	S1
Horned pondweed	*Zannichellia palustris*	NA	SSC	S2
Longleaf summer bluet_2	*Houstonia longifolia*	NA	SSC	

*Results from 2009 surveys; Tetra Tech, Inc., 2014a; 2018; Tetra Tech, Inc. 2016a.

1– Not observed, but suitable habitat present

2 – Observed in the HF area

SSC Maine Species of Special Concern

S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine

S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.

S3 Rare in Maine (20-100 occurrences).

Appendix H - Natural Ecosystems and Natural Community Types*

Natural Ecosystems		
Natural Ecosystems Type	**Descriptor**	**State Rank**
Coastal Plateau Bog (ECO-1)	Peatland	S3
Natural Community Types		
Maritime Slope Bog	Peatland	S2
Maritime Spruce-fir Forest (exemplary)	Forest	S4
Deer-hair Sedge Bog Lawn	Peatland	S3

*Results from 2009 Surveys
S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
S3 Rare in Maine (20-100 occurrences).
S4 Apparently secure in Maine.
S5 Demonstrably secure in Maine.

Birds of Conservation Concern as Identified at NSA Cutler

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Waterfowl – Ducks and Geese											
American black duck	*Anus rubripes*	~	~	HP	N/A	X	X	X	X	X	X
Barrow's goldeneye	*Bucephala islandica*	~	THR	N/A	N/A	~	~	~	~	~	X
Greater scaup	*Aythya marila*	~	SSC	N/A	N/A	~	~	~	~	~	x
Harlequin duck	*Histrionicus histrionicus*	~	THR	N/A	N/A	~	~	~	~	~	x
Loons, Grebes, and Cormorants											
Great cormorant	*Phalacrocorax carbo*	BCC non-breeding	THR breeding	N/A	N/A	~	~	~	~	X	X
Greater shearwater	*Puffinus gravis*	BCC non-breeding	~	N/A	N/A	~	~	~	~	~	X
Horned grebe	*Podiceps auritus*	BCC non-breeding	~	N/A	N/A	~	~	~	~	~	X
Pied-billed grebe	*Podilymbus podiceps*	BCC	~	N/A	N/A	~	~	~	~	~	X
Red-throated loon	*Gavia stellata*	BCC non-breeding	~	N/A	N/A	~	~	~	~	~	X
Red-necked grebe	*Podiceps grisegena*	~	IBA	N/A	N/A	~	~	~	~	~	X

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Herons and Bitterns											
American bittern	*Botaurus lentiginosus*	BCC	~	HP	N/A	~	x	X	X	~	~
Black-crowned night heron	*Nycticorax nycticorax*	~	THR	N/A	N/A		~	~	~		~
Great blue heron	*Ardea herodias*	~	SSC	N/A	N/A	x	x	x	X	X	~
Snowy egret	*Egretta thula*	BCC	~	N/A	N/A	~	+	~	X	X	~
Raptors – Hawks and Owls											
Bald eagle	*Haliaeetus leucocephalus*	BCC breeding	THR	N/A	N/A	X	x	X	x	X	~
Northern harrier	*Circus cyaneus*	~	SSC	N/A	N/A	X	X	X	X	X	~
Peregrine falcon	*Falco peregrinus*	BCC breeding	END breeding	N/A	N/A	~	~	~	X	X	x
Short-eared owl	*Asio flammeus*	~	THR breeding	N/A	N/A	~	X	X	X	X	~
Grouse											
Ruffed grouse	*Bonasa umbellus*	~	~	MP	N/A	X	X	X	~	~	~
Spruce grouse	*Falcipennis canadensis*	~	SSC	HP	N/A	X	X	X	~	~	~

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Gulls, Terns, and Alcids											
Arctic tern	*Sterna paradisaea*	BCC	THR	N/A	N/A	~	~	~	~	X	X
Atlantic puffin	*Fratercula arctica*	~	THR	~	~	~	~	~	~	~	X
Belted kingfisher	*Ceryle alcyon*	~	~	HP	~	~	~	~	~	X	~
Bonaparte's gull	*Larus philadelphia*	~	SSC breeding	N/A	N/A	X	~	~	~	X	X
Common murre	*Uria aalge*	~	SSC	N/A	N/A	~	~	~	~	~	X
Common tern	*Sterna hirundo*	~	SSC	N/A	N/A	~	~	~	~	X	X
Laughing gull	*Larus atricilla*	~	SSC	N/A	N/A	~	~	~	~	X	X
Least tern	*Sternula antillarum*	~	END	N/A	N/A	~	~	~	~	X	X
Razorbill	*Alca torda*	~	THR	N/A	N/A	~	~	~	~	~	X
Roseate tern	*Sterna dougallii*	END	END	N/A	N/A	~	~	~	~	X	X
Shorebirds – Sandpipers, Plovers, and Curlews											
American golden plover	*Pluvialis dominica*	~	IBA	N/A	HC	~	+	~	X	X	~
American woodcock	*Scolopax minor*	~	~	HHP	HC	X	X	X	X	X	~
Black-bellied plover	*Pluvialis squatarola*	~	IBA	N/A	~	~	~	~	~	~	~
Buff-breasted	*Tryngites*	~	~	N/A	HC	~	~	~	~	~	~

Common Name	**Scientific Name**	**Federal**	**State**	**PIF**	**Shore bird**	**Spruce Forest**	**Bog**	**Shrub**	**Grass land**	**Shore line**	**Deep Water**
sandpiper	*subruficollis*										
Dunlin	*Calidris alpina*	~	~	N/A	HC	~	~	~	~	X	~
Greater yellowlegs	*Tringa melanoleuca*	~	IBA	N/A	~	~	~	~	~	~	~
Hudsonian godwit	*Limosa haemastica*	BCC non-breeding	~	N/A	HC	~	~	~	~	X	~
Lesser yellowlegs	*Tringa flavipes*	BCC non-breeding	SSC	N/A	~	~	~	~	~	X	~
Piping plover	*Charadrius melodus*	FT	END	HHP	HCI	~	~	~	~	X	~
Purple sandpiper	*Calidris maritime*	BCC non-breeding	~	N/A	HC	~	~	~	~	X	~
Red knot	*Calidris canutus* ssp *rufa*	FT BCC non-breeding	SSC	N/A	HCI	~	~	~	~	X	~
Red-necked phalarope	*Phalaropus lobatus*	~	SSC	N/A	~	~	~	~	~	~	X
Ruddy turnstone	*Arenaria interpres*	~	IBA	N/A	HC	~	~	~	~	X	~
Sanderling	*Calidris alba*	~	~	N/A	HC	~	~	~	~	X	~
Semipalmated plover	*Charadrius semipalmatus*	~	IBA	N/A	~	~	~	~	~	X	~
Semipalmated sandpiper (eastern)	*Calidris pusilla*	BCC non-breeding	SSC ISS	N/A	HC	~	~	~	~	X	~
Short-billed dowitcher	*Limnodromus griseus*	~	IBA	N/A	HC	~	~	~	~	X	~
Solitary sandpiper	*Tringa solitaria*	BCC non-breeding	N/A	N/A	HC	~	~	~	~	X	~
Upland sandpiper	*Bartramia longicauda*	BCC	THR	N/A	HC	~	x	~	X	~	~

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Western sandpiper	*Calidris mauri*	~	~	N/A	HC	~	~	~	~	X	~
White-rumped sandpiper	*Calidris fuscicollis*	~	IBA	N/A	~	~	~	~	~	X	~
Willet	*Catoptrophorus semipalmatus*	~	IBA	N/A	~	~	X	~	~	X	~
Whimbrel	*Numenius phaeopus*	BCC non-breeding	SSC	N/A	HC	~	X	X	X	X	~
Wilson's plover	*Charadrius wilsonia*	~	~	N/A	HHE	~	~	~	~	X	~
Woodpeckers											
Black-backed woodpecker	*Picoides tridactylus*	~	~	MP	N/A	X	X	~	~	~	~
Hairy woodpecker	*Picoides villosus*	~	~	HP	N/A	~	~	~	~	~	~
Northern flicker	*Colaptes auratus*	~	~	MP	N/A	~	~	~	~	~	~
Yellow-bellied sapsucker	*Sphyrapicus varius*	~	~	HP	N/A	~	X	~	~	~	~
Flycatchers											
Eastern kingbird	*Tyrannus tyrannus*	~	SSC	MP	N/A	~	~	X	~	~	~
Eastern wood pewee	*Contopus virens*	~	SSC	HP	N/A	~	X	~	~	~	~

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Least flycatcher	*Empidonax minimus*	~	SSC	MP	N/A	~	X	~	~	~	~
Olive-sided flycatcher	*Contopus cooperi*	BCC	SSC	HHP	N/A	X	~	~	~	~	~
Yellow-bellied flycatcher	*Empidonax flaviventris*	~	~	MP	N/A	X	~	~	~	~	~
Chickadees, Creepers,Wrens, and Jays											
Boreal chickadee	*Parus hudsonica*	~	~	MP	N/A	X	X	X	~	~	~
Brown creeper	*Certhia americana*	~	~	MP	N/A	X	X	X	~	~	~
Gray jay	*Perisoreus canadensis*	~	~	MP	N/A	X	X	X	~	~	~
Sedge wren	*Cistothorus platensis*	~	END	HHP	N/A	~	x	X	x	~	~
Warblers											
American redstart	*Setophaga ruticilla*	~	SSC	HP	N/A	X	X	X	x	~	~
Bay-breasted warbler	*Setophaga* castanea*	BCC	~	HHP	N/A	X	X	x	~	~	~
Black-and-white warbler	*Mniotilta varia*	~	SSC	MP	N/A	X	X	X	x	~	~
Black-throated blue warbler	*Setophaga* caerulescens*	~	~	HHP	N/A	X	~	X	~	~	~

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Black-throated green warbler	*Setophaga* virens*	~	~	MP	N/A	X	X	X	~	~	~
Blackburnian warbler	*Setophaga* fusca*	~	~	HP	N/A	X	+	x	~	~	~
Blackpoll warbler	*Setophaga* striata*	~	~	MP	N/A	X	X	X	~	~	~
Canada warbler	*Wilsonia canadensis*	BCC	SSC	HHP	N/A	x	+	X	~	~	~
Cape May warbler	*Setophaga* tigrina*	~	~	HP	N/A	X	x	x	~	~	~
Chestnut-sided warbler	*Setophaga* pensylvanica*	~	SSC	HP	N/A	x	x	X	x	~	~
Mourning warbler	*Oporornis philadelphia*	~	~	MP	N/A	x	~	X	~	~	~
Nashville warbler	*Vermivora ruficapilla*	~	SSC	MP	N/A	X	X	X	~	~	~
Ovenbird	*Seiurus aurocapillus*	~	~	MP	N/A	X	X	X	~	~	~
Palm warbler	*Setophaga* discolor*	~	~	MP	N/A	X	X	X	~	~	~
Prairie warbler	*Setophaga* discolor*	~	SSC	MP	N/A	~	~	X	~	~	~
Tennessee warbler	*Vermivora peregrina*	~	SSC	~	N/A	X	X	X	~	~	~
Yellow warbler	*Setophaga* petechia*	~	SSC	~	N/A	~	x	X	X	~	~

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Thrushes											
Bicknell's thrush	*Catharus bicknelli*	BCC	SSC	HHP	N/A	X	X	X	~	~	~
Veery	*Catharus fuscescens*	~	SSC	HP	N/A	x	~	X	~	~	~
Wood thrush	*Hylocichla mustelina*	BCC	SSC	HHP	N/A	x	~	~	~	~	~
Mimids and Cuckoos											
Brown thrasher	*Toxostoma rufum*	~	SSC	~	N/A	~	~	X	X	~	~
Gray catbird	*Dumetella carolinensis*	~	~	MP	N/A	~	x	X	X	~	~
Yellow-billed cuckoo	*Coccyzus americanus*	~	SSC	HP	N/A	~	~	X	~	~	~
Sparrows, Towhees, and Finches											
Eastern towhee	*Pipilo erythrophthalmus*	~	SSC	MP	N/A	~	~	X	X	~	~
Evening grosbeak	*Coccothraustes vespertinus*	~	SSC breeding	~	N/A	~	~	X	~	~	~
Fox sparrow	*Passerella iliaca*	~	SSC breeding	N/A	N/A	X	~	X	~	~	~
Grasshopper sparrow	*Ammodramus savannarum*	~	END	HHP	N/A	~	~	x	X	~	~

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Nelson's sharp-tailed sparrow	*Ammodramus nelsoni*	BCC	SSC	HHP	N/A	~	~	~	X	x	~
Pine grosbeak	*Pinicola enucleator*	~	~	MP	N/A	X	X	X	~	~	~
Purple finch	*Carpodacus purpureus*	~	~	HP	N/A	X	X	X	~	~	~
Red crossbill	*Loxia curvirostra*	~	~	HP	N/A	X	X	X	~	~	~
Rose-breasted grosbeak	*Pheucticus ludovicianus*	~	~	MP	N/A	x	X	X	~	~	~
White-throated sparrow	*Zonotrichia albicollis*	~	SSC	~	N/A	X	X	X	+	~	~
Blackbirds and Orioles											
Baltimore oriole	*Icterus galbula*	~	~	HP	N/A	~	~	X	~	~	~
Bobolink	*Dolichonyx oryzivorus*	~	~	HP	N/A	~	x	x	X	~	~
Rusty blackbird	*Euphagus carolinus*	BCC	SSC	HHP	N/A	X	X	X	~	~	~
Eastern meadowlark	*Sturnella magna*	~	SSC	~	N/A	~	~	~	X	~	~
Scarlet tanager	*Piranga olivacea*	~	~	HP	N/A	~	X	~	~	~	~
Swallows, Swifts and Goatsuckers											
Bank swallow	*Riparia riparia*	~	~	MP	N/A	~	x	X	X	X	~
Barn swallow	*Hirundo rustica*	~	SSC	MP	N/A	~	x	X	X	X	~
Chimney swift	*Chaetura pelagica*	~	SSC	HP	N/A	X	x	X	x	+	~

Common Name	Scientific Name	Federal	State	PIF	Shore bird	Spruce Forest	Bog	Shrub	Grass land	Shore line	Deep Water
Northern rough-winged swallow	*Stelgidopteryx serripennis*	~	SSC	~	N/A	~	x	X	X	X	~
Purple martin	*Progne subis*	~	SSC	N/A	N/A	~	~	X	X	~	~
Tree swallow	*Tachycineta bicolor*	~	SSC	~	N/A	+	X	X	X	+	~
Whip-poor-will	*Caprimulgus vociferous*	~	SSC	HP	N/A	X	~	x	~	~	~
Larks											
Horned lark	*Eremophila alpestris*	~	SSC breeding	HP	N/A	~	X	~	X	X	~

X – Preferred habitat of species

x – Species use of this habitat

+ – Species may occur in this habitat infrequently

BCC – USFWS Bird of Conservation Concern

END – Endangered Species

HC – High Conservation Value

HCI – High Concern Imperiled

HHE – Highest Priority Endangered

HHP – Highest Priority

HP – High Priority

IBA – Important Bird Area

ISS – International Shorebird Survey

MP – Moderate Priority

PIF – Partners in Flight

Shorebird - National Shorebird Plan

SCC – Maine Species of Special Concern

THR – Threatened Species

*formerly *Dendroica*

APPENDIX I

VEGETATION AND WILDLIFE SPECIES (INCLUDING THREATENED AND ENDANGERED SPECIES) AND RARE NATURAL COMMUNITIES FACT SHEETS

Maine Natural Areas Program

Botrychium lunaria (L.) Sw.

Moonwort

- State Rank: S1
- Global Rank: G5
- State Status: Endangered

Habitat: Open turfy, gravelly or ledgy slopes, shores and meadows, chiefly calcareous. [Old field/roadside (non-forested, wetland or upland); Rocky coastal (non-forested, upland)]

Range: Greenland to Alaska, south to parts of the extreme northern United States.

Aids to Identification: Like most members of the genus *Botrychium* (Grape-ferns), *B. lunaria* is distinguished both by its succulent texture and by the fertile frond, which appears above the sterile frond and consists of a cluster of golden-brown globular sporangia (hence the name grape-fern). It differs from the other succulent *Botrychium* species in having the sterile blade only once-pinnate (divided), with the segments distinctly fan-like (lunate) in shape. The entire plant usually stands less than 8 cm high.

Ecological characteristics: Moonwort is a circumboreal species which is sporadic through much of its range. Because it is so rare in New England, little is known about its ecological relationships here. It is a calciphile (growing in areas of higher available calcium) and seems to prefer moderate light rather than deep shade. At one known Maine station, the necessary calcium is apparently derived not from a limestone bedrock, but rather from the mussel and clam shells which have been deposited on the shore.

Phenology: A fern (perennial): fertile segment and sporangia appear in July in Maine.

Family: Ophioglossaceae

Synonyms: *Botrychium lunaria* (L.) Sw. var *onondagense* (Underwood) House; *Botrychium onondagense* Underwood; *Osmunda lunaria* L.

Known Distribution in Maine: This rare plant has been documented from a total of 6 town(s) in the following county(ies): Aroostook, Franklin, Hancock, Knox, Washington.

Reason(s) for rarity: At southern limit of range; rare throughout much of range.

Conservation considerations: Known populations are small, and subject to the vagaries of small populations like random fluctuations or localized disturbance events. At least one has not been recently relocated even with extensive searching in exactly the same spot.

For more information, see the New England Wild Flower Society's Conservation Plan for *Botrychium lunaria* -pdf link- 156 KB.

Credits

Indicator Species Fact Sheet

Mountain Ash, *Sorbus americana*

Mountain ash is a tree species that is native to eastern North America. It can be found from Canada south to the mountains of Georgia and can be found as far west as Minnesota. Mountain ash prefers moist soil and full sunlight, growing along forest edges, roadsides and swamp areas. Height will vary based on conditions, but generally ranges from 10-30 ft.

The ash serves multiple roles within the ecosystem. In addition to providing shelter, it is a source of food for a variety of forest organisms. Moose and white-tailed deer feed on the leaves, twigs and branches. Smaller mammals and birds consume the red berries.

Humans monitor this species for both its function in the ecosystem and its potential effect on human health as an allergen.

Distribution of mountain ash.
USDA PLANTS Database

Leaves: Leaflets with serrated edges grow in the form of compound leaves with an alternate pattern along the trunk. They are dark green in color and 2-2 ½ in long.

Mountain ash foliage; Keith Kanoti, USDA Forest Service, Bugwood.org

Flowers: Small, white flowers grow in clusters that are 3-5 in across. Flowering occurs between May and July.

Fruit: Mountain ash produces small red berries that ripen in August and remain on the tree through early winter.

Bark: On younger trees, the bark is gray and smooth. With age, the bark becomes scaly in appearance.

Scaly bark; Keith Kanoti, USDA Forest Service, Bugwood.org

Mountain ash berries; Keith Kanoti, USDA Forest Service, Bugwood.org

Sources and Additional Information:

USDA, NRCS. 2014. The PLANTS Database (http://plants.usda.gov, 22 October 2014). National Plant Data Team, Greensboro, NC 27401-4901 USA.

Sullivan, Janet. 1992. Sorbus americana. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2014, October 20].

Missouri Botanical Garden. Plant Finder. http://www.missouribotanicalgarden.org/

Coastal Sedge Bog

Deer-hair Sedge Bog Lawn

State Rank S3

Community Description
This raised bog type is dominated by carpets or patches of deer-hair sedge, often with very stunted (<0.3 m) heath shrubs such as black crowberry, dwarf huckleberry, or leatherleaf. Round-leaved sundew, pitcher plant, and small cranberry grow among the peat mosses, which form a dense and spongy ground layer. Reindeer lichens are scattered among the mosses.

Soil and Site Characteristics
This community is restricted to raised bogs along or near the coast, often forming expansive "lawns" on the raised portions. The substrate is saturated, acidic (pH ~4.5) peat moss. As with other bog vegetation, it occurs in nutrient poor, usually ombrotrophic settings.

Diagnostics
Sites are in a peatland setting, with a dominance of deer-hair sedge and a lack of other circumneutral indicators. Dwarf huckleberry is characteristic but not dominant.

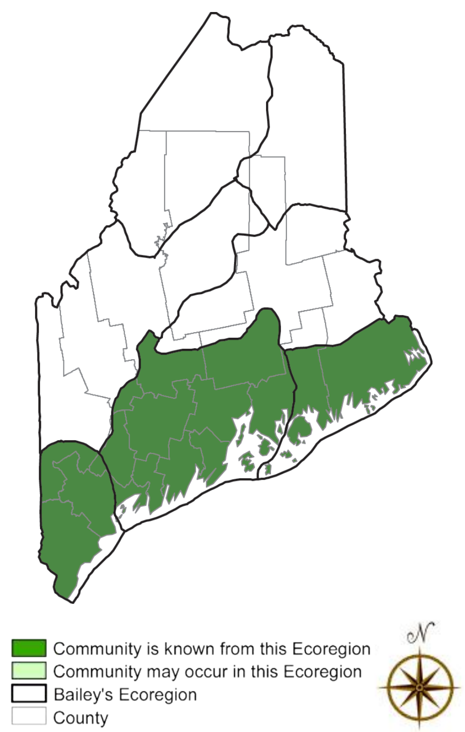
Labrador Tea

Similar Types
Shrubby Cinquefoil - Sedge Circumneutral Fens can also be dominated by deer-hair sedge but are in fens, not raised coastal bogs, lack dwarf huckleberry, and have other circumneutral indicators present such as shrubby cinquefoil or certain sedges. Huckleberry - Crowberry Bogs can occur in similar settings to Deer-hair Sedge Bog Lawns, and can share many species, but will have dwarf shrubs more dominant than sedges; the two types may occur adjacent to each other with a continuous gradation from one type to the next.

Conservation, Wildlife, and Management Considerations
This community type is not widely distributed, but has been subject to few threats to date. Slow vegetation growth rates, due to the nutrient poor setting, mean slow recovery from physical disturbances, such as recreational use. If disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can minimize impacts. Peat harvesting could threaten some sites but is not currently much of a factor. Draining or other hydrologic changes would have negative impacts on bog vegetation. Several occurrences are on public lands or private conservation lands.

The rare crowberry blue butterfly is restricted to coastal heaths in east-coastal Maine. It uses black crowberry as a larval host plant.

Location Map



Deer-hair Sedge

Distribution
Downeast Maine, extending eastward into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch, interspersed with other peatland types.

Characteristic Plants
These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

Sapling/shrub
Black chokeberry
Mountain holly

Dwarf Shrub
Black crowberry*
Dwarf huckleberry*
Labrador tea
Leatherleaf*
Pale laurel
Sheep laurel*
Small cranberry

Herb
Bog goldenrod
Coast sedge*
Deer-hair sedge*
Horned bladderwort
Pitcher plant
Round-leaved sundew

Bryoid
Bog broom-moss
Bog hair-cap moss
Little-tree reindeer-lichen
*Sphagnum rubellum**

Associated Rare Animals
Crowberry blue

Examples on Conservation Lands You Can Visit
- Acadia National Park – Hancock Co.
- Great Heath Public Lands – Washington Co.
- Great Wass Island Preserve – Washington Co.
- Larrabee Heath Preserve – Washington Co.
- Quoddy Head State Park – Washington Co.

Maritime Slope Bog

State Rank S2

Community Description

A well developed layer of dwarf shrubs is dominated by heath shrubs and black crowberry in a dense carpet in this vegetation type. There may be scattered small conifers, and typically at least a small amount of common juniper. Baked apple-berry is diagnostic and is restricted to this type and other coastal or subalpine peatlands. Herbaceous "bog" species (deer-hair sedge, pitcher plant, etc.) are also common. The bryoid layer is extensive (>70% cover, usually close to 100%) and is dominated by peat mosses and small islands of reindeer lichens.

Soil and Site Characteristics

Sometimes called "blanket bogs," these occur on bedrock or other rocky substrate. Soil is a thin organic layer over rock, and slopes are usually 5-10%. Sites occur on cool microsites near the Downeast coast.

Diagnostics

Tree cover is less than 25% and heath shrubs are dominant. Although the ground layer is composed of peat mosses, peat forms only a thin layer over bedrock or mineral substrate, so this is not a true peatland type.

Baked Apple–berry

Similar Types

Sheep Laurel Dwarf Shrub Bogs and Huckleberry - Crowberry Bogs share species and structure with Heath - Crowberry Maritime Slope Bogs; however, those are found in true peatlands (basins with deep accumulations of saturated peat), not on thin peat over rock. Heath - Lichen Subalpine Slope Bogs are compositionally similar but occur in the mountains.

Location Map

Black Crowberry

Conservation, Wildlife, and Management Considerations

This is an extremely restricted community type, but most documented occurrences are on public lands or private conservation lands. Recreation and climate change are the primary threats; careful planning of trails and ensuring that users stay on trails can help minimize recreational impacts.

The rare crowberry blue butterfly is restricted to coastal heaths in east-coastal Maine. It is uses black crowberry as a larval host plant.

Distribution

Downeast coastal Maine, extending eastward into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch

Round-leaved Sundew

Characteristic Plants

These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

Sapling/shrub
Black chokeberry
Common juniper
Mountain holly
Wild-raisin

Dwarf Shrub
Baked apple-berry
Black crowberry*
Black huckleberry
Labrador tea
Mountain cranberry
Rhodora
Sheep laurel*

Herb
Bog goldenrod
Deer-hair sedge
Pitcher plant
Round-leaved sundew
Starflower
White beak-rush

Bryoid
Bog hair-cap moss
Grey reindeer-lichen
Sphagnum mosses*
Woodland reindeer-lichen

Associated Rare Animals

Crowberry blue

Examples on Conservation Lands You Can Visit

- Great Wass Island Preserve – Washington Co.
- Petit Manan Point, Petit Manan National Wildlife – Washington Co.

Maritime Spruce - Fir Forest

State Rank S4

Community Description

Red spruce, white spruce, balsam fir, and/or larch are dominant in this Downeast coastal type. Composition is variable from the mid-coast to the Downeast coast. Red and white spruce are the most typical dominants; northern white cedar or hemlock are rarely co-dominant. The canopy may contain gaps with regenerating red maple, paper birch, mountain-ash, heart-leaved paper birch, and fir. Herbs and dwarf shrubs are typically <10% cover each, though in the canopy openings species such as raspberries, rough-stemmed goldenrod, whorled aster, and hay-scented fern may be locally abundant. The bryoid layer is >15% cover, dominated by mosses and liverworts rather than lichens.

Soil and Site Characteristics

Sites are along the immediate coast, often foggy and cool, on flats or lower to mid slopes (0-15%, may be steeper). Soils are shallow (<40 cm) over bedrock or till, with a well developed organic layer, acidic (pH 4.8-5.2) and mesic. Texture is sandy to loamy.

Usnea Lichen

Diagnostics

White spruce, bayberry, hay-scented fern, and mountain cranberry are indicators, though not always present. Sites contain relatively little or no bluebead lily, wood-ferns, or painted trillium. Broom-mosses do not dominate the bryoid layer, though they are often present.

Similar Types

Spruce - Fir - Broom-moss Forests are the most similar. They occur in more inland settings and, like this type, often have only sparse herbs, but unlike this type they are dominated by red spruce rather than white spruce and balsam fir, and their bryoid layer is dominated by broom-mosses. In poorly drained areas, Maritime Spruce – Fir Forests may grade into the Spruce - Fir - Cinnamon Fern Forest, which is distinguished by seasonally flooded or saturated soils and a more prominent cover of herbs and bryoids; along the coast, it usually occurs in small bedrock basins.

Location Map

White Spruce

Conservation, Wildlife, and Management Considerations

After centuries of intensive use, almost no original coastal forest remains. Many now mature forests are on old pastureland. Many good (albeit secondary-growth) sites are in conservation ownership. Acadia National Park contains a variety of successional stages of this type, including stands that burned in 1947 and stands that did not. Maritime forests are subject to higher wind and weather stress than inland sites, and as a result the disturbances tend to be higher intensity and more frequent, and the trees do not grow as old.

This community type may be utilized as nesting habitat by a number of coniferous forest specialist bird species such as the sharp-shinned hawk, yellow-bellied flycatcher, Cape May warbler, blackpoll warbler, bay-breasted warbler, northern parula, boreal chickadee, Swainson's thrush, red crossbill, and white-winged crossbill.

Distribution

Coastal, primarily from mid-coast Maine eastward into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Large Patch

Characteristic Plants

These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

Canopy
Balsam fir*
Eastern hemlock
Mountain ash*
Northern white cedar
Paper birch*
Red spruce*
White spruce*

Sapling/shrub
Balsam fir*
Mountain ash*
Red spruce
White spruce*

Herb
Balsam fir
Bayberry*
Hay-scented fern
Mountain cranberry*
Raspberries
Red spruce
Rough-stemmed goldenrod

Bryoid
Dicranum moss
Pincushion moss
Three-lobed bazzania

Associated Rare Plants

Swarthy sedge
White adder's-mouth

Examples on Conservation Lands You Can Visit

- Black Point Brook, Cutler Public Lands – Washington Co.
- Great Wass Island Preserve – Washington Co.
- North Cutler Coast, Cutler Public Lands – Washington Co.
- West Quoddy Head State Park – Washington Co.

Cutler West

Cutler, Maine

***Description*:**

The Cutler West focus area encompasses two peninsulas that lie west of the town of Cutler. Several peatlands of statewide significance and the Sprague Neck waterfowl habitat are among the most noteworthy ecological features within this focus area.

Kelley Heath

Kelley Heath is a roughly 225 acre wetland located east of Route 191 and just south of a gated former Navy road. The wetland includes a 125-acre coastal plateau bog surrounded by black spruce flats. The main part of the bog, which was apparently bull-dozed about 30 years ago, is dominated by deer-hair sedge (*Trichophorum cespitosum*) and black crowberry. Other common herbs and shrubs include tussock cotton-grass (*Eriophorum vaginatum),* sheep laurel *(Kalmia angustifolia)*, bog laurel (*Kalmia polifolia)*, small cranberry (*Vaccinium oxycoccos)*, Labrador tea (*Rhododendron groenlandicum)* and black chokeberry (*Photinia melanocarpa*). Vegetation is quite uniform. Other than the removal of the tree and shrub layer, the surface disturbance apparently had a limited long-term affect on the bog's vegetation. The southwest portion of the bog may not have been disturbed, based on the greater abundance of dwarf black spruce, other shrubs, and hummocks and hollows. Overall, this is one of the larger examples of a coastal plateau bog, and it is exhibiting good recovery from past disturbance.

The North Cutler Heaths consist of three proximal peatlands, ranging from 10 to 29 acres in size. These coastal plateau bogs are located north of the Ridge Road, just east of the former Cutler Navy base. The middle of these three peatlands supports black crowberry and sheep laurel on the raised surface of the bog. Other common herbs include bog laurel, small cranberry, Labrador tea, baked apple-berry (*Rubus chamaemorus*), leatherleaf (*Chamaedaphne calyculata*), and deer-hair sedge. There is a fairly distinct marginal slope, but vegetation zonation is not as clear as some other bogs. Over 50 Dragon's mouth orchids (*Arethusa bulbosa*) are scattered in these bogs. This orchid is not listed as rare in Maine, but it is quite uncommon.

West Cutler Heath is a coastal plateau bog on former Navy property, east of Sprague Neck. Black crowberry, baked apple-berry, and sheep laurel dominate the herb layer in most of the bog. Also common are deer hair sedge, bog laurel, small cranberry, Labrador tea and lowbush blueberry (*Vaccinium angustifolium*). Dragon's mouth orchid is frequent. Two old roadbeds or railroad grades have altered the bog. One, running roughly north-south, appears to have impounded the water on the east side of the bog. The other old roadbed, running roughly east-west, cuts through the middle of the bog; black spruce and larch were clustered along the north side of this raised road, where some organic material may have been pushed when the road was created.

Two of the coastal bog ecosystems host the crowberry blue – a state rare butterfly that feeds on black crowberry in its larval stage. In addition, the Cutler West focus area also includes important habitat for other wildlife species. There is a good deal of high quality habitat for coastal waterfowl and wading birds especially in the vicinity of Sprague Neck. The Little Machias Bay tidal flats are prime feeding and roosting areas for shorebirds and the tips of both peninsulas are essential nesting habitat for bald eagles.

Rare Species and Exemplary Natural Community Table for Cutler West

Common Name	Latin Name	S-RANK	G-RANK	State Status
Exemplary Natural Communities				
Coastal Plateau Bog Ecosystem		S3	N/A	N/A
Rare Animals				
Bald eagle	*Haliaeetus leucocephalus*	S4	G4	T
Crowberry Blue	*Lycaeides empetri idas*	S2	G5	SC

Other Habitats Mapped by MDIFW:
Tidal Waterfowl / Wading Bird Habitat
Freshwater Waterfowl / Wading Bird Habitat
Bald Eagle Essential Habitat
Shorebird Feeding and Roosting Areas

***Conservation Considerations*:**

- In general, the greatest threats to peatlands include peat mining, cranberry harvesting, timber harvest around the forested perimeters, and development.

- The ecological integrity of peatlands, including all the processes and life forms they support, are dependent on the maintenance of the current hydrology and water quality of these systems. Intensive timber harvesting, vegetation clearing, soil disturbance, new roads, and development on buffering uplands can result in greater runoff, sedimentation, and other non-point sources of pollution.

- Peatland systems benefit from establishing and/or maintaining vegetative buffers around their perimeter wherever possible. A buffer of 250 feet or more will serve to limit impacts from adjacent development, help prevent erosion, limit colonization of invasive species, and prevent unnecessary impacts from off road vehicle use.

- Maintenance of the open grassland habitat may have created favorable habitat for grassland birds. Future management for wildlife could consider maintaining a mowing regime.

***Protection Status*:**
The U.S. Navy formerly owned roughly 3,000 acres as a communications center. In the fall of 2003, a purchase and sale agreement was made with the Cutler Development Corporation and the Sunset Group LLC to re-develop the base. Re-development will tentatively include residences, commercial buildings. It is not clear whether special protection will be granted to ecologically important areas.

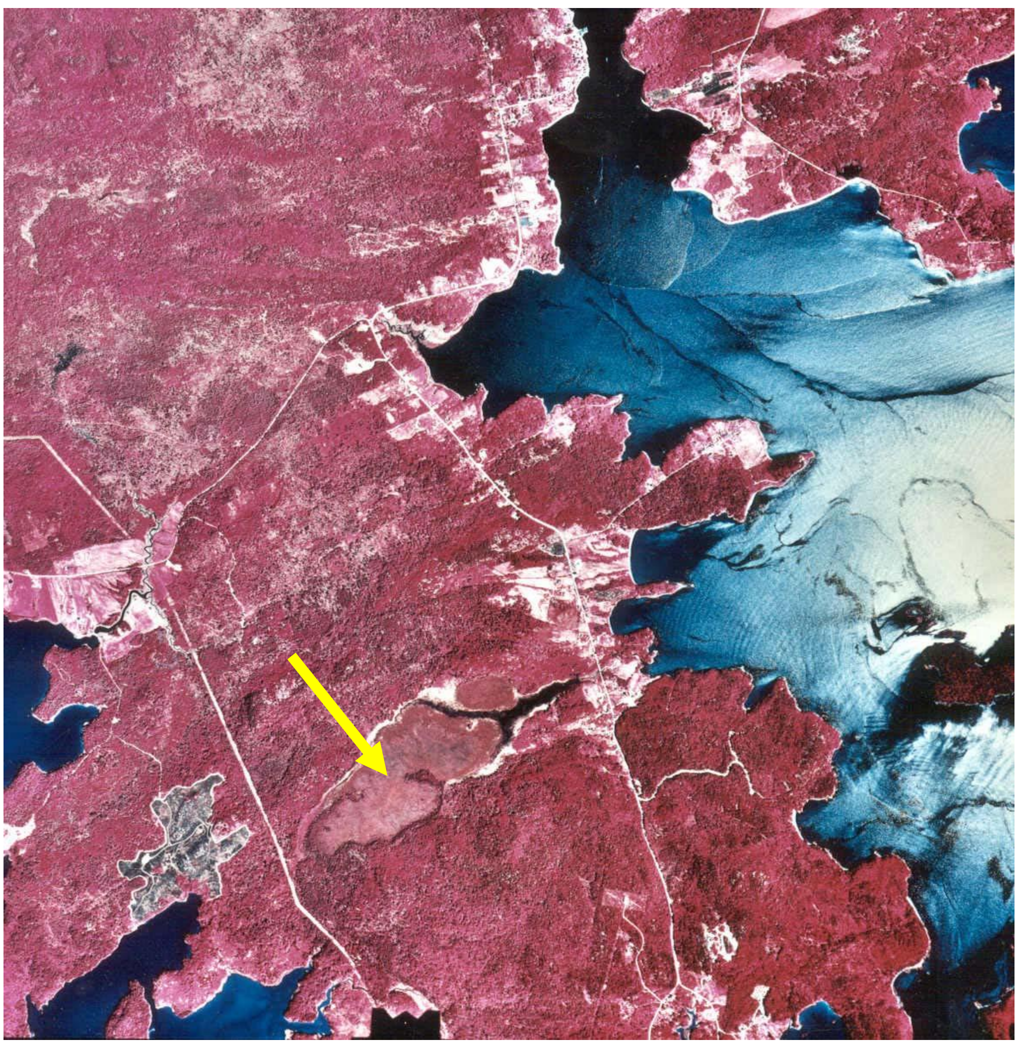
Larrabee Heath

Machiasport

***Description*:**

Larrabee Heath is a large (~235 acre), undisturbed, coastal plateau bog with steep marginal slopes on its north and south sides. Habitat zonation is well developed in this confined plateau bog. The Heath occupies an elongated valley and has stream flow confined to its north and south margins, where "marginal streams" (i.e., at the margin of the bog) abut upland slopes. Lateral expansion of the raised plateau has restricted these streams into narrowly meandering laggs (wet depressions). There is significant beaver activity below the confluence of the two streams. The combination of confined marginal streams and beaver ponding is commonly associated with inland raised bog systems, but is rare in coastal bog systems.

At varying distances from the marginal streams the gentle peat slope abruptly rises 3-6 feet. This raised plateau, which is dominated by dwarf shrub heath vegetation, constitutes the predominant vegetation community at Larrabee Heath—occupying approximately half of the wetland acreage. The most abundant shrubs here include sheep laurel (*Kalmia anugstifolia*), leatherleaf (*Chamaedaphne calyculata*), mountain holly (*Nemopanthus mucronata*), and black



Color infra-red air photo of Larrabee Heath, 1991 crowberry (*Empetrum nigrum*). Peat moss is ubiquitous with increasing amounts of *Sphagnum fuscum* at higher elevations on the plateau. Several acres of forested bog dominated by stunted black spruce (*Picea mariana*) are also present.

At the eastern end, beyond the confluence of the two lagg streams, Larrabee Heath is dominated by wet meadows that have been flooded by recent beaver activity. Grasses and sedges, especially bluejoint grass (*Calamagrostis canadensis*) and tussock sedge (*Carex stricta*), dominate the wet stream/pond margins while alder shrubs predominate in areas at greater distances from the stream.

The surrounding upland areas are spruce-fir forests dominated by red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), and paper birch (*Betula papyrifera*) with signs of historic selective cutting and damage from spruce budworm. The age of the surrounding forests is approximately 70 to 100 years. Larrabee Heath and the surrounding uplands may have experienced a fire around the turn of the century.

Rare Species and Exemplary Natural Community Table for Larrabee Heath

Common Name	Latin Name	S-RANK	G-RANK	State Status
Exemplary Natural Communities				
Coastal Plateau Bog Ecosystem		S3	N/A	N/A

Other Habitats Mapped by MDIFW:
Waterfowl / Wading Bird Habitat

***Conservation Considerations*:**
- In general, threats to peatlands include peat mining, cranberry harvesting, timber harvest around the forested perimeters, and development. Most of these threats have been abated by Nature Conservancy protection of the bog.
- Continued beaver activity may alter the vegetation of the wetland from peatland flora (e.g., ericaceous shrubs, peat mosses) to more minerotrophic vegetation (i.e., plants adapted to mucky shores, such as blue-joint grass.) Monitoring through air photos and field plots would help to clarify the continuing impacts of beavers.
- Invasive plant species such as common reed (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*) may pose future threats to this wetland.

***Protection Status*:**
Approximately 80% of the coastal plateau bog lies within a 427-acre parcel owned by The Nature Conservancy.

FEDERALLY THREATENED

Canada Lynx

(Lynx canadensis)

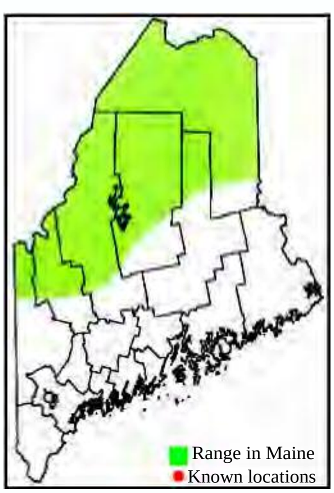
USFWS

Description

The loup cervier, lucivee, and Indian devil are all names used by old-time Maine woodsmen for the elusive Canada lynx. This is a secretive, forest-dwelling cat of northern latitudes and high mountains. It is medium-sized, similar in size to the bobcat, but appears larger because of its long legs. It has unique, long (over one inch), black tufts of fur on the ears and a short, black-tipped tail. (Bobcats have small tufts on the ears, and 3-4 black bars on the tail. The tip of the tail is black on top and white underneath.) The winter coat is light gray and faintly spotted, and the summer coat is much shorter and has a reddish-brown cast. Lynx have unusually large, densely haired feet to help travel over snow. Adult males average about 331/2 inches long and weigh 26 pounds. Females are about 32 inches long and average 19 pounds.

Range and Habitat

Lynx are common throughout the boreal forest of Alaska and Canada. The southern portion of their range once extended into the U.S. in the Rocky Mountains, Great Lakes states, and the Northeast. Today, they are known to exist in the lower 48 states only in Montana, Washington, Maine, and possibly Minnesota. Confirmed tracks and sightings in Maine in the last 15 years have been concentrated in northern Aroostook, Piscataquis, Somerset, and Franklin Counties. Historic data suggest they also occasionally occur in eastern Maine. A recent habitat assessment completed by the University of Maine documented the likelihood of suitable lynx habitat in several areas in northern Maine. Good habitat consists of large areas of young, dense stands of balsam fir and northern hardwoods approximately 10-20 years after a major forest disturbance (cutting, fire, etc.). These stands provide the highest densities of snowshoe hares, the primary food for lynx, and suitable areas for denning.



Life History and Ecology

Mating occurs during March, and 1-7 young are born 60-65 days later in May. Maine litters produce 1-4 kittens. Lynx dens in Maine consist of a bed under thick regenerating fir or elevated downed logs. The female raises the kittens. Young leave the den area in late June or early July and stay with the female for a full year before leaving their mother in late winter.

Lynx are highly specialized to hunt snowshoe hare, which comprise over 75 percent of their diet. When hares are abundant, lynx may consume one or two a day. In the summer, the diet is more varied and may include grouse, small mammals, and squirrels. In winter, carrion (dead animals) may supplement the diet.

Lynx are primarily nocturnal, but Maine lynx have been very active during the day. Family groups (mother and kittens) hunt together to increase efficiency. Males are solitary for most of the year except the breeding season. Size of the home range varies with snowshoe hare density, habitat, and season. In Maine, home ranges are about 18 square miles, or the equivalent of half a township. Home ranges overlap, especially where neighboring lynx are of different ages and sexes.

In northern Canada and Alaska, snowshoe hare populations undergo a 10-year cycle. Lynx numbers vary with the snowshoe hare populations. Snowshoe hare fluctuations in Maine are poorly understood, and may be more influenced by habitat availability and forest practices than by a multi-year cycle. During periods of low prey availability, lynx will travel hundreds of miles. Forty percent of the lynx population can starve and litter size declines following a crash in snowshoe hare populations.

Threats

Lynx are rare at the southern edge of their range as in Maine. Populations likely fluctuate with populations of snowshoe hares and are affected by lynx populations in neighboring Canada. Decreased snowfall in recent decades gives a competitive advantage to bobcats, whose range periodically expands northward. Bobcats are more aggressive and displace lynx from their home ranges. In recent years, a few lynx have been incidentally trapped or snared. Fishers killed several radio-collared lynx in Maine. Clearcutting is beneficial to lynx by providing large patches of young forest stands preferred by snowshoe hare. Recent trends in forest practices from large clearcuts to selective cutting may limit future lynx habitat. Woods roads are not a barrier to movement, but do increase human access and associated disturbances and introduce a small chance of road mortality. High-speed, interstate highways may be a more significant source of mortality and barrier to movements.

Conservation and Management

Lynx have always been present in Maine, but populations fluctuated. Several hundred animals may occupy the state during periods of high snowshoe hare populations and optimal habitat conditions. Trapping and hunting seasons for lynx have been closed in Maine since 1967. In 1997, the lynx was considered for state listing, but there was insufficient information to assess its status. Its current status is a Species of Special Concern. In response to petitions, the U.S. Fish and Wildlife Service named the lynx as threatened in 2000. A recovery plan has yet to be developed.

Habitat conditions were close to ideal in Maine in the late 1990s as the widespread clearcuts of the 1980s attained prime conditions for snowshoe hares. As stands mature and snowshoe hare numbers decline, lynx populations will likely decline. Lynx habitat used today will not be prime habitat 10 or 15 years later. Careful planning may be needed to ensure that sufficient young stands are always present on the landscape to preserve populations of lynx and snowshoe hares.

The role of lynx immigration from neighboring populations in New Brunswick and Quebec in supporting Maine's lynx population is unknown. Biologists have yet to determine whether a self-sustaining population of lynx can be supported in Maine through periods of low snowshoe hare density.

Much of our knowledge of lynx in Maine came from a study conducted near Clayton Lake from 1999-2003. Thirty-two lynx were radio-tagged, and 17 dens and 37 kittens were discovered. This study documented movements, sources of mortality, and home ranges, and assessed survey techniques. In 2002, a 3-year winter snow track survey was initiated to assess the relative abundance and distribution of lynx throughout their range in Maine.

Recommendations:

✓ Report all lynx sightings to MDIFW as soon as possible. Sightings can be verified from good photographs, tracks, scat, or hair samples.

✓ Manage northern forests in landscapes (at the township level) with areas having a high proportion of regenerating balsam fir/northern hardwood stands (less than 30 years old) that support high densities of snowshoe hares.

✓ Ensure that large blocks of suitable regenerating habitat are distributed widely over the landscape of northern and western Maine.

✓ Avoid incidental take of lynx from trapping and snaring.

✓ Conserve large blocks of unfragmented forestland. Avoid the construction of new high-volume/ high-speed highways in currently undeveloped areas of northern and western Maine.

Northern Long-Eared Bat

Myotis septentrionalis

Photo by Steve Taylor, University of Illinois

This northern long-eared bat, observed during an Illinois mine survey, shows visible symptoms of white-nose syndrome.

The northern long-eared bat is federally listed as a threatened species under the Endangered Species Act. ***Endangered*** species are animals and plants that are in danger of becoming extinct. ***Threatened*** species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's Endangered Species Program.

What is the northern long-eared bat?

Appearance: The northern long-eared bat is a medium-sized bat with a body length of 3 to 3.7 inches and a wingspan of 9 to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*.

Winter Habitat: Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible.

Summer Habitat: During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. They rarely roost in human structures like barns and sheds.

Reproduction: Breeding begins in late summer or early fall when males begin to swarm near hibernacula. After copulation, females store sperm during hibernation until spring. In spring, females emerge from their hibernacula, ovulate and the stored sperm fertilizes an egg. This strategy is called delayed fertilization.

After fertilization, pregnant bats migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies of females and young generally have 30 to 60 bats at the beginning of the summer, although larger maternity colonies have also been observed. Numbers of bats in roosts typically decrease from the time of pregnancy to post-lactation. Most bats within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Maximum lifespan for the northern long-eared bat is estimated to be up to 18.5 years.

Feeding Habits: Like most bats, northern long-eared bats emerge at dusk to feed. They primarily fly through the understory of forested areas feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation or by gleaning motionless insects from vegetation.

Range: The northern long-eared bat's range includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. The species' range includes 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Why is the northern long-eared bat in trouble?

White-nose Syndrome: No other threat is as severe and immediate as this. If this disease had not emerged, it is unlikely that northern long-eared bat populations would be experiencing such dramatic declines. Since symptoms were first observed in New York in 2006, white-nose syndrome has spread rapidly from the Northeast to the Midwest and Southeast; an area that includes the core of the northern long-eared bat's range, where it was most common before this disease. Numbers of northern long-eared bats (from hibernacula counts) have declined by up to 99 percent in the Northeast. Although there is uncertainty about the rate that white-nose syndrome will spread throughout the species' range, it is expected to continue to spread throughout the United States in the foreseeable future.

Other Sources of Mortality:

Although no significant population declines have been observed due to the sources of mortality listed below, they may now be important factors affecting this bat's viability until we find ways to address WNS.

Impacts to Hibernacula: Gates or other structures intended to exclude people from caves and mines not only restrict bat flight and movement, but also change airflow and microclimates. A change of even a few degrees can make a cave unsuitable for hibernating bats. Also, cave-dwelling bats are vulnerable to human disturbance while hibernating. Arousal during hibernation causes bats to use up their energy stores, which may lead to bats not surviving through winter.

Loss or Degradation of Summer Habitat: Highway construction, commercial development, surface mining, and wind facility construction permanently remove habitat and are activities prevalent in many areas of this bat's range. Many forest management activities benefit bats by keeping areas forested rather than converted to other uses. But, depending on type and timing, some forest management activities can cause mortality and temporarily remove or degrade roosting and foraging habitat.

Wind Farm Operation: Wind turbines kill bats, and, depending on the species, in very large numbers. Mortality from windmills has been documented for northern long-eared bats, although a small number have been found to date. However, there are many wind projects within a large portion of the bat's range and many more are planned.

What Is Being Done to Help the Northern Long-Eared Bat?

Disease Management: Actions have been taken to try to reduce or slow the spread of white-nose syndrome through human transmission of the fungus into caves (e.g. cave and mine closures and advisories; national decontamination protocols). A national plan was prepared by the Service and other state and federal agencies that details actions needed to investigate and manage white-nose syndrome. Many state and federal agencies, universities and non-governmental organizations are researching this disease to try to control its spread and address its affect. See www.whitenosesyndrome.org/ for more.

Addressing Wind Turbine Mortality: The Service and others are working to minimize bat mortality from wind turbines on several fronts. We fund and conduct research to determine why bats are susceptible to turbines, how to operate turbines to minimize mortality and where important bird and bat migration routes are located. The Service, state natural resource agencies, and the wind energy industry are developing a Midwest Wind Energy Habitat Conservation Plan, which will provide wind farms a mechanism to continue operating legally while minimizing and mitigating listed bat mortality.

Listing: The northern long-eared bat is listed as a threatened species under the federal Endangered Species Act. Listing a species affords it the protections of the Act and also increases the priority of the species for funds, grants, and recovery opportunities.

Hibernacula Protection: Many federal and state natural resource agencies and conservation organizations have protected caves and mines that are important hibernacula for cave-dwelling bats.

What Can I Do?

Do Not Disturb Hibernating Bats: To protect bats and their habitats, comply with all cave and mine closures, advisories, and regulations. In areas without a cave and mine closure policy, follow approved decontamination protocols (see http://whitenosesyndrome.org/topics/decontamination). Under no circumstances should clothing, footwear, or equipment that was used in a white-nose syndrome affected state or region be used in unaffected states or regions.

Leave Dead and Dying Trees Standing: Like most eastern bats, the northern long-eared bat roosts in trees during summer. Where possible and not a safety hazard, leave dead or dying trees on your property. Northern long-eared bats and many other animals use these trees.

Install a Bat Box: Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat boxes may provide additional roost sites. Bat boxes are especially needed from April to August when females look for safe and quiet places to give birth and raise their pups.

Support Sustainability: Support efforts in your community, county and state to ensure that sustainability is a development goal. Only through sustainable living will we provide rare and declining species, like the northern long-eared bat, the habitat and resources they need to survive alongside us.

Spread the Word: Understanding the important ecological role that bats play is a key to conserving the northern long-eared and other bats. Helping people learn more about the northern long-eared bat and other endangered species can lead to more effective recovery efforts. For more information, visit www.fws.gov/midwest/nleb and www.whitenosesyndrome.org

Join and Volunteer: Join a conservation group; many have local chapters. Volunteer at a local nature center, zoo, or national wildlife refuge. Many state natural resource agencies benefit greatly from citizen involvement in monitoring wildlife. Check your state agency websites and get involved in citizen science efforts in your area.

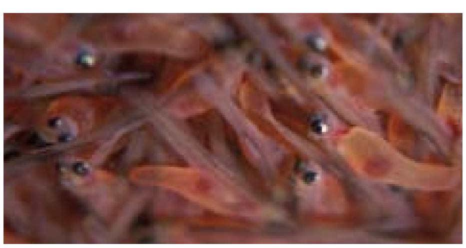
Atlantic Salmon

Salmo salar

While at one time hundreds of thousands of Atlantic salmon made their epic migration from the oceans of Greenland to their natal rivers in Maine, now it would be a privilege to see even a few of these powerful creatures. Depleted by a combination of overfishing, pollution and dams, this once-prominent salmon species is severely reduced. Now we must rely on fish hatcheries to provide enough young for the species to survive.

Historically in North America, Atlantic salmon once stretched from Ungava Bay, Canada, to the rivers of Long Island Sound, but now the only remaining wild U.S. populations swim in Maine rivers.

Early life
Atlantic salmon spawn in freshwater rivers and streams during autumn. Eggs remain in gravel substrates and hatch during winter. Tiny young salmon, called fry, emerge from the gravel in spring.


USFWS

Atlantic salmon fry with sac

Until now, the salmon have looked like any other minnow, but soon dark bands and red spots can be seen on their sides. The colorful juvenile salmon, called parr, remain in freshwater one to three years before undergoing "smoltification" to prepare for migrating to the ocean.

Atlantic salmon are anadromous, meaning they travel from the sea to spawn in fresh water. These fish are highly migratory, undertaking long marine migrations between U.S. rivers and a wide expanse of the northwest Atlantic Ocean.

The journey
Most Atlantic salmon of U.S. origin spend two winters in the ocean before returning to freshwater to spawn. These adult Atlantic salmon average from 28 to 30 inches long and weigh from 8 to 12 pounds. Although uncommon, adults can grow as large as 30 pounds. In the United States, most adult Atlantic salmon ascend Maine rivers beginning in spring and continuing through the autumn, with migration peaking in June.

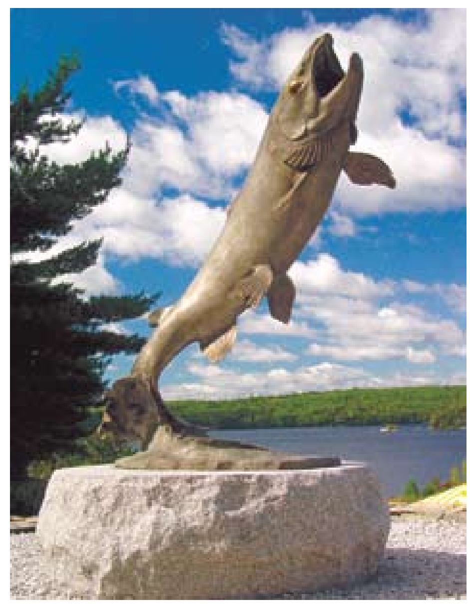
Going home
So how do these fish find their way from the oceans of Greenland all the way back to their natal rivers? Well, it isn't GPS or a map. Atlantic salmon actually imprint upon their home river by olfactory sense during smoltification.

Imprinting allows Atlantic salmon to recognize the chemical fingerprint of their home river. Using this olfactory ability, the salmon can find their way home from the middle of the ocean to the stream where they were born.

The recovery story
Atlantic salmon populations have been declining since the Industrial Revolution because of dam construction with no or inadequate fish passage, pollution, overfishing, illegal fishing, habitat loss and other factors. The most significant threats now are poor marine survival and dams obstructing fish passage.

In December 2000, wild Atlantic salmon populations in small coastal rivers in Maine – the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, Sheepscot rivers and Cove Brook – were protected as endangered under the Endangered Species Act.

Together, the U.S. Fish and Wildlife Service and the State of Maine have a river-specific stocking program working toward the restoration and stability of the Atlantic salmon populations in Maine rivers.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Craig Brook National Fish hatchery

Craig Book National Fish Hatchery is the oldest public salmon hatchery in the nation and the last refuge in the United States for federally endangered Atlantic salmon. Craig Brook raises and releases up to 1.5 million juvenile salmon – 1-inch fry and 6-inch smolts – to recover populations.

As part of a river-specific stocking program begun in 1994, young Atlantic salmon are captured each year from the Dennys, Machias, East Machias, Pleasant, Narraguagus and Sheepscot rivers and brought to the hatchery to be raised as broodstock. The Atlantic salmon recovery program at Craig


USFWS

Atlantic salmon female

Brook mimics the species' river-specific life cycle. Offspring are raised separately by river population and released as fry or smolts into their parents' home river, thereby protecting the genetic integrity of the salmon in each of these watersheds.

Biologists also release 2 million juvenile fish each year to restore the Atlantic salmon population in Maine's largest river, the Penobscot. The Penobscot lost all its native salmon north of Bangor by the mid-20th century, but has become America's greatest salmon restoration success story.

The Penobscot River has the only salmon population with sufficient numbers of returning adults to support an adult capture program. About 400 returning adult females and 200 males are temporarily captured for use as broodstock. They are released after artificial spawning. Most of the returning Penobscot adults are allowed to pass unobstructed at Veazie Dam to continue their upstream migration to spawn naturally in the river's headwaters.

More salmon rivers have protection

Based on a review of the status of Atlantic salmon in Maine, in June 2009 NOAA's Fisheries Service and the U.S. Fish and Wildlife Service redefined the population of Gulf of Maine Atlantic salmon and extended Endangered Species Act protection to salmon in large Maine rivers to help prevent extinction and to recover the imperiled population.

In addition to salmon originally protected in 2000, Atlantic salmon from the Penobscot, Kennebec and Androscoggin rivers now have Endangered Species Act protection. Salmon in these larger rivers were added because they are genetically similar or reside in watersheds with similar conditions to those found in the coastal rivers of Maine.

The restoration story

The Nashua, North Attleboro, Pittsford, Richard Cronin and White River national fish hatcheries produce salmon fry to restore lost populations in the Connecticut, Merrimack and Pawcatuck rivers. Salmon in these rivers are not protected by the Endangered Species Act. Hundreds of people, from schoolchildren to adults, assist each spring in stocking fry into these rivers and their tributaries as an investment in the future of Atlantic salmon.

U.S. Fish & Wildlife Service
300 Westgate Center Drive
Hadley, MA 01037
413/253 8200

Federal Relay Service
for the deaf and hard-of-hearing
1 800/877 8339

U.S. Fish & Wildlife Service
1 800/344 WILD
http://www.fws.gov

June 2009

U.S. DEPARTMENT OF THE INTERIOR MARCH 3, 1849

U.S. FISH & WILDLIFE SERVICE DEPARTMENT OF THE INTERIOR

STATE THREATENED

Arctic Tern

(Sterna paradisaea)

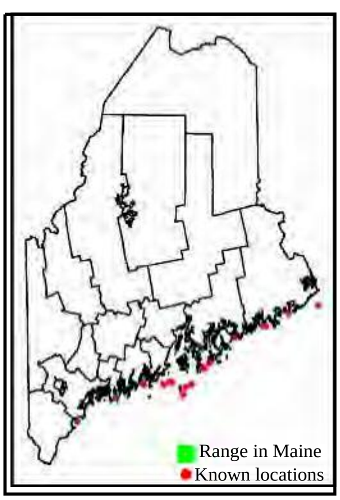
Stephen Kress

Description

The arctic tern is the champion "globe trotter," annually migrating over 15-20,000 miles round-trip from its nesting areas in North America to wintering areas in the Antarctic. The arctic tern is a graceful, medium-sized seabird (length 15 inches, wingspan 31 inches) with long, pointed wings and a long, forked tail. In the breeding season it has a light gray body and belly and a white rump and tail. Its black cap and nape are separated from its gray throat by a white facial stripe. The arctic tern is distinguished from other tern species by its deep red beak. Common terns have red beaks tipped in black, and roseate terns generally have all-black or salmon-colored beaks.

Range and Habitat

Arctic terns have the longest annual bird migration known. After leaving North America, they fly across the North Atlantic, travel south along the coasts of Europe and Africa, and winter in the Antarctic – a distance of over 10,000 miles! Their return route may be along the coast of South America.



Maine's arctic tern population is at the southern edge of the species' range in eastern North America. Here the terns nest primarily on a few outer coastal islands, always in close association with other terns and other seabirds. Nesting islands are usually treeless and covered by short herbaceous vegetation. Arctic terns prefer to nest on bare rocks and beaches, presumably because their short legs preclude movement through tall, dense vegetation. Of the 3,000 islands off the coast of Maine, at least 150 have been used by nesting terns in the last century. Arctic terns currently nest on only 10 islands in Maine.

Life History and Ecology

Arctic terns return to their breeding grounds when sexually mature at 3-5 years of age. However, some birds may breed as early as two years old. After they breed for the first time, they exhibit high fidelity to a nesting island, and often return to the same breeding colony yearly. They arrive at breeding islands in Maine in mid-May.

After elaborate courtship flights, ground displays, and ritual feeding, terns establish pair bonds and select a nest site. Two eggs are laid between May 20 and June 10 in a simple scrape that is often lined with pebbles, shells, or vegetation. The incubation period lasts 20-24 days, and both parents share responsibility for incubation. Chicks leave the nest within days, but continue to be fed and brooded by the parents. Fledging occurs in 21-28 days. Within 2-3 days after fledging, they begin to accompany parents on short flights to nearby feeding areas, and generally depart the colony within two weeks. Fall migration begins in mid to late August.

Arctic terns feed on small fish and crustaceans, which they capture by plunging into the water and catching with their bills. Primary foods eaten in Maine include white hake, Atlantic herring, and sand lance. The terns may forage up to 10 miles away from their nesting island, in deep water, rocky shores, upwelling areas, and over schools of predatory fish. Some individuals specialize in taking shrimp and small amphipods (shrimp-like animals).

Terns can be long-lived. The longevity record for an arctic tern is 34 years!

Threats

The primary causes of declining tern numbers in the Gulf of Maine are gull predation, human disturbance, and food shortages. Gulls arrive on nesting islands earlier than terns, occupy the best nesting areas, and drive terns away. Gulls also eat tern eggs, chicks, and sometimes adults. Habitat on a few islands has been lost because of the construction of permanent or seasonal dwellings. Human disturbance on islands can cause nest and chick abandonment and increase gull predation. Terns feed on the immature forms of many commercially valuable fish. Fisherman may compete with terns for species like herring and hake. Nesting productivity is low in years of poor food availability or adverse weather conditions (rain, fog) that prevent terns from finding food. The recent collapse of some commercially valuable fish stocks may have adverse effects on tern populations.

Conservation and Management

Prior to passage of laws protecting migratory birds, arctic terns were harvested to supply feathers for the millinery trade (to make women's hats) and their eggs were collected for food. Passage of the Migratory Bird Treaty Act of 1918 provided protection for migratory birds, and by 1931 an estimated 8,000 pairs of arctic terns nested on the coast of Maine. However, since the 1940s, arctic tern numbers have declined because of predation and competition with gulls. Most of the population is now concentrated on a few islands managed by conservation groups. The arctic tern was listed as threatened in Maine in 1997 because of past declines and because the population is nesting on only a few islands.

Recovery of Maine's island nesting tern populations (arctic, common, and roseate) requires intensive management. Since the 1970s, terns have disappeared from most of their former nesting islands. Intensive management is occurring on 10 tern nesting islands. Management includes removal or control of competing gull populations, use of decoys and sound recordings to attract terns, and maintaining the presence of tern managers to protect the birds from human disturbance during the nesting season. Management has halted population declines, and arctic tern numbers have stabilized at about 2,500 pairs. This is still far below historic levels. More than 90 percent of Maine's breeding population nests at only three sites – Machias Seal Island, Matinicus Rock, and Petit Manan Island. Because of food limitations and gull predation, arctic terns have not recolonized many of their former nesting areas. Arctic tern nesting islands are designated as Significant Wildlife Habitats under Maine's Natural Resource Protection Act or as Protection Fish and Wildlife areas under the Land Use Regulation Commission.

Recommendations:

✓ Protect seabird nesting islands and adjacent waters from further development, especially human dwellings, fishing piers, docks, and aquaculture facilities. Review Essential Habitat maps and guidelines prior to development near roseate tern islands. Consult with a biologist from MDIFW and the U.S. Fish and Wildlife Service to assist with planning.

✓ Municipalities should strive to prevent development of seabird nesting islands and adjacent waters and identify these areas in comprehensive plans. Consider protecting a 1/4 mile buffer around seabird nesting islands.

✓ Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.

✓ Stay off seabird nesting islands during the nesting season (April 1 to August 15). If visitation is approved (e.g., commercial tours to a seabird island), remain on designated paths and in blinds to minimize disturbance.

✓ Keep boat activity more than 660 feet from seabird nesting islands. If birds flush from the island, you're too close.

✓ Keep all pets off islands. Do not introduce mammalian predators.

✓ Locate aquaculture facilities farther than 1/4 mile from seabird nesting islands.

✓ Avoid overfishing and polluting nursery areas for herring, hake, and other fish stocks important as food for seabirds.

✓ Do not use gill nets near seabird islands or known feeding areas.

✓ Do not dump oil, litter, or waste overboard. Even small amounts of oil can kill birds. Seabirds are often injured by eating plastic particles from trash that are mistaken for food.

✓ Avoid overboard discharge of fish waste or bait. Predatory gull populations have increased because of this readily available supply of food.

U.S. Fish & Wildlife Service

Rufa red knot

Calidris canutus rufa

Skilled aviator Rear Admiral Richard E. Byrd flew over both the North and South poles. But what this renowned man accomplished with the help of sled dogs, ships and airplanes, a little shorebird weighing less than a cup of coffee completes every year of its life. The red knot is truly a master of long-distance aviation.

On wingspans of 20 inches, some red knots fly more than 9,300 miles from south to north every spring and repeat the trip in reverse every autumn, making this bird one of the longest-distance migrants in the animal kingdom. About 9 inches long, red knots are about the size of a robin. Biologists have identified six subspecies, three of them living in the Western Hemisphere: *C.c. islandica, C.c. roselaari,* and *C.c. rufa*. This last, the red knot known as rufa, winters at the tip of South America in Tierra del Fuego, in northern Brazil, throughout the Caribbean, and along the U.S. coasts from Texas to North Carolina. The rufa red knot breeds in the tundra of the central Canadian Arctic from northern Hudson Bay to the southern Queen Elizabeth Islands.

Surveys of wintering knots along the coasts of southern Chile and Argentina and during spring migration in Delaware Bay on the U.S. coast indicated a serious population decline during the 2000. Biologists from the U.S. Fish and Wildlife Service, state natural resource agencies, and non-profit organizations all share a concern for the rufa red knot and are pooling efforts to identify what needs to be done to prevent further losses.

> *A red knot banded in May 1987 was seen on Delaware Bay in May 2000. During those 13 years, the bird had flown about 242,350 miles, a distance farther than from the earth to the moon.*

Strength in numbers

Red knots winter and migrate in large flocks containing hundreds of birds. While we can guess at some of the benefits of traveling in large flocks, such as protection from predators, we can also see the downside - susceptibility to habitat change and loss, oil spills, toxins, red tides, diseases, collisions with wind turbines, storms, and hunting. Red knots were heavily hunted in the early 20th century, and may have never recovered in eastern North America. Knots are still hunted in parts of the Caribbean and South America.

Eating like a bird

For much of the year red knots eat small clams, mussels, snails and other invertebrates, swallowing their prey whole – shell and all. Migrating knots can complete nonstop flights of 1,500 miles and more, converging on critical stopover areas to rest and refuel along the way. In order to endure their long journeys, red knots undergo extensive physical changes. Flight muscles enlarge, while leg muscles shrink. Stomachs and gizzards decrease, while fat mass increases by more than 50 percent. Due to these physical changes, knots arriving from long migration flights are not able to feed maximally until their digestive systems regenerate, a process that may take several days. Thus, migrating birds require stopover habitats rich in easily digested foods – with thin or no shells – in order to gain enough weight to fuel the next flight. In spring, migrating knots seem to follow a northward "wave" in quality prey – by timing their stopovers with the spawning seasons of intertidal invertebrates, knots take advantage of readily digestible food resources like juvenile clams and mussels and horseshoe crab eggs. Red knots arrive at stopovers areas very thin, sometimes emaciated. They eat constantly to gain enough weight to continue their journeys, adding up to 10 percent of their body weight each day and nearly doubling their body weights during some stopovers.

Requirements for survival

The red knot's unique and impressive life history depends on suitable habitat, food, and weather conditions at far-flung sites across the Western Hemisphere, from the extreme south of Tierra del Fuego to the far north of the central Canadian Arctic. Further, red knots need to encounter these favorable habitat, food, and weather conditions within narrow seasonal windows as the birds hopscotch along migration stopovers between wintering and breeding areas. For example, the red knot population decline that occurred in the 2000s was caused primarily by reduced food availability from increased harvests of horseshoe crabs, exacerbated by small changes in the timing that red knots arrived at the Delaware Bay. Red knots may also be particularly vulnerable to global climate change, which is likely to affect the arctic tundra ecosystem where the knots breed; the quality and quantity of coastal habitats due to rising sea levels; the quantity and timing of invertebrate food resources throughout the bird's range; and the severity, timing, and location of storm and weather patterns.

Horseshoe crab harvests are now managed with explicit goals to stabilize and recover red knot populations; red knot number appear to have stabilized in the past few years, but at low levels relative to earlier decades. Red knots fascinate biologists, bird watchers and people who appreciate the complex beauty of the natural world. Together with these partners, the U.S. Fish and Wildlife Service is dedicated to working to conserve this extraordinary bird.

Northeast Region
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035
413/253 8200
http://northeast.fws.gov

Federal Relay Service
for the deaf and hard-of-hearing
1 800/877 8339

U.S. Fish and Wildlife Service
http://www.fws.gov
1 800/344 WILD
September 2013

STATE ENDANGERED

Grasshopper Sparrow

(Ammodramus savannarum)

MDIFW

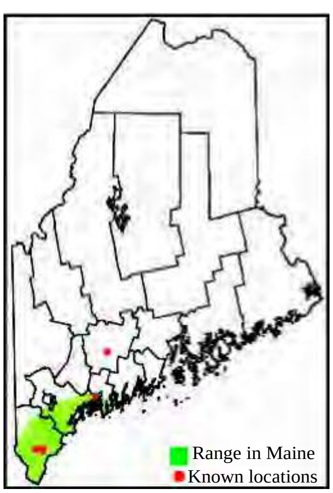
Description

The future of the grasshopper sparrow is tied inextricably to the fate of large grasslands, a rare feature amid Maine's forest-dominated landscape. The grasshopper sparrow is a small, inconspicuous bird known for its buzzy, grasshopper-like song. This sparrow is five inches in length. It has a wingspan of about eight inches and a short, pointed tail. Its flat-topped head has a pale buffy-white central stripe. The unstreaked, cream-buff breast distinguishes it from other grassland sparrows. A yellow patch at the bend of each wing can been seen at close range. Its song is a high, hissing, insectlike buzz preceded by weak *tik* notes.

Range and Habitat

The grasshopper sparrow breeds in grasslands across the U.S., except in the Southwest. Maine is the northernmost extent of the breeding range in the East. Grasshopper sparrows only nest at four sites in southern and central Maine. Wintering areas are the southern U.S. and Central America.

This species requires grasslands of at least 30 acres and prefers fields greater than 100 acres. All breeding sites in Maine are greater than 200 acres. Preferred grasslands have short, native bunch grasses, patches of bare ground, and scattered forbs and short shrubs. Fence posts provide perches. Patches of bare ground are important to allow adults and young to run to escape predators and search for insects. These habitat characteristics are most frequently found in glacial outwash plains dominated by sandy soils. Breeding sites in southern Maine include airports and intensively managed blueberry barrens. The Kennebunk Plains, at 600 acres, is one of Maine's largest grasslands. It supports 30-60 percent of the state's grasshopper sparrows, the largest population in the Northeast. Individual birds also have been observed in blueberry barrens in eastern Maine.



Life History and Ecology

Grasshopper sparrows first breed at one year of age. Males arrive at breeding areas in late May, 5-10 days before the females arrive. Males establish territories and display to prospective mates from perches on weed stalks, shrubs, or fence posts. Nest-building begins immediately following pair formation. A cup nest is built on the ground, usually at the base of a shrub or clump of grass. The nest is domed with overhanging grasses and has a side entrance. Females lay between 3-6 eggs, although 4-5 is typical. The female incubates the eggs for 11-13 days, after which she broods the chicks for about 9 days. Both parents share feeding duties.

After the young leave the nest, they remain concealed below the vegetation. Fledglings disperse from the nesting territory, but are still fed by the female for an additional 4-19 days. Adults may produce two broods during the breeding season, which lasts from May through the second week of August.

The grasshopper sparrow forages exclusively on the ground. During the breeding period, insects, primarily grasshoppers, make up most of the diet. Seeds of various grasses and weeds comprise the remainder. Fall migration begins in mid or late August and continues through September.

Threats

Grasshopper sparrows were once common in New England; however, because of habitat loss and fragmentation, they now breed only at a few scattered locations in the Northeast, mostly at airports, military bases, large blueberry barrens, and a few remnant sandplain grasslands. In the past 100 years, there has been a decline in the quantity and quality of grasslands for wildlife. Maine agricultural lands have diminished from 33 percent of the landscape to 6 percent as farmland has reverted to forests or been converted to residential and commercial development or gravel pits. In the Northeast, hayfields were traditionally not harvested until late summer and so provided ideal habitat for birds throughout the breeding season. Today, most hayfields are mowed earlier and more frequently, or are planted to crops. Pastures can be suitable habitat for grassland birds unless they are subject to heavy grazing. Extensive row crops or fields uniformly covered with mat-forming grasses are not suitable. Some agricultural herbicides and pesticides negatively affect grassland bird habitat or their insect food.

Conservation and Management

The grasshopper sparrow was listed as endangered in Maine in 1986 because of small populations, declining habitat, and limited distribution in the state. At the peak of agricultural development, it was common in many large hayfields and pastures of southern and central Maine. After 1950, declining agriculture and increasing reforestation resulted in widespread loss of suitable breeding habitat. Since 1983, 50-80 territorial males have occurred annually at just four breeding sites in York and Cumberland Counties. Intensive site management, including prescribed burning, mowing, and curtailment of herbicide spraying, has been necessary to retain populations at Brunswick Naval Air Station, Kennebunk Plains, Sanford Muncipal Airport, and the Wells Barrens. The continued existence of this species depends on maintaining large grassland communities. Additional research is needed to document populations, productivity, and limiting factors in different habitats and to assess management techniques. Reclamation of large sand or gravel pits with proper vegetation management may create suitable habitats. Grasshopper sparrow nests, eggs, and fledglings are strictly protected by the Maine Endangered Species Act.

The grasshopper sparrow shares its habitat with many other rare and declining bird species, such as the upland sandpiper (threatened), vesper sparrow, horned lark, killdeer, bobolink, meadowlark, northern harrier, and savannah sparrow. All these species are reliant on grasslands but are declining in the Northeast. Conservation of the grasshopper sparrow depends on protecting, maintaining, or enhancing the remaining grassland areas of the state, particularly fields greater than 100 acres.

Recommendations:

✓ Prior to land development or managing grasslands and barrens, consult with a biologist from MDIFW to assist with planning.

✓ Municipalities should strive to maintain important grasslands and barrens identified by MDIFW as open space, identify these areas in comprehensive plans, and conserve accordingly.

✓ Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.

✓ Maintain known nesting areas in native grasses, little bluestem, or low-growing shrubs like lowbush blueberry and do not develop or convert them to other land uses.

✓ When managing grasslands, employ best management practices using guidelines in Massachusetts Audubon Society's *Conserving Grassland Birds* publications (www. massaudubon.org).

✓ Avoid mowing nesting areas between May 1 and August 5. If mowing is necessary prior to early August, mark nest sites or locations of young birds and leave patches of unmowed grass or low-growing shrubs. Raise the mowing bar to greater than six inches to prevent destruction of nests and young birds.

✓ Keep grazing animals off known nesting fields during the critical nesting period (May 1 to August 5).

✓ Maintain approximately 40 percent of the vegetation cover at a height of 8-12 inches, with minimal litter and grass cover. Maintain some patches of bare ground, scattered tall forbs (8-25 inches), and short shrubs for song perches.

✓ Manage multiple, contiguous fields to provide a mosaic of grassland types by mowing, burning, or late-season grazing. Mow every 2-5 years to inhibit establishment of shrubs and trees.

✓ Burn fields every 5-10 years after September 1 or before May 1. Do not burn more than 50 percent of a grassland within a year.

✓ Avoid or minimize herbicide and pesticide applications, or employ integrated pest management techniques.

✓ Limit commercial gravel and sand mining in grasslands and blueberry barrens. Restore old gravel pits and agricultural fields to grasslands and low shrubs.

STATE THREATENED

Harlequin Duck

(Histrionicus histrionicus)

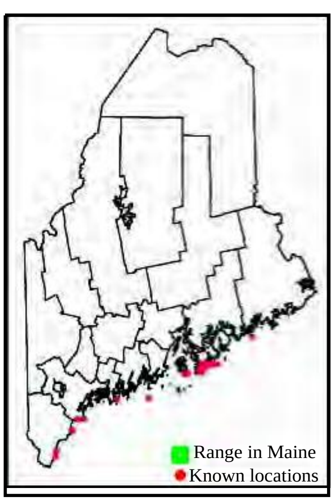
Mark McCollough

Description

The harlequin is a small diving sea duck and is among the most beautiful waterfowl of North America. As such, it is much sought after by bird watchers and naturalists. The striking blue, white, black, and chestnut plumage of the males gives the duck its name, in honor of the Italian clown. Adult males have slate-blue bodies, chestnut flanks, and white streaks and spots on the head, neck, and back. A white crescent between the eye and the bill extends alongside the black crown stripe. Adult and juvenile females are uniformly sooty-brown with three white dots on the head. Young males achieve their adult plumage after the molt during their second summer.

Range and Habitat

Harlequins are found in the northern hemisphere and winter on both the Atlantic and Pacific Oceans. The larger Pacific population (300,000 birds) breeds in Asia and western North America. Fewer than 15,000 harlequins are thought to exist in the Atlantic population, and they breed in eastern Canada, Greenland, and Iceland. Harlequins that winter along the coast of eastern North America, including Maine, seem to come primarily from a breeding population of about 1,800 individuals in southeastern Canada (Quebec, Newfoundland, and Labrador). The closest nesting population occurs on the Gaspé Peninsula. The eastern Canadian population winters from Newfoundland south to Virginia, although the majority winter in the Gulf of Maine. About 1000 birds winter in Maine, primarily at a few traditional sites in outer Jericho and Penobscot Bays.



Eastern North American harlequins nest in the subarctic. They winter in small flocks on rough coastal waters and exposed rocky shores, especially on the outermost, remote islands in Maine.

Life History and Ecology

Beginning in late March, harlequin ducks leave their wintering grounds and migrate to eastern Canada where they breed and nest inland along turbulent mountain streams and rivers. After mating, the females lay 3-8 creamy to buff-colored eggs that are incubated for about 28 days. The nest is frequently on the ground in a rock crevice or dense cover, although nests in tree cavities have sometimes been observed. After breeding, the males depart for molting areas along the coast. Some wintering birds from Maine were documented molting in Greenland. Despite being separated for a period of time each summer, harlequins establish long-term pair bonds that are reformed each year on wintering areas. Fall migration begins in September, and birds arrive on wintering areas in October and November. They winter in the same locations each winter, and the same pairs can often be seen feeding and resting at the same ledge year after year. They forage by diving in the foaming surf along remote, exposed rocky shorelines where they glean amphipods (small shrimp-like animals), small snails, and other marine invertebrates from the seaweed and bottom. They spend much of the short winter days feeding, but during warm fall and spring days they haul out on the rocks to rest and preen.

Threats

Compared to other waterfowl, harlequin ducks have an extremely low reproductive potential. They do not breed until they are three years old and have small clutch sizes. In some years, only half of the breeding-age females may breed, perhaps because of limited food resources or other disturbances in the breeding areas. As a result, the eastern North American population is particularly susceptible to sources of adult mortality. Harlequin populations declined from unrestricted subsistence hunting and liberal limits for sport hunting. Hunting was discontinued in eastern Canada and Maine in the early 1990s. A potential threat is oil spills. A catastrophic spill in outer Penobscot Bay in winter could affect most of the eastern North American population.

Conservation and Management

The harlequin was listed as endangered in eastern Canada in 1990, but was removed from the Canadian list in 2001. It was listed as threatened in Maine in 1997. It was a candidate for federal listing in the early 1990s, and in 1998 was petitioned for federal listing. The proposed listing was determined to be unwarranted because of lack of information about movements between the three Atlantic breeding populations.

Because of concern about its status and future, considerable effort has been directed at conserving harlequin ducks in Maine. A University of Maine graduate student completed landmark life history studies in the 1990s and continues to capture and mark birds to document movements, survival, and site fidelity. Considerable research continues in eastern Canada to better document nesting areas and breeding success. MDIFW and others have conducted numerous comprehensive surveys of wintering habitat by shore, boat, and aerial counts. Satellite telemetry and genetic studies are underway to determine the relationship between Canadian and Greenland nesting populations and the origin of birds wintering off the coast of Maine. Population augmentation techniques have not been developed. It is believed that the population will slowly increase on its own in response to protection from hunting and other sources of human-caused mortality. As a state-threatened species, the harlequin is strictly protected in Maine.

Recommendations:

✓ Avoid activities that routinely disrupt the feeding of harlequins on wintering areas (e.g., dragging for fish and shellfish, excessive disturbance by bird watchers and waterfowl hunters).

✓ Route oil-bearing ships away from known harlequin wintering areas and develop oil spill contingency plans for these habitats.

✓ Protect birds from poaching and other sources of human-caused mortality.

STATE ENDANGERED

Least Tern

(Sterna antillarum)

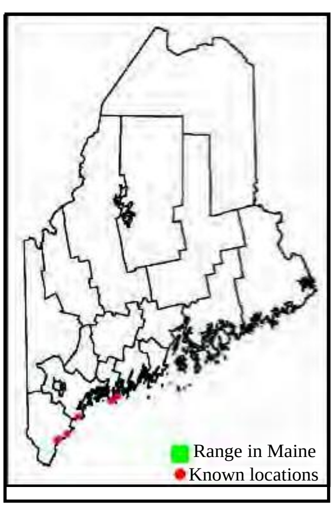
Maine Audubon Society

Description

Feisty and acrobatic, the least tern is the smallest of Maine's five species of nesting terns. It is about nine inches long and has a 20-inch wingspan. The least tern is white with pale gray feathers on the back and upper surfaces of the wings, except for a narrow black stripe along the leading edge of the upper wing feathers. Its cap is black with a small patch of white on the forehead. In summer, the adult has a yellow bill with a black tip, and yellow to orange feet and legs. The juvenile has a black bill and yellow legs, and the feathers on the back are darker than those of the adult, with a distinctly "scaled" appearance. The least tern's small size, white forehead, and yellow bill distinguish it from Maine's other resident terns.

Range and Habitat

Least terns breed in three North American populations: along the Atlantic coast from Maine to Texas, the Pacific Coast from California to Mexico, and the major rivers in the Mississippi watershed. The Atlantic Coast population is the largest at about 10,000 pairs. Least terns migrate to the eastern coast of Central and South America and northeast Brazil for the winter.



Least tern nesting habitat includes open sand, gravel, or shell-covered beaches above the high tide line. The birds are particularly attracted to the dynamic sand spits at the ends of beaches. They feed on small fish over shallow open water areas, stream and river outlets, tidal ponds, and salt marshes adjacent to nesting areas.

Life History and Ecology

Least terns arrive in New England between late April and early May. Most do not return from wintering areas to breed until they are 2-3 years old. Males establish and defend territories where they display to prospective mates, either to reestablish old pair bonds or to find a new mate. During courtship the male feeds fish to a female. Both sexes make scrapes in sandy areas with sparse vegetation above the high tide line, although the female selects the scrape that becomes the nest.

First clutches of two eggs are laid about 2-3 weeks after arrival on the breeding grounds. Incubation begins after laying the first egg and lasts 19-25 days. Both sexes incubate, brood, and feed chicks. Renesting occurs if the eggs or chicks are destroyed early in the breeding period. Both sexes defend their territory, eggs, and chicks. Birds from a colony often band together to drive away potential predators, including humans, by diving and defecating on intruders.

Chicks depart the nest shortly after hatching and may wander as far as 200 yards from the nest. Fledging occurs after 20 days. After the young have fledged, adults and young from several nests associate with each other for feeding, loafing, and roosting. Fledglings follow parents to feeding areas, where they are fed by parents and eventually begin to forage for themselves. Young birds disperse from colony sites about three weeks after fledging. Before migrating, adults with fledglings may remain for 6-8 weeks within the coastal breeding habitat. Adults and juveniles congregate at prime fishing areas beginning in late July and early August. They forage in bays, estuaries, rivers, creek mouths, and tidal marshes, usually within 11/2 miles from colonies. They hover up to 30 feet above the water, then plunge into the water and grasp small marine fish with their beaks. The species of forage fish have not been documented in Maine.

Immatures remain on wintering areas for their first year. Wintering areas of the Atlantic coast populations are largely unknown, although some banded birds have been resighted on the northern coast of South America. Least terns can live to 24 years of age.

Threats

Habitat loss and degradation, human disturbance, and predation threaten the recovery of this species. Natural phenomena (storm tide flooding, excessive rainfall) can also cause egg and chick loss. Over % of Maine's 30 miles of beaches have been lost as nesting habitat for least terns because of construction of jetties, seawalls, and high-density housing. Maine's beaches are used by tens of thousands of visitors annually during the least tern nesting season. Beach users can crush nests and chicks. Pets (dogs and cats) destroy nests and harass terns. Beach maintenance activities, especially vehicles associated with beach sweeping and garbage collection, can crush chicks and alter habitat. Garbage left on beaches attracts predators, including foxes, skunks, raccoons, crows, and gulls, all of which readily prey on tern eggs and chicks. Beach restoration and "nourishment" activities can have a net benefit for least terns if completed outside the nesting season, but also may attract birds to high human use areas. Without intensive management, the aforementioned threats would rapidly reduce Maine's least tern population to near-extinction.

Conservation and Management

There are no records of least terns nesting in Maine during early European settlement. They were likely present, but were quickly extirpated by subsistence hunting. The species was nearly extirpated from the entire East Coast during the 1870s by overharvest for the millinery trade (decorating ladies' hats). Least terns were first recorded nesting in Maine in 1961. Since that time, nesting colonies have been documented at 13 sites. Populations have been monitored since 1977, and the popualtion has fluctuated between 39 (in 1982) and 125 pairs (in 1993).

Pacific and interior populations of least terns are federally endangered. Least terns are listed as a Species of Management Concern on the East Coast by the U.S. Fish & Wildlife Service. They were listed as Maine's first endangered species in 1982. A state recovery plan was written for least terns in Maine in 1993. Least tern nesting, feeding, and brood-rearing habitats were given legal protection in Maine by designating these areas as Essential Habitats in 1995. Least tern numbers have not increased substantially despite two decades of intensive management.

Least tern management begins in May when nesting areas on beaches are fenced and signed. These protected areas offer refuge from human disturbance for nesting terns and recently fledged chicks. Chronic predation and human disturbance are major factors limiting populations, and entire colonies can be lost in a single night from these causes. In many years, only a handful of young are fledged. Electric fencing and large wire mesh fences have been employed to deter predators, with mixed results. Predator control (especially removal of resident pairs of foxes) has not been effective because of social and political limitations that reduce the effectiveness of trappers. Nightly monitoring of colonies has recently proven to be successful in deterring predators. Biologists patrol nesting areas several times weekly to deter dogs, educate the public, and monitor nests and chicks. Population and productivity data are collected each year to monitor population health and recovery status.

Because of Essential Habitat designation, all projects or activities funded and carried out by municipalities and state agencies are reviewed by MDIFW. In some communities, municipalities help with monitoring and management activities. Least terns nest in the same beach environment as piping plovers (endangered) and many other migratory shorebirds.

Recommendations:

✓ Avoid further residential development of beach and dune habitats. Review Essential Habitat maps and guidelines prior to development near plover and tern beaches and adjacent dunes, intertidal areas, and salt marshes. Consult with a biologist from MDIFW and the U.S. Fish and Wildlife Service prior to any project that alters beaches or dunes.

✓ Municipalities should strive to maintain important beach and dune systems identified by MDIFW as open space, identify these areas in comprehensive plans, and conserve accordingly.

✓ Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.

✓ Follow the state and federal laws and regulations pertaining to sand dunes.

✓ To preserve water quality and wetland functions, maintain contiguous, forested riparian habitats at least 250 feet from salt marshes adjacent to plover and tern nesting areas. Follow Shoreland Zoning standards.

✓ Avoid major projects and activities on plover and tern beaches during the nesting season (April 1 to August 31).

✓ Do not approach plovers or terns or their nests. Respect fenced or posted areas to protect endangered species and other wildlife.

✓ Keep pets off the beach during the nesting season (April 1 to August 31).

✓ Remove trash from the beach. Carry in/carry out is the best trash collection policy.

✓ Avoid flying kites or placing beach volleyball areas within 150 yards of plover or tern nesting areas.

✓ Avoid fireworks within one mile of nesting areas.

✓ Avoid use of vehicles on the beach during the nesting season. If vehicles are used, employ a "spotter" to walk in front of the vehicle to search for eggs and chicks.

✓ When feasible, remove jetties and seawalls that adversely affect plover and tern habitat.

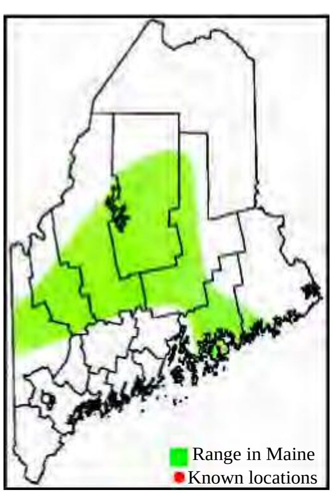
STATE ENDANGERED

Peregrine Falcon

(Falco peregrinus)

Description

The peregrine falcon is a sleek, rapid-flying bird of prey. Its wingspan measures 35-46 inches, body length ranges from 13-19 inches, and weight is 20-35 ounces. Females are about 30 percent larger than males; otherwise the sexes are similar in appearance. Adults have uniform blue-gray upperparts that extend as a "helmet" onto the head and face; light barring on the belly; white on the chest and throat; and a rufous wash on the lower chest and belly. The bold, distinct mustache mark is obvious on both adults and immatures. Immature birds have brown upperparts, heavy streaking on the underparts, and buff on the chest and throat. Wings are long and taper to a point. The tundra peregrine (subspecies *tundrius*), which typically is seen during migration in the East, is paler than the *anatum* subspecies. Maine's reintroduced peregrines are a genetic blend of many subspecies and races from around the world and vary in plumage characteristics.



Range and Habitat

Peregrine falcons are found worldwide and breed on all continents except Antarctica. Although once broadly distributed in North America, they were extirpated throughout much of their historic range. Three subspecies occur in North America. *Falco peregrinus anatum* was native to the East and bred in Maine. Breeding peregrines were reported in all mountainous and coastal headland regions of the state.

Breeding habitat requires cliffs for nesting and perching and an adequate prey base of small to medium-sized birds. Open water in proximity to cliffs may enhance foraging opportunities. Nests, or eyries, are located on ledges or overhangs that are inaccessible to mammalian predators and provide protection from the elements. More recently, peregrines have adapted to nesting on bridges and buildings in urban environments. Peregrines are coastal migrants. In September and October, many Canadian birds (*tundrius* and *anatum* subspecies from the North) are seen throughout Maine, particularly near offshore islands.

Life History and Ecology

Peregrine falcons generally reach sexual maturity at two years of age. They form permanent pair bonds and remain mated for life. Peregrines breeding in Maine return from wintering areas and establish territories in March or April. Courtship displays include high circling, undulating flights, and figure-eight flights. Both members of the pair engage in high circling and "flight play."

The nest is a scrape or slight depression in gravel or debris on a cliff ledge. Eggs are laid at 2-3 day intervals, with completed clutches containing 3-4 eggs. Incubation begins with the laying of the last egg and lasts 30-36 days. Both sexes share incubation duties, although the female does the majority. Hatching in Maine occurs in May or early June. The young remain in the nest for about six weeks and fledge in late June or July. Fledglings remain at the nest through August. Both adults feed the young.

Peregrines attack and kill their prey in flight by a sharp blow from a vertical dive. Diving speeds have been estimated at 200 miles per hour. Primary prey items include shorebirds, seabirds, rock doves, and a variety of other small birds. Peregrines migrate in the fall, primarily to coastal areas in the Southeast or Central and South America. However, some adults breeding in the Northeast may remain year-round.

Threats

Shooting and collection of peregrines or their eggs were infrequently documented in Maine during the early 1900s. Increased use of pesticides after World War II, especially DDT, caused drastic declines in peregrine populations worldwide. Organochlorine compounds like DDE, a by-product of DDT, resulted in shell thinning, egg breakage, and reproductive failure. After peregrines were completely extirpated from the eastern United States by the early 1960s, DDT was banned in the U.S. in 1972. Although no longer used here, this chemical persists in our environment and is still used in South America where peregrines winter. Habitat is not limiting in Maine, where cliffs adjacent to large open areas are in good supply. Human disturbance (e.g., hiking and rock climbing) during the nesting season can cause nest failure.

Conservation and Management

There is little information on past populations of the eastern peregrine (subspecies *anatum*) in Maine. Only 16 eyries are referenced in the historic literature, but this likely is an underestimate. An eyrie occupied by peregrines during 1962 in Acadia National Park was among the last known active nests in the East.

Maine joined other states in a large-scale reintroduction program. Young, captive-reared peregrines were slowly released at former nest sites in a process called "hacking." A total of 144 birds were successfully released at eight different locations in Maine from 1984-1997. Peregrines began to nest in Maine in 1987. The first successful nesting of reestablished peregrines in Maine occurred in Oxford County. In 1988, the last site occupied by eastern peregrines in Acadia National Park was reoccupied. From 1988-2001, 5-8 pairs nested in the state at 13 different sites. Young have been produced at normal rates. The population dramatically increased to 15 pairs in 2002. Reintroduced peregrines have been successful in New Hampshire, Vermont, and New York, and undoubtedly young produced there have established eyries in Maine. With recovery of the species nationwide, the peregrine falcon was taken off the federal endangered species list in 1999, but its breeding population remains listed as endangered on the Maine list, as its numbers here are still low.

Recommendations:

✓ Prior to land development near peregrine falcon eyries, consult with a biologist from MDIFW to assist with planning.

✓ Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.

✓ Prohibit climbing on the cliff and hiking near the cliff rim within 1/4 mile of peregrine eyries during the March 15 to August 15 nesting season. Falcons are especially disturbed by nearby activity on the cliff or on trails that are line-of-sight from the nest or perches. (Where falcon nests are already established in proximity to humans, these recommendations can be relaxed, unless the birds show evidence of disturbance from human activity.)

✓ Maintain trail closures until five weeks after the last bird has fledged (usually late July to mid-August).

✓ Avoid construction of permanent roads within 660 feet of a known peregrine site.

✓ Avoid logging within 1/4 mile of an active eyrie during the nesting season.

✓ Aircraft should not approach closer than 1,500 feet above a nest. Closer approaches may cause peregrines to attack planes or may cause a frantic departure from the nest. Falcons startled from the eyrie have been known to damage eggs or injure nestlings.

✓ Route powerlines and other wires away from eyries to avoid collisions and electrocution hazards.

✓ Avoid applications of pesticides around occupied eyries during the breeding season.

✓ Wetlands, especially intertidal mudflats, estuaries, and coastal marshes, are key feeding areas. Protect wetlands used regularly by peregrine falcons at any time of the year from filling, development, or other disturbances that could alter prey abundance and habitat quality.

✓ Maintain large trees and snags in areas where peregrines nest and feed. These perches are important for roosting and hunting. Leave snags and debris on mud flats for perching and roosting.

STATE ENDANGERED

FEDERALLY THREATENED

Piping Plover

(Charadrius melodus)

MDIFW

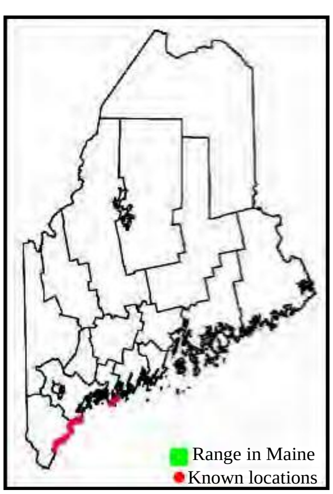
Description

The piping plover is a small, handsome shorebird (about seven inches long) found on sandy beaches and dunes in southern Maine. Its back is a uniform sandy brown color. The underside is white, and is interrupted by a single narrow black band around the neck. The bill is short and orange with a black tip. The legs are orange. The semipalmated plover, a common migrant on beaches in late summer, is similar in appearance, but has a darker brown head and back and a wide brown or black collar.

Summer visitors to southern Maine beaches have a good opportunity to see piping plovers. Signs, fenced sections of beach, and nest exclosures identify areas of the beach that are being managed for nesting piping plovers. By giving the birds space and following a few rules of beach etiquette, we can share the beach with this endangered species.

Range and Habitat

The piping plover breeds in three distinct populations in North America. About 1,400 pairs nest in alkali wetlands and along large rivers in the northern Great Plains of the U.S. and Canada. A tiny population of only about 20 pairs nests on beaches along Lakes Superior and Michigan. The Atlantic coast population of about 1,500 pairs nests on ocean beaches from Newfoundland to South Carolina. Wintering areas include the southeast Atlantic coast from North Carolina to Florida and the Gulf Coast south to the Yucatan Peninsula.



Habitat for the piping plover includes beaches, mudflats, sandflats, tidal ponds, and salt marshes. On the Atlantic coast, nest sites include open sand, gravel, or shell-covered beaches above the high tide line. Sand spits, barrier islands, blowout areas in dunes, and dredge spoil are preferred nesting areas.

Life History and Ecology

After returning to breeding beaches in Maine in April, males establish and defend a territory by elaborate aerial displays. The breeding territory includes both feeding and nesting habitat. When the male has attracted a mate, one of several scrapes is selected as the nest site and is lined with pieces of shell and tiny pebbles. Over a period of six days the female lays a clutch of four eggs. Incubation begins after the laying of the last egg and lasts for about 28 days. Both sexes share with incubation and feeding young. If the first nest is destroyed, females may renest.

Within hours of hatching, the precocial chicks leave the nest but stay close to be brooded by the parents. Parents lead the chicks away from the nest scrape a day or two after hatching, but usually remain within the established territory. Chicks remain close to parents and alternate between feeding and being brooded. Adult females may desert broods within 5-10 days after hatching. Fledging occurs in 28-32 days.

After fledging, adults and young congregate on feeding areas prior to migration. Piping plovers feed primarily on marine worms and small crustaceans found in the “splash zone,” although they also feed extensively in piles of wrack (seaweed) that accumulates at the high tide line. Intertidal flats and back dune ponds are also used for feeding. Plovers can live to be 14 years of age.

Threats

Habitat loss and degradation, human disturbance, and predation threaten the recovery of this species. Over two-thirds of Maine’s 30 miles of beaches have been lost as nesting habitat for piping plovers because of construction of jetties, seawalls, and high density housing. Maine’s beaches are used by tens of thousands of visitors annually during the plover nesting season. Beach users can crush nests and chicks and disturb feeding birds. Pets (dogs and cats) destroy nests and harass plovers. Vehicles required for beach maintenance activities, especially beach sweeping and garbage collection, can crush eggs and chicks and alter habitat. Beach sweeping and removal of the wrack line also eliminates valuable feeding habitat. Garbage left on beaches attracts predators, including foxes, skunks, raccoons, crows, and gulls, all of which readily prey on plover eggs and chicks. Beach restoration and “nourishment” activities can have a net benefit for plovers if done in the off-season, but also may attract birds to high human use areas. Without intensive management, the aforementioned threats would rapidly reduce Maine’s plover population to near-extinction.

Conservation and Management

Piping plover populations declined in the 1800s because of unlimited harvesting for subsistence and the millinery trade (ladies’ hat decorations). Numbers increased and peaked in the 1940s following the passage of the Migratory Bird Treaty Act. After WWII, many Maine beaches were rapidly developed for summer homes, and populations of plovers and other beach nesting birds plummeted. By 1981, only seven pairs could be found in the state.

Atlantic coast piping plovers are federally threatened, and they were listed as endangered in Maine in 1986. A state recovery plan was written for plovers in 1990. Piping plover nesting, feeding, and brood-rearing habitats were given legal protection by Essential Habitat designation in 1995. Essential Habitat designation requires that all projects funded, permitted, and carried out by municipalities and state agencies in mapped areas be reviewed by MDIFW.

Piping plover management begins in April when plover territories on beaches are fenced and signed. These areas offer refuge from human disturbance for nesting birds and recently fledged chicks. Wire mesh exclosures are placed around nests as soon as they are found to prevent predation by birds and mammals. Biologists and wardens patrol nesting areas several times weekly to deter dogs, educate the public, and monitor nests and chicks. In some instances, programs to deter or remove nest predators have been initiated. Population and productivity data are collected each year to monitor population health and recovery status. Plovers share their beach environment with nesting least terns (endangered) and many other migratory shorebirds.

In some communities, municipalities help with monitoring and management activities. Intensive management has enhanced productivity and survival of young, and numbers have steadily increased to 55-60 pairs at about 20 sites in the late 1990s.

Recommendations:

✓ Avoid further residential development of beach and dune habitats. Review Essential Habitat maps and guidelines prior to development near plover and tern beaches and adjacent dunes, intertidal areas, and salt marshes. Consult with a biologist from MDIFW and the U.S. Fish and Wildlife Service prior to any project that alters beaches or dunes.

✓ Municipalities should strive to maintain important beach and dune systems identified by MDIFW as open space, identify these areas in comprehensive plans, and conserve accordingly.

✓ Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.

✓ Follow the state and federal laws and regulations pertaining to sand dunes.

✓ To preserve water quality and wetland functions, maintain contiguous, forested riparian habitats at least 250 feet from salt marshes adjacent to plover and tern nesting areas. Follow Shoreland Zoning standards.

✓ Avoid major projects and activities on plover and tern beaches during the nesting season (April 1 to August 31).

✓ Do not approach plovers or terns or their nests. Respect fenced or posted areas to protect endangered species and other wildlife.

✓ Keep pets off the beach during the nesting season (April 1 to August 31).

✓ Remove trash from the beach. Carry in/carry out is the best trash collection policy.

✓ Avoid flying kites or placing beach volleyball areas within 150 yards of plover or tern nesting areas.

✓ Avoid fireworks within one mile of nesting areas.

✓ Avoid use of vehicles on the beach during the nesting season. If vehicles are used, employ a “spotter” to walk in front of the vehicle to search for eggs and chicks.

✓ When feasible, remove jetties and seawalls that adversely affect plover and tern habitat.

STATE THREATENED

Linda Welch

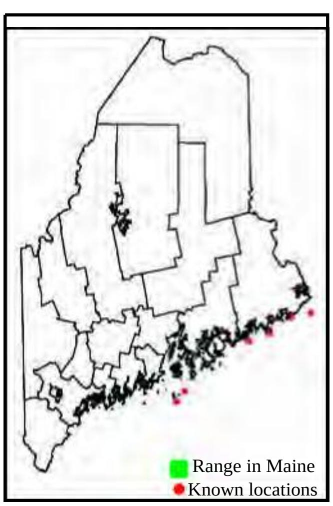
Razorbill

(Alca torda)

Description

In the northern hemisphere, Maine's puffins, guillemots, and razorbills are the ecological equivalent of penguins. Appropriately dressed in "formal attire," these tuxedoed birds fly underwater, capture fish, and live in large colonies. Another relative, the extinct great auk, used to winter off the coast of Maine.

Razorbills are short (17 inches long), chunky seabirds with short, stubby wings. They are members of the auk family and are closely related to puffins, guillemots, and murres. The breeding adult razorbill is distinguished by a black back and head, white belly, thick bill, and uptilted tail (when swimming). The black bill is flat with a vertical white mark midway along its length. A white line extends from the eye to the bill. Winter plumage is similar; the bill covering is shed, and the throat, cheeks, and ear coverts are white. Legs and feet are black. On breeding grounds, razorbills make a low guttural or croaking *urrr* sound.



Range and Habitat

The razorbill is found in arctic and subarctic marine waters from Maine to northern Russia. There are about 700,000 razorbills in the North Atlantic, and over 70 percent of the population nests in Iceland. About 330 pairs nest in the Gulf of Maine, which is the extreme southern edge of their range. Razorbills nest on rocky, isolated islands, although they occasionally nest on mainland cliff faces or headlands if mammalian predators are absent. Islands must have suitable nesting sites, which include ledges with crevices and boulder fields, and deep rock fissures. Razorbills only nest on three islands in Maine: Matinicus Rock, Freeman Rock, and Old Man Island. The largest colony in the Gulf of Maine is on Machias Seal Island on the Maine/New Brunswick border. After breeding, razorbills stay out to sea along pack ice areas of the North Atlantic. In the western Atlantic, razorbills winter at sea off Atlantic Canada south to Massachusetts.

Life History and Ecology

Razorbills breed for the first time when they are 4-6 years of age. Immatures return annually to breeding colonies, with the youngest birds arriving later in the breeding period and staying the shortest amount of time. As birds get older, each year they arrive at the breeding colonies progressively earlier and spend more time at the colony prospecting for mates and nesting sites. Most return to breed at the colony where they were born, and keep the same mate for several years. Razorbills return to breeding colonies in Maine in February and early March, about three months before egg laying begins. During this period, they alternate time at the colony displaying and defending nest sites with time at sea feeding. Nest sites are typically under rocks and in crevices. Egg laying occurs during May and June, and is closely related to sea surface temperature. A single egg is laid on bare rock, and is incubated by both adults for about 35 days.

After hatching, the chick is closely brooded by the parents until it can regulate its own body temperature at about 9-10 days of age. When about 18 days old, the partially grown and flightless chick leaves the colony in the middle of the night to avoid gull predation. Primary and secondary wing feathers develop after the young bird has left the colony. The adult male accompanies its chick to sea, where it feeds the chick for several weeks. Adults feed primarily on fish, including sand lance, Atlantic herring, Atlantic cod, and capelin. Fall migration begins in mid-September in Maine. Longevity may exceed 30 years.

Threats

Historically, razorbills were more numerous, but not abundant, at the southern edge of their range. They declined from overharvest for food, feathers, and eggs. In the last 50 years, expanding populations of black-backed and herring gulls became serious predators of razorbills, their chicks and eggs. The presence of gulls inhibits razorbills from recolonizing some former nesting areas. The availability of food can affect breeding success. Incidental take in gill nets can be a serious problem in some areas. Oil pollution and spills have the potential to kill large numbers of birds. Maine razorbill nesting islands are remote and rarely visited by humans, so human disturbance is not typically a concern.

Conservation and Management

Historic data on razorbills in Maine are nonexistent. Hunting and egg collecting eliminated the species from Maine islands by 1890. At some time in the 1900s, they began to return to some former nesting islands, and by the 1970s there were about 25 pairs on two islands. About 180 pairs currently nest on three islands, and the population is believed to be slowly increasing. About 150 pairs nest on Machias Seal Island. Unlike most other endangered seabirds, razorbills still exist on unmanaged islands (Old Man Island and Freeman Rock). These rocky enclaves are unsuitable for nesting gulls, thus providing predator-free habitat for razorbills.

Ongoing gull control and management programs on Matinicus Rock and Machias Seal Island benefit razorbills. Active programs are underway to establish new colonies at Eastern Egg and Petit Manan Islands. Razorbills were listed as threatened in Maine in 1997 because of their small population size and limited distribution. All razorbill islands in Maine are in conservation ownership and protected by Significant Wildlife Habitat provisions of the Natural Resource Protection Act.

Recommendations:

✓ Protect seabird nesting islands and adjacent waters from further development, especially human dwellings, fishing piers, docks, and aquaculture facilities. Review Essential Habitat maps and guidelines prior to development near roseate tern islands. Consult with a biologist from MDIFW and the U.S. Fish and Wildlife Service to assist with planning.

✓ Municipalities should strive to prevent development of seabird nesting islands and adjacent waters and identify these areas in comprehensive plans. Consider protecting a 1/4 mile buffer around seabird nesting islands.

✓ Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.

✓ Stay off seabird nesting islands during the nesting season (April 1 to August 15). If visitation is approved (e.g., commercial tours to a seabird island), remain on designated paths and in blinds to minimize disturbance.

✓ Keep boat activity more than 660 feet from seabird nesting islands. If birds flush from the island, you're too close.

✓ Keep all pets off islands. Do not introduce mammalian predators.

✓ Locate aquaculture facilities farther than 1/4 mile from seabird nesting islands.

✓ Avoid overfishing and polluting nursery areas for herring, hake, and other fish stocks important as food for seabirds.

✓ Do not use gill nets near seabird islands or known feeding areas.

✓ Do not dump oil, litter, or waste overboard. Even small amounts of oil can kill birds. Seabirds are often injured by eating plastic particles from trash that are mistaken for food.

✓ Avoid overboard discharge of fish waste or bait. Predatory gull populations have increased because of this readily available supply of food.

FEDERALLY ENDANGERED

STATE ENDANGERED

Roseate Tern

(Sterna dougallii)

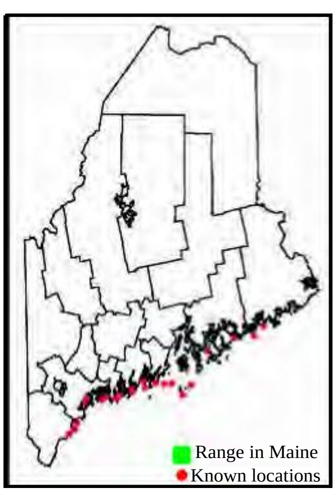
Stephan Repasky

Description

Roseate terns are graceful seabirds (length 15 inches, wingspan 31 inches) with pointed wings and long, forked tails. They are very similar in appearance to arctic and common terns. Roseates are distinguished by their voices, the lack of a black trailing edge on the underwings, and shorter wings. At the beginning of the breeding season their bills are entirely black, but a salmon-red color develops along the basal third as the season progresses. In the breeding season, they have white bellies that can be washed with a rosy tinge (hence their name); light gray bodies; and white rumps and tails. Like other terns, they have black caps and napes, and their legs and feet are bright reddish-orange.

Range and Habitat

Roseate terns nest in temperate and tropical marine habitats throughout the northern hemisphere. The North American subspecies breeds in two distinct groups: the Northeast population, which breeds from the Magdalen Islands of Quebec south to Long Island in New York, and a population in the Caribbean Sea. Both populations winter in South America from Colombia to Brazil. Roseate terns nest exclusively in marine environments on islands, barrier beaches, and salt marsh islands. Nesting islands are close to good foraging areas. Of the 3,000 islands off the coast of Maine, at least 150 have been used by nesting terns in the last century. In recent years, only 4-6 islands have been used by roseate terns.



Life History and Ecology

First breeding is generally at 2-4 years old. After roseate terns breed for the first time, they are highly faithful to a nesting island, returning to the same breeding colony year after year. They arrive at breeding islands in Maine in mid-May. Roseates pair with a single mate, but may exchange mates from year to year. After a three-week period of courtship, 1-5 (average 2) eggs are laid in mid-May to mid-June. The nest is a simple scrape in dense vegetation or under rocks or driftwood. Both adults incubate eggs, and chicks hatch in about 23 days. The chicks stay close to the nest site and are fed by the parents for 22-30 days before they fledge.

Roseate terns feed on small fish, and sand lance predominates in the diet in the Northeast. In Maine, white hake, four bearded rockling, herring, and pollock are also taken. Roseates forage by plunging into the water and catching small fish with their bills. They favor fishing over shallow sand shoals and tide rips. During August and early September, large flocks of roseates can be observed at migratory staging areas (inlets, barrier beaches, and islands, usually adjacent to good food sources). The longevity record for a roseate tern is 25 years.

Threats

The primary factors affecting tern populations in Maine are gull predation, habitat loss, human disturbance, and food shortages. Herring and great black-backed gulls arrive on nesting islands earlier than terns, occupy the best nesting areas, and drive terns away. Tern eggs, chicks, and even adults are taken by gulls. Laughing gulls, which nest in close association with terns, have increased rapidly on some islands, driving terns from prime nesting habitat and taking some eggs and chicks. Habitat on some islands has been lost because of the construction of permanent or seasonal dwellings. Human disturbance on islands can cause nest and chick abandonment and increase gull predation. Terns feed on the immature forms of many commercial fish like herring and hake. Commercial fisherman may compete with roseate terns for food. Nesting productivity is low in years of poor food availability or adverse weather conditions (rain, fog) that prevent terns from finding food.

Conservation and Management

By 1890, roseate terns in the Northeast were reduced to about 2,000 pairs because of overharvest for the millinery trade (decorating ladies' hats). Although most nesting islands were abandoned during this period, at least four sizable colonies survived. With the passage of migratory bird laws in the early 1900s, roseate numbers rebounded. The Northeast population peaked in the 1930s at about 8,500 pairs. Maine's population was never very large, reaching about 275 pairs in 1931. Since the 1940s, roseate numbers have declined throughout their range because of predation and competition by increasing gull populations. By 1977, only 2,300 pairs remained in the Northeast. This population was listed as endangered in 1987 by the federal government. Maine's population dwindled to 52 pairs in 1987, the year after it was listed as endangered by the state. The roseate tern is also listed as endangered in Canada.

Recovery of Maine's tern populations (arctic, common, and roseate) has required intensive management on a few nesting islands. Ten Maine nesting islands are currently managed for terns. On each of these islands, gulls are removed or controlled, decoys and sound recordings of colonies are used to attract nesting terns, and tern managers live on the islands during the nesting season to deter predators and control human disturbance. Roseate tern numbers have responded well to management, and about 289 pairs nested on four islands in the state in 2001. Most of Maine's breeding population nests at only two or three islands, and the birds have yet to recolonize many of their former nesting areas. Roseate tern nesting islands are designated as Essential Habitats under the Maine Endangered Species Act, Significant Wildlife Habitats under the Maine Natural Resource Protection Act, or as Protection Fish and Wildlife areas under the Land Use Regulation Commission. Because of Essential Habitat designation, all projects or activities funded and carried out by municipalities and state agencies within 1/4 mile of roseate tern nesting islands are reviewed by MDIFW.

Recommendations:

✓ Protect seabird nesting islands and adjacent waters from further development, especially human dwellings, fishing piers, docks, and aquaculture facilities. Review Essential Habitat maps and guidelines prior to development near roseate tern islands. Consult with a biologist from MDIFW and the U.S. Fish and Wildlife Service to assist with planning.

✓ Municipalities should strive to prevent development of seabird nesting islands and adjacent waters and identify these areas in comprehensive plans. Consider protecting a 1/4 mile buffer around seabird nesting islands.

✓ Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.

✓ Stay off seabird nesting islands during the nesting season (April 1 to August 15). If visitation is approved (e.g., commercial tours to a seabird island), remain on designated paths and in blinds to minimize disturbance.

✓ Keep boat activity more than 660 feet from seabird nesting islands. If birds flush from the island, you're too close.

✓ Keep all pets off islands. Do not introduce mammalian predators.

✓ Locate aquaculture facilities farther than 1/4 mile from seabird nesting islands.

✓ Avoid overfishing and polluting nursery areas for herring, hake, and other fish stocks important as food for seabirds.

✓ Do not use gill nets near seabird islands or known feeding areas.

✓ Do not dump oil, litter, or waste overboard. Even small amounts of oil can kill birds. Seabirds are often injured by eating plastic particles from trash that are mistaken for food.

✓ Avoid overboard discharge of fish waste or bait. Predatory gull populations have increased because of this readily available supply of food.

STATE THREATENED

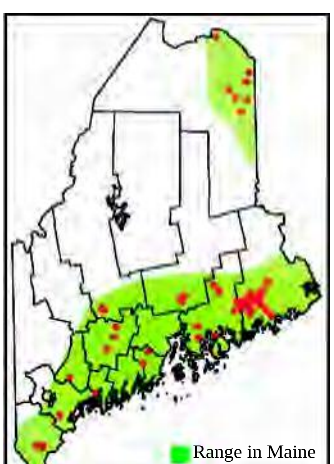
Upland Sandpiper

(Bartramia longicauda)

Andy Weik

Description

Upland sandpipers (or "uppies" to birders) provide an added dimension to grasslands. Their musical call, stirring courtship flights, and habit of perching on fenceposts enliven the rural landscape. Upland sandpipers are among the rarest and most appealing of grassland birds in the Northeast. They are large shorebirds (12 inches high, 26-inch wingspan) identified by a small head, long neck, long tail, black rump, overall buffy plumage with intricate brown markings, and yellow legs. Feathers on the back are olive-buff and strongly barred dark brown with pale buff fringes. The dark streaking on the buff-colored breast contrasts with prominent dark chevrons along the white flanks. The wings are long and pointed. In flight, the undersides of the wings are white and strongly barred dark brown. The tops of the wings are blackish at the tip and brown next to the body. The upland sandpiper has a prominent dark eye and crown stripe. Its short bill is curved slightly downward. When alighting, the species momentarily holds its wings straight up. Its call is a liquid, mellow *ch-wut*, and in flight it whistles a strong *qui-di-di-du*.



Range and Habitat

The upland sandpiper breeds across North America from Alaska, the prairie Provinces, Midwestern states, and northern tier states to Maine. The highest nesting densities are in the northern prairie states and provinces. In Maine, upland sandpipers breed in large grasslands and barrens along the coast and eastern Aroostook County. Most of the state's population nests in the Downeast blueberry barrens. Wintering areas are in South America, with the largest concentrations in Argentina.

Upland sandpipers require large fields (greater than 150 acres), with open shortgrass areas such as blueberry barrens, meadows, pastures, hayfields, fallow agricultural fields, and airports. They occasionally breed in bogs and open peatlands. They prefer a mix of short and tall (less than 24-inch) grass interspersed with patches of bare ground. Fence posts, if available, are used for singing perches. The birds avoid fields with uniform coverage of dense grass and legumes, or a thick layer of dead vegetation. They will use fields dominated by bunchgrasses or blueberry plants.

Life History and Ecology

Upland sandpipers first breed at one year of age. Adults arrive on breeding grounds in Maine from late April to early May. Males call while they circle high above their territories. Upland sandpipers are monogamous, and are thought to arrive on their breeding areas already paired. After elaborate courtship displays, they select a nest site. They nest in extensive, open tracts of short grassland cover types. They are loosely colonial, and several nesting territories are usually grouped in fields. While nest sites are defended, nearby loafing and feeding sites are shared communally. The nest is a shallow scrape in the ground lined with dry grass, with overhanging vegetation for concealment. A clutch of four eggs is incubated for 21-27 days. Within a day of hatching, chicks leave the nest. At least one parent guards the chicks until fledging occurs at 30-34 days of age. Feeding and brood-rearing occur in open, short, grassy cover types. Prey items are primarily insects and include grasshoppers, crickets, and other small invertebrates.

Threats

Upland sandpipers were more common in Maine in the 1800s when a higher percentage of the state was in farmland. Maine agricultural lands diminished from 33 percent of the landscape to 6 percent, as grasslands have reverted to forests or have been fragmented by residential and commercial development. As grasslands disappeared from the landscape in the 1890s, so did upland sandpipers. In the past 100 years, populations have probably stabilized or slightly increased. In the Northeast, hayfields were traditionally harvested in late summer and provided good habitat throughout the breeding season. Today most hayfields are mowed earlier and more frequently, or planted to crops. Pastures can be suitable habitat unless they are subject to heavy grazing. Extensive row crops or fields uniformly covered with mat-forming grasses are not suitable. Some agricultural pesticides negatively affect grassland birds or their insect food.

Conservation and Management

The upland sandpiper was listed as threatened in Maine in 1997 because of small populations, regional population declines, and diminishing habitat in the Northeast. It is also listed as a Migratory Bird Species of Management Concern in the Northeast by the U.S. Fish & Wildlife Service. Historically, upland sandpipers were common summer residents in Maine and were distributed among 13 counties. At the peak of agricultural development in the late 1800s, upland sandpipers were considered common.

After 1950, declining agriculture and increasing reforestation resulted in widespread loss of potential breeding habitat. Since 1989, upland sandpipers have been reported at 73 sites in 11 counties. Current breeding habitat is limited to the few remaining large grasslands and blueberry barrens in the state. Continued existence of this species depends on maintaining these habitats. Maine has the largest upland sandpiper population in the Northeast (currently about 150 pairs), and as such will play an important role in conservation of the species in the region. Additional research is needed to document the species' nesting ecology, populations, productivity, survival of chicks, and limiting factors. Habitat protection, enhancement, and management are key to the species' recovery. Nests, eggs, and fledglings of upland sandpipers are protected from take by the Maine Endangered Species Act.

The upland sandpiper shares its habitat with many other rare or declining species such as the grasshopper sparrow (endangered), short-eared owl, vesper sparrow, horned lark, killdeer, bobolink, meadowlark, northern harrier, and savannah sparrow. All these species rely on grasslands, and all are declining in the Northeast. Conservation of the upland sandpiper depends on maintaining the remaining grassland areas of the state, particularly fields greater than 150 acres.

Recommendations:

✓ Prior to land development or managing grasslands and barrens, consult with a biologist from MDIFW to assist with planning.
✓ Municipalities should strive to maintain important grasslands and barrens identified by MDIFW as open space, identify these areas in comprehensive plans, and conserve accordingly.
✓ Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.
✓ Maintain known nesting areas in native grasses, little bluestem, or low-growing shrubs like lowbush blueberry and do not develop or convert them to other land uses.
✓ When managing grasslands, employ best management practices using guidelines in Massachusetts Audubon Society's *Conserving Grassland Birds* publications (www. massaudubon.org).
✓ Avoid mowing nesting areas between May 1 and August 5. If mowing is necessary prior to early August, mark nest sites or locations of young birds and leave patches of unmowed grass or low-growing shrubs. Raise the mowing bar to greater than six inches to prevent destruction of nests and young birds.
✓ Keep grazing animals off known nesting fields during the critical nesting period (May 1 to August 5).
✓ Maintain approximately 40 percent of the vegetation cover at a height of 8-12 inches, with minimal litter and grass cover. Maintain some patches of bare ground, scattered tall forbs (8-25 inches), and short shrubs for song perches.
✓ Manage multiple, contiguous fields to provide a mosaic of grassland types by mowing, burning, or late-season grazing. Mow every 2-5 years to inhibit establishment of shrubs and trees.
✓ Burn fields every 5-10 years after September 1 or before May 1. Do not burn more than 50 percent of a grassland within a year.
✓ Avoid or minimize herbicide and pesticide applications, or employ integrated pest management techniques.
✓ Limit commercial gravel and sand mining in grasslands and blueberry barrens. Restore old gravel pits and agricultural fields to grasslands and low shrubs.

Globally Important Bird Areas

Northeastern Coastal Maine, including Naval Computer and Telecommunications Station Cutler

Ornithological Highlights: thousands of nesting and wintering seabirds are concentrated here, in addition to thousands of shorebirds, particularly during migration.

Location: area from Great Wass Island up the coast to Cutler Bay
- · *Atlantic Northern Forest* (NABCI Bird Conservation Region #14)
- · *Spruce-Hardwood Forest* (PIF Physiographic Area #28)

Size: linearly this section is about 20-25 miles but incorporates several deep inlets

Ownership: A mix of state and private lands, in addition to U.S. territorial waters. Great Wass Island is owned by The Nature Conservancy; U.S. Navy

Site description: This site extends between Cutler Harbor to the east and Great Wass Island to the west and includes Little Machias Bay, Machias Bay, Englishman's Bay, Little Kennebec Bay, and Eastern Bay. Portions of the towns of Jonesport, Beals, Jonesboro, Machias, Machiasport, Trescott, and Cutler are included. The site as thus defined includes many seabird nesting islands, extensive mudflats, dense stunted spruce cover (similar to that found below the alpine zone), large areas of alder barrens and bogs, and miles of rocky intertidal habitat. The area is adjacent to the area including Machias Seal Island and its surrounding waters.

NCTS Cutler comprises 3,000 acres on Sprague Neck Peninsula. Habitats include rock-bound shoreline cliffs, tidal pools, spruce forest, offshore islands, and 2,200 acres of grassland in the communication tower area. Sprague Neck Bar is designated an Ecological Reserve Area for its significance to tens of thousands of migrating shorebirds.

The ocean off this section of the coast is very cold throughout the year and the many upwells bring nutrients to the surface which are absorbed by phytoplankton, the base of the food chain. Because of the cold water in the outer portion of the bay, pelagic birds as well as whales are often found nearshore.

Birds: This area supports over 70% of the nesting Razorbill in Maine, the only state in which it breeds. In 1997 Old Mann Island had over 100 pairs, Pulpit Rock 10-12 pairs, and Freeman Rock 50 pairs. There are several hundred pairs of Black Guillemot in the area, in addition to more than 1,000 pairs of Common Eider and perhaps as many as 1,000 Leach's Storm-Petrel on the islands. Up to 50,000 Black-legged Kittiwakes winter off the coast. Probably in excess of 30,000 shorebirds use the area at some point during the year. The site is one of the most significant in the U.S. for fall migrating Whimbrel (400 to 700 birds) and White-rumped Sandpiper. Other shorebirds found in significant numbers Semipalmated Sandpiper (12,000-25,000), Semipalmated Plover (1,500-2,500), Black-bellied Plover (800-1,200), Short-billed Dowitcher (1,200-1,500), yellowlegs spp. (700-1,000), and Purple Sandpiper (2,000-3,500).

Short-eared Owl breeds, and the density of nesting Merlin is the highest in the eastern U.S. Bicknell's Thrush may also breed. The headlands along Culter east of Little Machias Bay, the Roque Island Archipelago, the Cross Island group and the Head Harbor Island group of islands support good numbers of nesting Blackpoll Warbler, a species which typically nests at high elevations in Maine. In winter, Harlequin Duck and Barrow's Goldeneye are present, and national high counts for American Black Duck and Purple Sandpiper have been recorded in a Christmas Bird Count circle, which covers part of the area.

Conservation issues: Most of these shorebird species have shown sharp declines over the last 15 years. Counts in the 1980s for these species were as follows: Semipalmated Sandpiper, 20,000-30,000; Semipalmated Plover, 2,500-3,500; Black-bellied Plover, 1,500-2,500; and Short-billed Dowitcher, 2,000-3,500.

Visitor information: The area is of interest throughout the year. Fall migration and winter are good times to visit.

References:

Pierson, E.C., J.E. Pierson, and P.D. Vickery. 1996. A birder's guide to Maine. Down East Books, Camden, ME

WHAT DO I DO IF I FIND A STRANDED ANIMAL?

1. Call for help. If the animal appears to be injured or dead, notify the appropriate authorities. The names and contact numbers of authorized organizations are on the back panel of this brochure. Do not touch the animal or push it back into the water. Doing so can cause the animal to re-strand and die. If it goes back into the water on its own, do not follow it or try to swim with it.

2. Monitor from a safe distance. Remain 100 yards or more away from marine mammals and sea turtles, as marine mammals are protected under the Marine Mammal Protection Act, and sea turtles are protected under the Endangered Species Act.

- Do not get too close or crowd around the animal, for the safety of you and the animal. Remember that these animals are wild and will try to defend themselves, even in a weakened state. They may bite, and you may scare them back into the sea, possibly putting them at even greater risk.
- Protect yourself by not touching the animal. Wild animals can carry many diseases, parasites, and bacteria. Some of these can be transmitted to humans, even if the animal is no longer alive.

3. Watch carefully. Observe the position of the animal (whether or not it is alive) and monitor its breathing. If possible, wait for members of the Northeast Region Stranding Network to arrive so that you can quickly direct them to the animal. They will provide the best possible care for the stranded marine mammal or sea turtle.

HOW DO I CONTACT THE NORTHEAST REGION STRANDING NETWORK?

To report a stranded marine animal, call the closest Stranding Network member and follow the instructions inside this brochure.

MAINE
Allied Whale, College of the Atlantic
207-288-5644 or 207-266-1326

Maine Department of Marine Resources
800-532-9551

University of New England
Marine Animal Rehabilitation Center
207-580-0447

MASSACHUSETTS
Cape Cod Stranding Network
508-743-9548

New England Aquarium
617-973-5247

Whale Center of New England
978-281-6351

Wellfleet Bay Wildlife Sanctuary
508-349-2615

CONNECTICUT/ RHODE ISLAND
Mystic Aquarium Marine Mammal
and Sea Turtle Stranding Program
860-572-5955 ext. 107

NEW YORK
Riverhead Foundation for
Marine Research and Preservation
631-369-9829

NEW JERSEY
Marine Mammal Stranding Center
609-266-0538

DELAWARE
MERR Institute
302-228-5029

MARYLAND
National Aquarium in Baltimore
Marine Animal Rescue Program
410-408-6633 or 800-628-9944

Maryland Department of Natural Resources
Stranding Program
800-628-9944

VIRGINIA
Virginia Institute of Marine Science Sea Turtle
Stranding and Research Program
866-493-1085

Virginia Aquarium & Marine Science Center
757-437-6159

This brochure was developed and produced by the National Aquarium in Baltimore for the Northeast Region Stranding Network through the NOAA Fisheries Prescott Grant Program. Photo credits: Cape Cod Stranding Network, MERR Institute, Marine Animal Rehabilitation Center, National Aquarium in Baltimore, and Virginia Marine Science Museum Stranding Center.

HELPING STRANDED MARINE LIFE

Northeast Region Stranding Network

WHAT IS A STRANDING?

Marine mammals and sea turtles sometimes end up on our shores sick, injured, or dead. Other times, they become entrapped or disoriented and unable to return to their natural habitat without assistance. These events are known as strandings. In some cases, live stranded animals can be rescued, rehabilitated, and returned to the wild. In every case, whether alive or dead, stranded marine mammals and sea turtles reveal valuable information about their lives.

WHY DO ANIMALS STRAND?

Strandings occur naturally, but may also be caused by human behaviors. Natural causes include inability to find adequate food, disorientation in rough waters, or sickness. Human-related causes include fishing, pollution, and boating. Unfortunately, human actions—whether caused by accident or negligence—are responsible for half of all strandings in this region.

WHAT KIND OF STRANDED ANIMALS MIGHT YOU FIND ON OUR BEACHES?

Sea turtles: Most sea turtles are unable to regulate their internal body temperature and may 'cold stun' in frigid waters, a condition similar to hypothermia in humans. Sea turtles also strand due to injuries caused by boat strikes, fishing gear interactions, illness, ingestion of marine debris, and other natural and human-related causes.

Seals: Since seals spend much of their time out of water, stranding network members may watch a seal for 24 – 48 hours to see if it returns to the water on its own. Ice seals, such as harp and hooded seals, often strand with sand or rocks in their stomachs; they mistake these items for ice and consume them. Seals have been found with injuries caused by disease, fishing gear interactions, and gun shot.

Large whales: The Northeast Region experiences an average of 26 large whale strandings per year. Ship strikes are the leading identifiable cause. Entanglement in fishing gear and man-made debris also contributes significantly to large whale strandings.

Small whales, dolphins, and porpoises: These animals may be struck by boats, become entangled in fishing gear, or simply become ill. Some small whales and dolphins will mass-strand (when two or more animals strand together).

If you find a stranded animal, seek immediate assistance.

WHAT CAN WE LEARN FROM STRANDINGS?

Each marine animal stranding gives scientists an opportunity to learn more about strandings, animal health, successful rehabilitation, and the animals themselves. Some marine mammal species are known only from stranded specimens. The samples and physical information collected provide valuable scientific information to help prevent future strandings.

WHAT IS THE NORTHEAST REGION STRANDING NETWORK?

The Northeast Region Stranding Network is made up of 15 organizations from Maine to Virginia authorized by Federal law to respond to strandings. This network plays a vital role in marine mammal research, and ultimately strives to rescue, rehabilitate, and release stranded marine mammals and sea turtles.

MARINE MAMMAL STRANDING RESPONSE FACT SHEET

What is a stranded marine mammal?

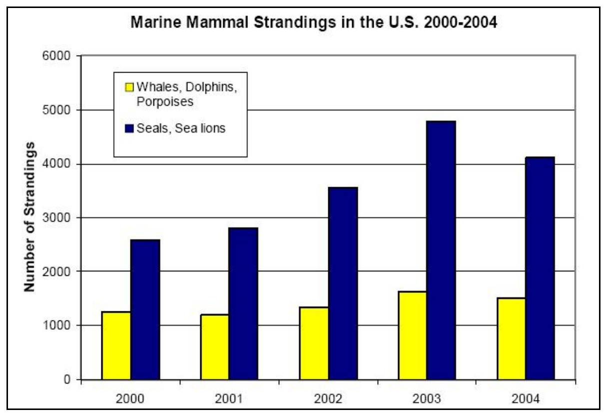
A cetacean (whale, dolphin, or porpoise) is considered stranded when it is on the beach, dead or alive, or in need of medical attention while free-swimming in U.S. waters. A pinniped (seal or sea lion) is considered to be stranded either when dead or when in distress on the beach and not displaying normal haul-out behaviors. Live-stranded animals are usually in need of medical attention or free-swimming but cannot return to their natural habitat without assistance.

Single strandings involve one animal per event and occur frequently, depending on geographic area and time of year. Each year, 2,500 to 6,000 stranded marine mammals are reported to the National Marine Mammal Stranding Network.

Mass strandings involve more than two cetaceans (excluding cow/calf pairs) stranding at the same time and place. Several causes have been determined or implicated, including, but not limited to, extreme weather events, tidal changes, disease of all or a single group member, or human-related events.

Unusual Mortality Events involve strandings or mortalities that occur abnormally (are unexpected, involve a significant die-off of a marine mammal population, and demand immediate response). Special investigation teams are assembled to determine the causes of these events.

Pilot whale mass stranding, New England
Photo by Cape Cod Stranding Network



Why do marine mammals strand?

In many stranding cases, the cause of stranding is unknown, but some identified causes include:

- infectious disease, including parasite infestation
- starvation (e.g., associated with El Niño events)
- pollution exposure
- trauma (e.g., injuries from ship strikes or fishery entanglements)
- sound (human-generated or natural)
- harmful algal blooms and associated biotoxins
- unusual weather or oceanographic events
- ingestion of marine debris

Who responds to marine mammal strandings?

The **National Marine Mammal Stranding Network** created under the Marine Mammal Health and Stranding Response Program consists of over 100 organizations partnered with NOAA Fisheries Service to investigate marine mammal strandings. These stranding networks are established in all coastal states and are authorized through Stranding Agreements from NOAA Fisheries Service regional offices. They consist of professionals and volunteers from nonprofit organizations, aquaria, universities, and state and local governments who are trained in stranding response, animal health, and disease. Through a National Coordinator and six regional coordinators, NOAA Fisheries Service oversees, coordinates, participates in, and authorizes the response activities and provides training to personnel.

MARINE MAMMAL STRANDING RESPONSE FACT SHEET (continued)

What is the response to an unusual mortality event?

In 1992, Congress authorized NOAA Fisheries to establish a Working Group on Marine Mammal Unusual Mortality Events. This group consists of external experts and is consulted when a situation arises where marine mammals are dying in an unusual way. The group determines if the mortality event is "unusual", and recommends an appropriate response.

The group reviews all possible information, including historical data and current population trends, and determines whether or not an event is truly unusual within 24 hours of the initial consultation. After the working group announces their decision, NMFS officially declares the event unusual and appoints an on-site coordinator. If it is deemed unusual, the Working Group will provide advice to NMFS as to what samples should be collected or how the investigation should be conducted.

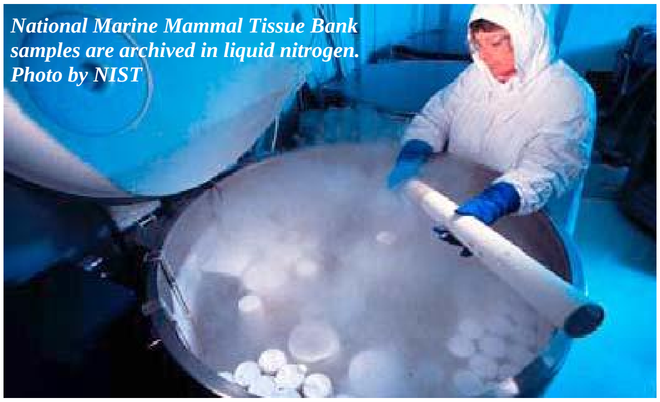
In addition, the group provides advice and possibly assists with the entire investigation. When an event is deemed unusual, money from the Marine Mammal Unusual Mortality Event Fund, which is managed by the National Fish and Wildlife Foundation (NFWF) and NOAA Protected Resources, becomes available to assist with the investigation.

Since 1991, the Working Group has consulted on 33 marine mammal mortality events in the U.S.

For more information on unusual mortality events, visit: http://www.nmfs.noaa.gov/pr/health/mmume/


Bottlenose dolphins from a 2004 unusual mortality event near Panama City, Florida. Photo by NOAA

What is learned from stranded whales and dolphins?


National Marine Mammal Tissue Bank samples are archived in liquid nitrogen. Photo by NIST

Stranding events provide a tremendous amount of information to researchers and resource managers. NMFS facilitates the exchange of information between Stranding Network members to continually improve the response and treatment of animals. The information collected provides many insights into the lives of whales and dolphins including seasonal distribution, natural history, population health, environmental contaminant levels, cases of human interaction, and incidence of disease. In some cases, the only existing information about certain species has been learned from stranding events.

Where can I find more information?

On the Marine Mammal Health and Stranding Response Program website: http://www.nmfs.noaa.gov/pr/health/

APPENDIX J

EAGLE PROTECTION PLAN

Eagle Protection Plan

Naval Computer and Telecommunication Area Master Station Atlantic Cutler

Cutler, Maine

Prepared for:

Prepared by:

Tetra Tech, Inc.
451 Presumpscot Street
Portland, Maine 04103

November 2018

TETRA TECH

TABLE OF CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech) assessed bald eagle (*Haliaeetus leucocephalus*) collision risk with infrastructure at Naval Computer and Telecommunications Area Master Station Atlantic Detachment Cutler (NCTAMSLANT DET Cutler or Installation) for the U.S. Department of the Navy (Navy), Naval Facilities Engineering Command, Mid-Atlantic. In response to U.S. Fish and Wildlife Service (USFWS) concerns and requests for information regarding eagle take in relation to the communication towers and associated antennae and guy wire array at the Installation, Tetra Tech conducted three studies in 2016 and 2017 to document nesting and migratory eagle movements: raptor migration, eagle use, and eagle telemetry. Background research and information collected during these studies informed the development of this Eagle Protection Plan (EPP) for NCTAMSLANT DET Cutler.

In summary, Tetra Tech's research and studies confirmed that high risk classification is warranted because of the high density of eagles in the area, the proximity of nest sites to the Installation, and because eagles were documented in the Installation's hazard area—the 800-acre (324-hectare) area beneath all communication towers and associated antennae and guy wire array that poses a collision risk for birds—during all three studies. Exposure rates were relatively low, however, and eagles demonstrated an overall avoidance pattern of the hazard area. Common forms of adaptive management, typically executed by siting modifications or curtailment, are not an option at the Installation because the towers and guy wires are critical to the military mission. If eagles are injured or killed at the Installation, and the injury or kill is determined to be unavoidable, obtaining an incidental take permit would be prudent. If eagle displacement, injury, or take is attributed to the Installation, the Navy could voluntarily participate in compensatory conservation actions for eagles in Maine.

1.1 Eagle Protection Plan Objectives

This EPP includes findings from previous studies, describes how the Navy plans to employ potential mitigation strategies and best management practices (APLIC 2006, APLIC 2012), and discusses how the Navy can work collaboratively with the USFWS to avoid and minimize impacts specifically for eagles. In addition, this plan was formulated to further evaluate and address the issue of *take* and whether obtaining incidental take permits is warranted at this time. This EPP also proposes eagle impact avoidance, minimization, and mitigation measures to be considered by the Navy for the Installation and outlines a long-term monitoring program to document impacts to and potential take of eagles.

1.2 Installation Overview

NCTAMSLANT DET Cutler is located in the Town of Cutler, Washington County, Maine (Figure 1). The primary mission of the Installation is to provide communication services to ships and submarines. The Installation occupies 3,003 acres (1,215 hectares) and comprises two parcels, but this EPP only assesses eagle collision risk at the Very Low Frequency (VLF) area. The VLF area is approximately 2,896 acres (1,172 hectares) and is situated on a peninsula overlooking the Atlantic Ocean. It is surrounded on three sides by Little Machias Bay to the east; Cross Island, Cross Island Narrows, Little Holly Cove, Big Holly Cove, and the Atlantic Ocean to the south; and Holmes and Machias bays to the west. The panels in each antenna array are supported by 13 main towers, including a center tower surrounded by an inner circular array of six towers and an outer circular array of six towers (Figure 2), and a vast network of associated guy wires. The main towers are approximately 800 to 1,000 feet (244 to 305 meters) tall, and each main tower is supported by one or two counterweights that are supported by towers that are approximately 200 feet (61 meters) tall. Currently, 117 structures are located throughout the VLF area, including winch houses and electrical distribution buildings associated with the antennas and supporting towers, and support and operation facilities. The support and operation facilities include a centrally located transmitter building, two helix houses, a public works shop, a power plant building, and security and administrative buildings. The overall layout of facilities has changed very little since the Installation came online in 1961.

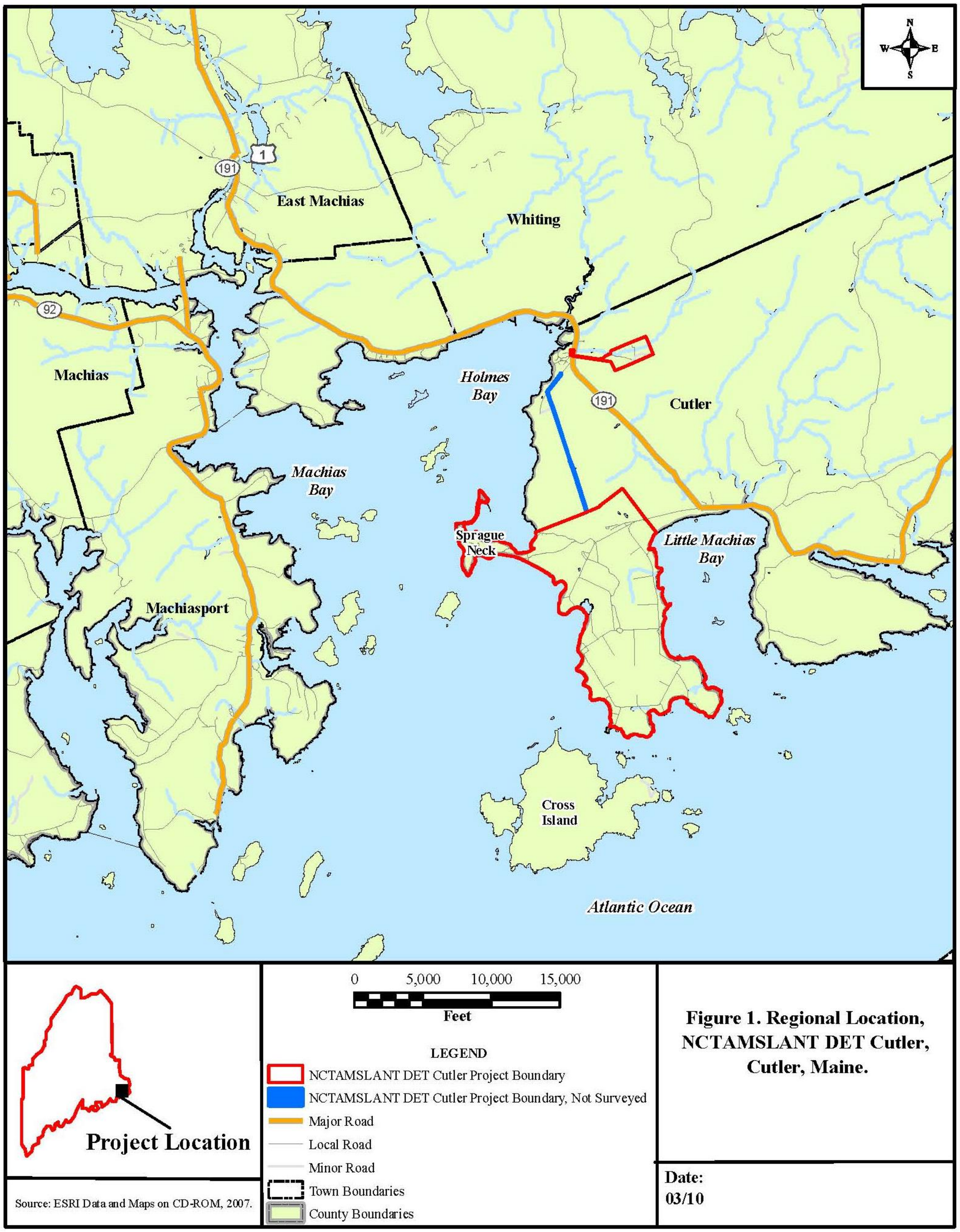


Figure 1. Regional Location Map, NCTAMSLANT DET Cutler, Maine.

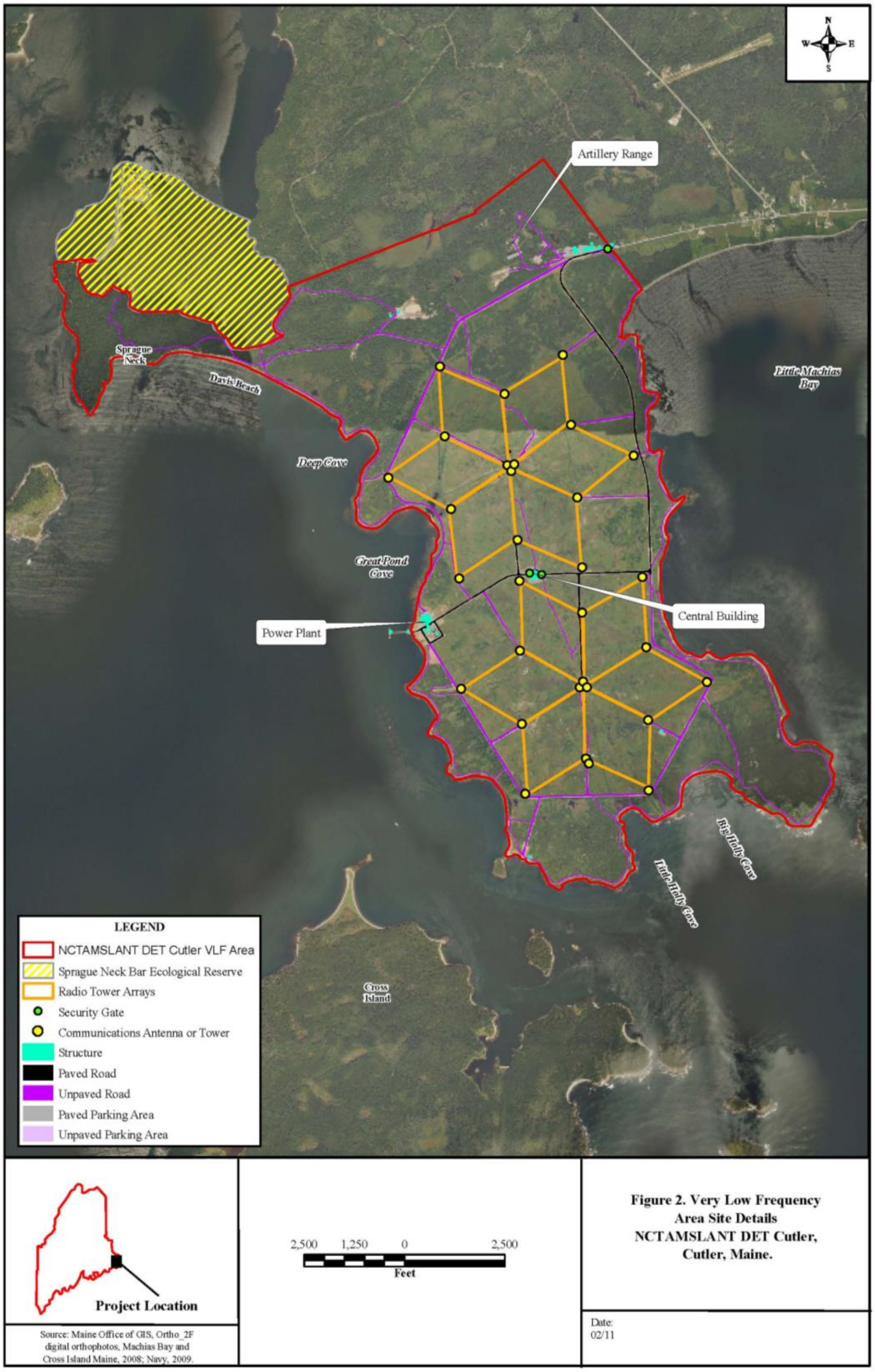


Figure 2. Site Details for the Very Low Frequency Area, NCTAMSLANT DET Cutler, Maine.

1.3 Eagle Risk Assessment

Collision risk and displacement of eagles at the Installation is the focus of this EPP. The Installation's communication towers and associated antennae and guy wire array present direct and indirect risks to birds and bats through three primary factors: direct collision; construction, operation and maintenance activities; and loss of energy reserves when circling towers (Gehring and Walter 2012, USFWS 2016a). Direct mortality through collision is the greatest threat to raptors (Erickson et al. 2005, Gehring et al. 2011, Longcore et al. 2012).

The three studies conducted by Tetra Tech in 2016 and 2017 were the first of their kind for the Installation and, therefore, no published research existed to provide background information for this EPP. In addition, the communication towers and associated antennae and guy wire array at the Installation is unique, further limiting the availability of relevant background research. Published studies, however, are available for bird and bat collisions with other structures at different facilities, and data about eagle population trends and threats in Maine are also available.

Research indicates that birds are at risk of colliding with landscape structures such as communication towers, meteorological towers, wind turbines, lighthouses, and power lines (Shire et al. 2000, Erickson et al. 2005, Manville 2005, Drewitt and Langston 2006, Arnett et al. 2007, Gehring et al. 2009, Gehring et al. 2011). Birds are also susceptible to displacement due to the presence of these structures. Longcore et al. (2012) estimated annual bird mortality from communication towers at 6.8 million in the U.S. and Canada. Collisions with meteorological towers at wind energy projects have also been well documented. Avian risk of collision fatality at towers (including communication towers and meteorological towers) varies depending on tower height, lighting, color, structure, and the presence of guy wires (The Ornithological Council 2007). Avian risk increases with tower height (Longcore et al. 2008). The presence of guy wires substantially increases the risk of avian collisions. Documented collisions are substantially lower at unguyed towers compared to guyed towers thus birds, especially neotropical nocturnal migrants, are suspected to collide more frequently with guy wires and less frequently with the towers themselves (Shire et al. 2000, Longcore et al. 2008, Longcore et al. 2013). In some studies, data has shown that collisions with guyed meteorological towers have represented a greater risk for avian collision than wind turbines (Johnson et al. 2000).

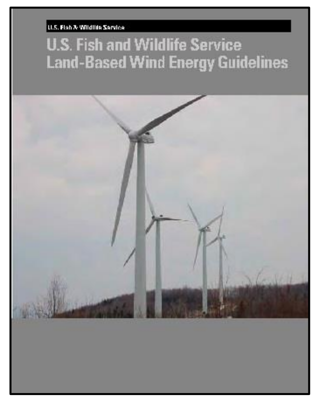
Following national population losses from the pesticide dichlorodiphenyltrichloroethane (DDT), eagle recovery efforts focused on protecting nest sites and territories. These efforts contributed to significant population rebounds in Maine. In the 1970s there were fewer than 30 breeding pairs estimated in the state, which increased to more than 633 nesting pairs and 2,500 bald eagles estimated as of 2015 (DeSorbo et al. 2015). Studies have found that tidal mudflats with little human activity provide the highest quality foraging habitat for bald eagles (Thompson et al. 2005). The availability of multiple food resources (sea ducks, nesting seabirds, fish) and foraging habitats in the coastal region surrounding the Installation likely supports higher densities of eagles and greater survival rates than in other areas of Maine. Eagle longevity records from eastern Maine indicate that it is not uncommon for birds to live beyond 15 years, with a single individual documented to live until 32 years old, which is the oldest of any recorded eagle in North America (MDIFW 2012). Estimates of the wintering eagle population in Maine are not available due to variable distribution, which is likely a response to available food resources and ultimately the seasonal limiting factor in Maine (Todd 2004). During the breeding season, habitat availability is not expected to be a factor on population growth in Maine, although in isolated coastal areas, eagle densities may be high enough that additional population growth is limited (Todd 2004). The density of nest sites in the region surrounding the Installation and the availability of food resources suggest a high density of eagles occupy the area (USFWS 2017). Proximity of nests in a given area can be evaluated to determine the mean species-specific inter-nest distance. Using one-half of the mean inter-nest distance has been a common method to determine territory sizes of raptors (USFWS 2013).

Eagles face a number of anthropogenic threats including a suite of environmental contaminants, trauma (which includes collisions with utility wires, and motor vehicle strikes), electrocution, and intentional shooting or trapping (Todd 2004). Ongoing fatality studies have demonstrated that a variety of avian species, including raptors, are susceptible to direct mortality at the Installation due to collision with the communication towers and associated antennae and guy wire array (Tetra Tech 2017). To date, at least five bald eagles have been killed or seriously injured at the Installation (Navy 2016). The most recent was in the spring of 2013 when an injured eagle was incidentally found between fatality search plots (the eagle was later euthanized). Causes of deaths or injuries were not determined but might have resulted from collision with Installation infrastructure. A lesser known potential risk to avian species from communication towers is the impact of low-level, non-thermal radiation emitted from towers. Studies have documented embryo deformities, but effects of tower-emitted radiation on nesting and roosting wild birds are not fully understood (Manville 2005).

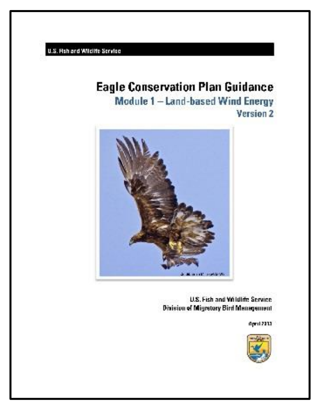
Due to the robust regional population of eagles, proximity of nest sites to the communication tower array at the Installation, and persistent fog that decreases an eagle's ability to perceive obstacles, the risk of collision is considered high.

1.4 Development of the EPP

Tetra Tech sought to follow a standardized approach of risk assessment to eagles at the Installation. The USFWS has published *Interim Guidelines for Communications Tower Siting, Construction, Operation, and Decommissioning Recommendations* (USFWS 2016a). However, these guidelines are limited in scope and are primarily focused on siting and tower sizing, lighting, and visual marker mitigation measures that could be applied during the planning and construction phases of communication tower projects. Since the Installation is unique in terms of its military mission and it was already constructed in the late 1950s and early 1960s, there are no specific guidelines available that completely suit Installation activities for reducing risks to birds and bats.



The *Land-Based Wind Energy Guidelines* (WEG; USFWS 2012) and the *Eagle Conservation Plan Guidance* (ECPG; USFWS 2013) present a multi-tiered approach for addressing risk associated with wind development. Although these guidelines were designed specifically for wind energy projects and are not completely applicable to communication sites such as the Installation, they provide a sound outline for infrastructure related eagle risk assessment. This EPP incorporates applicable elements found in the WEG and ECPG and is organized into sections that loosely follow the multi-tiered approach presented in those guidance documents.



USFWS guidance documents used to develop this EPP

Tetra Tech has been coordinating with the Navy to develop this EPP to represent best management practices and good-faith efforts to minimize impacts to eagles and comply with the Migratory Bird Treaty Act (MBTA). Tetra Tech is currently developing a separate Bird and Bat Conservation Strategy (BBCS) to detail the avoidance, minimization, mitigation, monitoring, and adaptive management at its facility for all migratory birds including bald and golden eagles. This EPP provides specific eagle avoidance, minimization, mitigation, and monitoring measures; and adaptive management practices.

1.5 Regulatory Framework

The Installation has received attention from state and federal agencies in recent years because of its ecological value as a stopover for migratory birds, accompanied by the potential for bird collision with the communication towers and associated antennae and guy wire array (Tetra Tech 2014a, Tetra Tech 2014b). Native birds and bats in North America are protected under a variety of federal and state laws and regulations. At the federal level, these include the Endangered Species Act (ESA), MBTA, Bald and Golden Eagle Protection Act (BGEPA), and the Lacey Act. At the state level, regulatory protections for fish and wildlife species in Maine are provided under the Maine Endangered Species Act (MESA). Although there are exceptions in these laws for military lands, the Sikes Act was created in the 1960 and was amended in 1997 to include Integrated Natural Resources Management Plans to facilitate sustainable resource management while maintaining the capability of the installation to support the military mission (DoD 2004). These regulations are described in the following subsections.

1.5.1 Endangered Species Act

The ESA and its implementing regulations in Title 50 of the Code of Federal Regulations (CFR) Section 17 prohibit the *take* of any fish or wildlife species that is federally listed as threatened or endangered without prior approval pursuant to either Section 7 or Section 10 of the ESA. The purpose of the ESA is “to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservation of these species” (USFWS 2009). Section 3 of the ESA defines *take* as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct” (16 U.S. Code [USC] §1532 (19)). Section 9 of the ESA prohibits take of threatened or endangered species, which includes killing, injuring, or harming a listed species or its habitat. Any activity that may result in the “incidental take” of a threatened or endangered species requires a permit issued from the USFWS under Sections 7 or 10 of the ESA.

ESA Section 7(a)(2) requires each federal agency to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any federally listed threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat (16 USC §1536 (a)(2)). If the actions of a federal agency could affect a federally listed threatened or endangered species, the action must be addressed under Section 7 of the ESA (16 USC §1536 (a)(2)). Section 10 of the ESA allows a non-federal applicant, under certain terms and conditions, to incidentally take a listed species that would otherwise be prohibited under Section 9 of the ESA.

Federal law first listed the bald eagle as endangered in 1978. Following conservation efforts and subsequent increases in population the bald eagle was downgraded to a threatened species in 1995, and then entirely removed from the ESA in 2007 once the national population was fully recovered (USFWS 2009). Although the bald eagle was delisted, eagles continue to receive protection under the BGEPA and MBTA (USFWS 2016b).

1.5.2 Migratory Bird Treaty Act

The MBTA is the cornerstone of migratory bird conservation and protection in the U.S. The MBTA implements four treaties that provide for international protection of migratory birds. It is a strict liability statute, meaning that proof of intent, knowledge, or negligence is not an element of an MBTA violation. The statute’s language is clear that actions resulting in the taking or possession (permanent or temporary) of a protected species, in the absence of a USFWS permit or regulatory authorization, are a violation of the MBTA. For eagles, the BGEPA take authorization (Section 1.5.3) serves as authorization under the MBTA (50 CFR 22.11(b); USFWS 2013).

The MBTA states:

> Unless and except as permitted by regulations … it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill … possess, offer for sale, sell … purchase … ship, export, import … transport or cause to be transported … any migratory bird, any part, nest, or eggs of any such bird …. [The Act] prohibits the taking, killing, possession, transportation, import and export of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior (16 USC §703).

The word *take* is defined by regulation here as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect” (50 CFR 10.12). In summary, any take of migratory birds can be prosecuted regardless of intent. However, the USFWS does not usually pursue legal action if good faith efforts have been made to minimize impacts (U.S. Department of the Interior 2017).

1.5.3 Bald and Golden Eagle Protection Act

The BGEPA prohibits the take of any bald eagle or golden eagle (*Aquila chrysaetos*), alive or dead, including any part, nest, or egg. *Take* is defined here as to “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb” a bald or golden eagle. *Disturb* means to agitate or bother an eagle to a degree that causes or is likely to cause (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. However, the USFWS established a voluntary permit in November 2009 to provide a mechanism to acquire permits for incidental eagle take associated with otherwise lawful activity (50 CFR 22.26). Issuance of such a permit would require consultation with the USFWS and development of an Eagle Conservation Plan (ECP) following the ECPG Module 1 – Land Based Wind Energy (USFWS 2013). Although take permits under the BGEPA are available for bald eagles nationwide and for golden eagles in the western U.S., take permits for golden eagles are not currently permitted in the eastern U.S. The ECPG recommends preparation of an ECP or incorporation of ECP components into a BBCS for projects in areas with eagle-related risk.

Permit requirements relating to incidental take were recently revised for the first time since 2009. Under the new rule “non-purposeful take permits” are now called “incidental take permits” and the maximum length of the permit was extended from 5 years to up to 30 years. Permitted projects are required to consult with the USFWS every 5 years to evaluate compliance with the permit, and permits may be revoked if a project is deemed to be out of compliance (USFWS 2016b). The Installation currently does not have a take permit and is working with the USFWS to evaluate future needs and requirements.

1.5.4 Lacey Act

The Lacey Act was passed in 1900 to protect bald eagles, along with plants and other wildlife species, by making it a federal offense to take, possess, transport, sell, import, or export their nests, eggs and parts that are taken in violation of any state, tribal or U.S. law. It also prohibits false records, labels, or identification of wildlife shipped, prohibits importation of injurious species and prohibits shipment of fish or wildlife in an inhumane manner.

1.5.5 Maine Endangered Species Act

The MESA (12 Maine Revised Statutes Annotated §7751–7759) was passed in 1975 to protect vulnerable species in the state from extinction. The Maine Department of Inland Fisheries and Wildlife (MDIFW) administers MESA and is responsible for monitoring resident fish and wildlife populations. Based on scientific studies, MDIFW determines whether any species should be listed as either endangered (i.e., at risk of becoming extinct in all or a significant portion of its range) or threatened (i.e., likely to become endangered in the foreseeable future). If MDIFW finds that a species merits listing under the MESA, it may make a recommendation to the legislature, which makes the final decisions about listing species pursuant to MESA. Once a species is listed, MDIFW develops protection guidelines, including protecting the species' *essential habitat*. All activities that require a state or local permit within the habitat of an endangered or threatened species are subject to review by MDIFW. Although the Installation is a federal facility, the Navy is required to complete appropriate permitting and associated review by MDIFW per the *federal consistency provision* of the Coastal Zone Management Act for activities that may affect Maine's coastal uses or resources (16 USC §1456).

As of 2017, 45 species of fish and wildlife were listed as endangered or threatened in Maine, either under MESA, the federal ESA, or both. While the federal ESA looks at species status from a national or range-wide perspective, MESA is only concerned with species disappearing from Maine. MESA does not provide formal protections to state species of special concern but does monitor these species to determine if a recommendation for listing pursuant to MESA is warranted.

In Maine, the golden eagle remains listed as endangered, whereas the bald eagle is considered a state species of special concern due to successful management and protection, which has resulted in population growth state-wide (MDIFW 2011). In addition to protection by BGEPA, MBTA, and the Lacey Act, the golden eagle is a Maine endangered species. Golden eagles have the potential to occur at the Installation during migration; however, no golden eagles have been documented at the Installation to date. Golden eagles are not known to nest in Maine and are rarely observed in the state (Mark McCullough, USFWS, pers. comm.). Risk to golden eagles from collision with Installation facilities is low as they are not expected to occur, and do not regularly occur in Maine.

1.6 Agency Consultation

The Navy consulted with the MDIFW, Maine Department of Environmental Protection, and the USFWS during the implementation of the Installation's Integrated Natural Resources Management Plan, and a formal review of that plan by these and other interested state agencies is required every 5 years. The Navy coordinates reviews of bird and bat survey work plans with the MDIFW, USFWS, or both as applicable, prior to initiating field studies. Consultation with these agencies is ongoing and conducted periodically as needed for conservation and protection of rare, threatened, or endangered species under their respective jurisdictions.

2.0 FIELD STUDIES

2.1 Avian Field Studies Summary

Numerous avian and bat surveys have been completed at the Installation since 2009. Tasks related to eagles at the Installation include 3 years of fatality monitoring (Spring and Fall 2015–2017), and a raptor migration study (Fall 2016 and 2017). Eagle nest locations have been documented in the area (USFWS 2014), but no surveys have specifically addressed eagles at the Installation prior to 2016. Therefore, following Stage 2 of the ECPG (Site Specific Surveys and Assessment), Tetra Tech conducted a year-long eagle use study (2016–2017) and an eagle telemetry study (2017). Results of these surveys provide the most current information available for eagles at the Installation throughout the year. This information was used to inform the development of this EPP.

2.2 Raptor Migration Study

Raptor migration surveys were completed at the Installation during the fall 2016 and spring 2017 seasons to establish baseline raptor migration information for the Installation and to document raptor migratory movements in relation to the communication towers and associated antennae and guy wire array, including potential avoidance or non-avoidance behaviors. Non-raptor observations were also documented and proved to be a valuable source of information on eagle use at the Installation.

2.2.1 Methods

The standard survey method of HawkWatch (a program created by the Hawk Migration Association of North America), was used to conduct the migration surveys. The method was expanded, however, to include information on potential hazards specific to the Installation, such as whether the flight path occurred within the Installation or the Hazard Zone. At the Installation, the Hazard Zone includes all areas within the tower fields where individuals might be susceptible to collision with communication towers and associated antennae and guy wire array. Visual counts of migrating raptors and eagles were documented from one primary location and one secondary location that provided views of the skies and surrounding areas. Surveys were carried out within the recommended sampling windows of early September to mid-October (fall 2016) and April to mid-May (spring 2017) to target periods of highest raptor migration activity in Maine.

2.2.2 Results

Ten surveys were conducted during the fall 2016 and spring 2017 seasons for a total of 20 survey events. A total of 260 raptors representing 12 species were recorded during the surveys (Table 1). Bald eagle accounted for most of the observations (n=78, 30%) followed by American kestrel (*Falco sparverius*; n=46, 18%). Flight path locations were concentrated within the Installation (32%) and along the coast (28%), while open water observations accounted for only 6%, with the remaining categories (bar, inland, combination, ridge) consisting of 34% of observations combined. A total of 77 raptors and eagles were observed within the Hazard Zone, and bald eagle was the most commonly recorded species within this zone, representing 36% of the total observations (Table 2). Bald eagle observations dominated both the fall 2016 (n=41) and spring 2017 (n=37) seasons. The species was observed perched on nesting boxes on several occasions throughout the survey period. One adult was observed on a nest box along the northeast shore of the Installation on 07 April 2017, and another was observed on 14 April 2017 perched in a nest box located along the west shore of the peninsula.

Table 1. Cumulative Number of Individual Raptors Observed During the Fall 2016 and Spring 2017 Raptor Migration Study, NCTAMSLANT DET Cutler, Maine.

Common Name	Scientific Name	Total Observations
American kestrel	*Falco sparverius*	46
Bald eagle	*Haliaeetus leucocephalus*	78
Broad-winged hawk	*Buteo platypterus*	3
Cooper's hawk	*Accipiter cooperii*	5
Merlin	*Falco columbarius*	25
Northern goshawk	*Accipiter gentilis*	1
Northern harrier	*Circus cyaneus*	28
Osprey	*Pandion haliaetus*	20
Peregrine falcon	*Falco peregrinus*	11
Red-tailed hawk	*Buteo jamaicensis*	3
Sharp-shinned hawk	*Accipiter striatus*	31
Turkey vulture	*Cathartes aura*	9
Survey Total		260

Table 2. Summary of Species Observed within the Hazard Zone During the Fall 2016 and Spring 2017 Raptor Migration Study, NCTAMSLANT DET Cutler, Maine.

Common Name	Scientific Name	Number of Individuals within Hazard Zone	Percent of Total
American kestrel	*Falco sparverius*	12	16%
Bald eagle	*Haliaeetus leucocephalus*	28	36%
Merlin	*Falco columbarius*	3	4%
Northern harrier	*Circus cyaneus*	11	14%
Osprey	*Pandion haliaetus*	12	16%
Peregrine falcon	*Falco peregrinus*	1	1%
Red-tailed hawk	*Buteo jamaicensis*	2	3%
Sharp-shinned hawk	*Accipiter striatus*	8	10%

2.3 Eagle Use Study

Eagle use surveys were conducted at the Installation from November 2016 to October 2017 to determine how eagles respond to the communication towers and associated antennae and guy wire array, and to evaluate the level of collision risk at the Installation.

2.3.1 Methods

The ECPG defines a project area eagle population as "the population of breeding, resident non-breeding, migrating, and wintering eagles within the project area" (USFWS 2013). To capture bald eagle activity throughout the year, Tetra Tech conducted eagle use surveys at the Installation once per month from November 2016 to October 2017 to adequately survey for all sectors of the population as described in the ECPG. Five point-count locations were established around the perimeter of the VLF tower fields at elevated locations with favorable vantages of the surrounding area. The visible area of the combined survey locations covered the entirety of the hazard area on the Installation.

Each observation was appended with ancillary information including time, activity, lowest flight height, highest flight height, flight direction, minutes below 1,000 meters (vertical), minutes within the hazard area, and additional descriptive notes. This information was used to summarize cumulative eagle use at the Installation and determine the *eagle exposure rate* (eagle-minutes flying within the project foot print per hour per km^2; a standard metric used to characterize level of risk).

2.3.2 Results

Tetra Tech completed 12 days of surveys at the Installation from November 2016 to October 2017, totaling 60 1-hour point-counts or 3,600 minutes of sampling effort (Table 3). Sixty-eight (68) bald eagles were observed during the sampling period; of those, 42 were confirmed as adults, 11 immature, and 15 unknown. A total of 18 eagles were observed in flight or perched within the hazard area during the survey. Most of the observations were made during the spring (21) and the fewest were made in the winter (9). Eagle observations varied greatly by the time of day. When the survey period was divided into morning (before 11:00), mid-day (11:00–13:30), and late-day (after 13:30), the fewest eagles were observed in the morning (14) and late-day (19), and most observations were made mid-day (35).

Table 3. Eagle Use Survey Effort by Survey Location, November 2016–October 2017, NCTAMSLANT DET Cutler, Maine.

Point	Survey Period	Total Surveys	Total Survey Minutes	Eagles Observed
1	November 2016–October 2017	12	720	6
2		12	720	13
3		12	720	29
4		12	720	11
5		12	720	9
Total		**60**	**3,600**	**68**

Table 4. Summary of Eagle Observations by Season, November 2016–October 2017, NCTAMSLANT DET Cutler, Maine.

Date	Adult	Immature	Unknown	Total Eagles Observed
Winter	9			9
Spring	15	9	7	31
Summer	4	2	1	7
Fall	14	0	7	21
Total	**42**	**11**	**15**	**68**

Flight Paths

Eagle flights did occur on the Installation and within the hazard area but collectively illustrated a trend of avoidance regarding the hazard area (Figure 3). Most of the flight paths occurred over open water in Little Machias Bay, and in the area surrounding Mink Island. There were no clear trends in flight locations based upon season. However, eagle flights observed in the summer were more linear and shorter in overall length (i.e., less time was spent soaring). Of the total flight path lengths observed, only 17.4% occurred within the Installation and 4% within the hazard area (Table 5). Half of the total flight paths were recorded in the winter and only 5% in the summer. Of the flights that occurred in the hazard area, nearly 40% of the flight lengths occurred in the spring (Table 5).

Bald eagles flying through the hazard area.

Table 5. Percentage of Total Eagle Flight Path Lengths by Area and Season, November 2016–October 2017, NCTAMSLANT DET Cutler, Maine.

Season	All Flight Paths	Installation[1]	Hazard Area[2]
Fall	23.1	28.9	21.1
Spring	21.5	26.0	39.8
Summer	5.1	9.0	10.0
Winter	50.3	36.1	29.1
Total	**100.0**	**17.4**	**4.0**

[1] Of all flight paths observed, only 17.4% occurred within the Installation. Of the 17.4% that occurred within the Installation, 28.9% occurred in the fall, 26.0% occurred in the spring, 9.0% occurred in the summer, and 36.1% occurred in the winter.
[2] Of all flight paths observed, only 4% occurred within the hazard zone. Of the 4.0% that occurred within the hazard zone, 21.1% occurred in the fall, 39.8% occurred in the spring, 10.0% occurred in the summer, and 29.1% occurred in the winter.

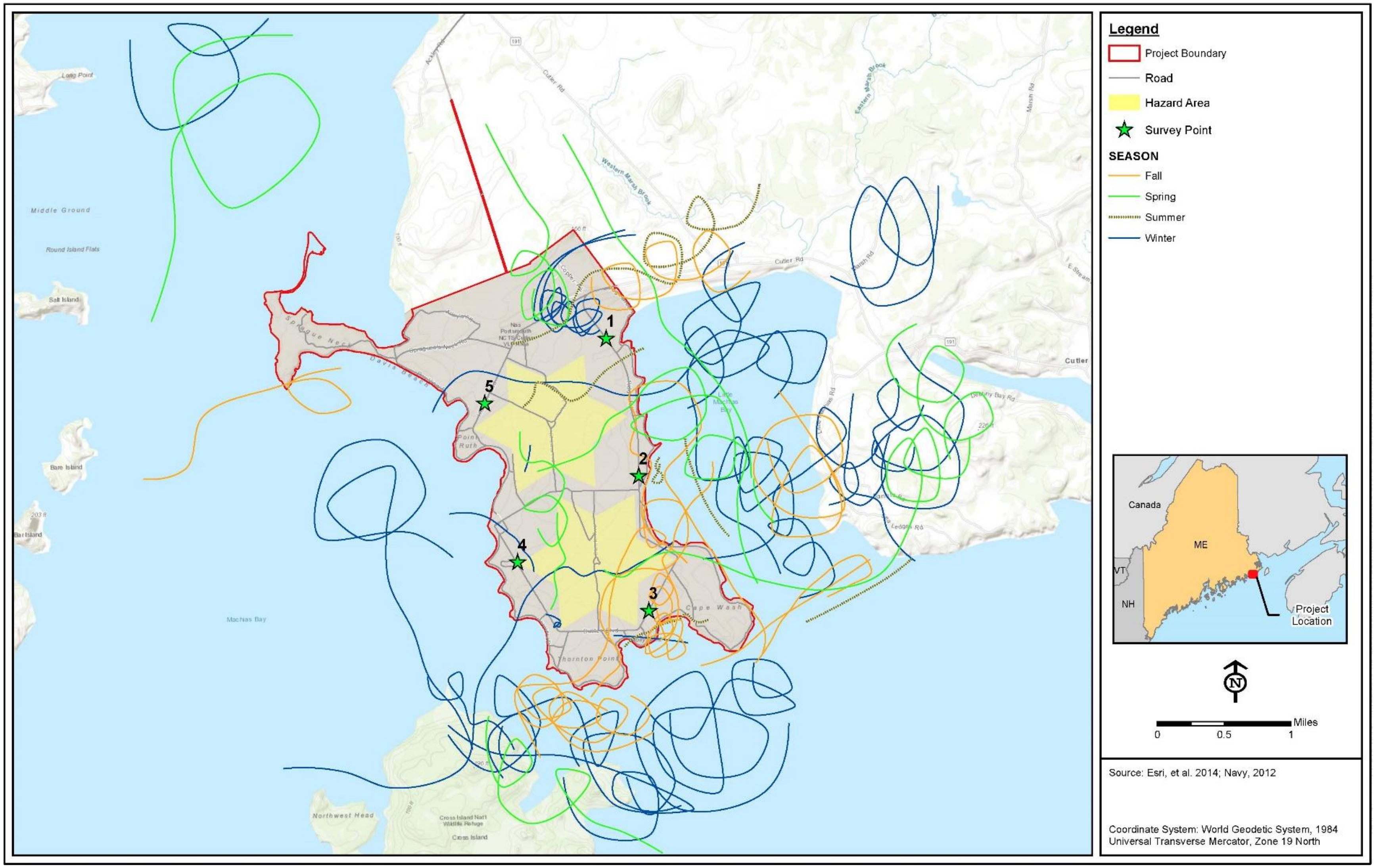


Figure 3. Flight Paths Observed During Eagle Use Surveys and Survey Point Locations, November 2016–October 2017, NCTAMSLANT DET Cutler, Maine.

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Eagle Exposure Rate

Eagles were observed within the hazard area for a total of 79.5 minutes throughout the duration of the survey. This value includes two observations of eagles perching on towers within the Installation on 25 April 2017; one lasting 15 minutes at Survey Point 4 and the other lasting 30 minutes at Survey Point 5 (Figure 3). According to the ECPG, eagle exposure rates only include flight time. Therefore, total eagle exposure time for the survey is 34.5 minutes. Factoring this value into the eagle exposure rate results in 0.015 eagles per hour per square kilometer of hazard area. Where:

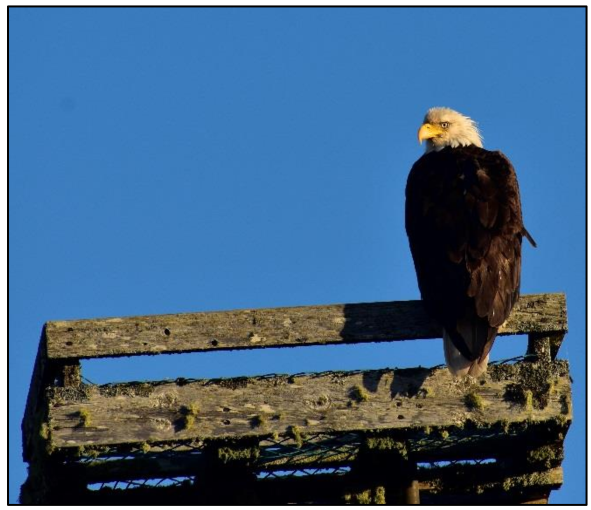
3.1 square kilometers (area of hazard area) x 12 survey events = 37.2 square kilometers total hazard area surveyed

34.5 eagle minutes (flying) = 0.575 eagle hours of exposure

0.575/37.2 = 0.015 eagles per hour per square kilometer

Perch Locations

Eagles were observed at eight perch locations during surveys and incidentally while on the Installation. One observation was made on 12 October 2017 at an old nest box immediately east of the south tower field. A transmitter was observed on this individual and when cross referenced with telemetry data, it was confirmed that this was the Cape Wash eagle. Eagles also were observed on 04 April 2017 at an old nest box on the southwest portion of the Installation. Neither nest box was active, but still used by eagles and osprey (*Pandion haliaetus*) as a perch. On 25 April 2017 two eagles were observed during the surveys perched in towers (perch point east of Point 4 and perch point north of Survey Point 5, Figure 3). Eagles were observed incidentally perched on rocks along the shore on two occasions. Eagles also were observed perched in trees (southeastern most perch on the Installation, within a tall pine east of Little Machias Bay) and along the coast on rocks.



Bald eagle perched on an old nest box.

Bald eagle perched in tower.

Bald eagle perched on rocks.

Inter-Nest Distance

Thirteen (13) primary nesting locations were identified within a 5-mile radius of the Installation. Of those locations, three were occupied by eagles that were instrumented with transmitters by Biodiversity Research Institute (2018; Section 2.4). The mean inter-nest distance was 2,044 meters. One-half of the mean inter-nest distance (1,022 meters) was used as an approximation of territory size and buffered around each nest location (USFWS 2013). Territory buffers at nest sites on Sprague Neck, Mink Island, and Cape Wash overlapped with the Installation, but do not occur within the hazard area. It is unlikely that all the nest sites included in the analysis determining the mean-inter nest distance were active, therefore the territory size estimate is considered conservative.

Incidental Eagle Observations

Five bald eagles were incidentally observed outside of designated surveys (i.e., traveling between point-count stations or on Installation for non-eagle tasks). All individuals were in flight and locations marked on the map represent a centralized flight path location (Figure 3). Of those observations, three individuals were adults and two were immature. An immature eagle observed on 24 May 2017 was the only individual within the hazard area. On this instance, the eagle was being harassed and chased by a northern harrier (*Circus cyaneus*) and the eagle flew directly over the helix house within the centralized area of the VLF at a height of approximately 100 meters.

2.4 Eagle Telemetry Study[1]

Biodiversity Research Institute captured four resident, territorial adult bald eagles in the vicinity of the Installation and fitted them with GPS transmitters to: characterize space use of bald eagles relative to the hazard area in the Installation during the summer-fall period and determine the flight or perch altitude of bald eagles within the hazard area relative to the height of towers (Biodiversity Research Institute 2018). The following is a summary of the 2018 report.

2.4.1 Methods

Nest sites identified in previous surveys by MDIFW guided initial searches by boat on 17 May and 1–4 June 2017 to locate nesting territories and potential bald eagle capture targets within the vicinity of the Installation. Nest sites close to the Installation were prioritized captures.

Four adult bald eagles were captured between 1–4 June 2017. Captured eagles were instrumented with CTT-1000-CDMA series (3rd Generation) GPS transmitters manufactured by Cellular Tracking Technologies (Rio Grande, NJ) using a backpack-style harness made of Teflon ribbon (Bally Ribbon Mills, Bally, PA). Transmitters were programmed to record one GPS fix every 15 minutes, from sunrise to sunset (sunrise and sunset zenith angles: 102 degrees, corresponding to Nautical Twilight). Horizontal and vertical (meters above mean sea level) location estimates were obtained as well as instantaneous speed (in kilometers per hour) during each GPS fix.

Individual bald eagle space use relative to the Installation was characterized by utilization distributions (UD). GPS data fixes recorded from the day after transmitter deployment to a data analysis cutoff date of 28 November at 12:00 UTC (analysis period hereafter) from each eagle was applied to a dynamic Brownian Bridge Movement Model (Kranstauber et al. 2012) to generate UDs. Bald eagle space use and potential collision risks relative to the Installation were evaluated by the proportion and area of the UD of each eagle

[1]Section 2.4 is from the 2018 Biodiversity Research Report: Pilot GPS Telemetry Study: Evaluating bald eagle movements relative to the Naval and Telecommunications Area Master Station Atlantic Detachment Cutler, Cutler Maine. by Chris Desorbo.

overlapping with the buffered hazard area at 50% (commonly referred to as *core use area*), 75% and 95% isopleth levels. The potential collision risks for bald eagles associated with the Installation was assessed by determining vertical GPS fixes within the buffered hazard area with the height of the towers (244 meters [800 feet]; 305 meters [1000 feet]).

2.4.2 Results

The four GPS units instrumented to bald eagles acquired a total of 40,328 GPS fixes with latitude and longitude estimates during the analysis period (2–5 June–28 November). The area of 95% isopleth UDs for instrumented eagles ranged in area from 8.9–89.5 square kilometers. UDs for all four eagles were generally centered on nest sites (Figure 4). The size of the UD for the Sprague Neck eagle was larger than the UDs for the remaining three eagles at all isopleth levels. The UDs for the Sprague Neck and Cape Wash eagles were larger due to brief visits to Deer Island and Campobello Islands in New Brunswick, Canada.

Of the four bald eagles studied, only UDs for the two nesting territories closest to the Installation (Sprague Neck and Cape Wash Island) intersected the Cutler area boundary or the buffered hazard area. No overlap was exhibited by the East Machias River or Little River Island eagles. Of the 333 GPS fixes occurring within the buffered hazard area, 98% (n=328) were fixed by the Cape Wash Island bird, while the remaining 2% (n=5) were fixed by the Sprague Neck bird. All five locations fixed by the Sprague Neck bird were within the radio tower hazard area. GPS locations were fixed within the buffered hazard area on 56 different days between June and November: 10.7% of these days were in June, 7.1% were in July, 7.1% were in August, 21% were in September, 30% were in October, and 23% were in November. Spatial analyses support the assertion that bald eagles nesting closer to the base may have a higher probability of interacting with the radio tower hazard area compared to individuals associated with nesting territories farther away from the Installation during the analysis period. Most of the locations within the buffered hazard area are associated with a common perching area on the southeastern shoreline of the peninsula north of Cape Wash (Figure 4).

Altitudes of the 333 GPS fixes that occurred within the buffered hazard area (5 within the radio tower hazard area, 328 within the 200 meter buffer surrounding it) ranged from 0–519 meters (mean ± standard deviation: 33.2 ± 30.1 meters). All 333 locations occurring within the buffered hazard area were below the height of both the 244-meter (800-foot) and 305-meter (1000-foot) towers except for one GPS fix at 520 meters occurring in the radio tower hazard area.

2.4.3 Discussion

This limited sample may suggest bald eagles have a higher probability of entering into the buffered hazard area during the fall and early winter months (September–November) as compared to the summer months (June–August). This trend may reflect higher mobility in adults after young fledge. Previous satellite telemetry studies in Maine indicated the median date fledgling bald eagles dispersed from nesting territories was 18 September (range: 21 August–21 October; DeSorbo et al. 2015).

Bald eagle use of the buffered hazard area may differ during the winter or spring seasons compared to the time period evaluated in this study. Non-breeding eagles, failed breeders, fledglings, and subadult eagles may exhibit different use patterns compared to the individuals evaluated in this study—all or three-quarters of which were raising young (breeding status was not confirmed for the Cape Wash bird). Higher use of the radio tower hazard area in the winter months compared to the summer months is plausible given bald eagles may opportunistically shift their diets from foraging on fish and birds in the marine environment to scavenging carrion and other food sources in terrestrial habitats.

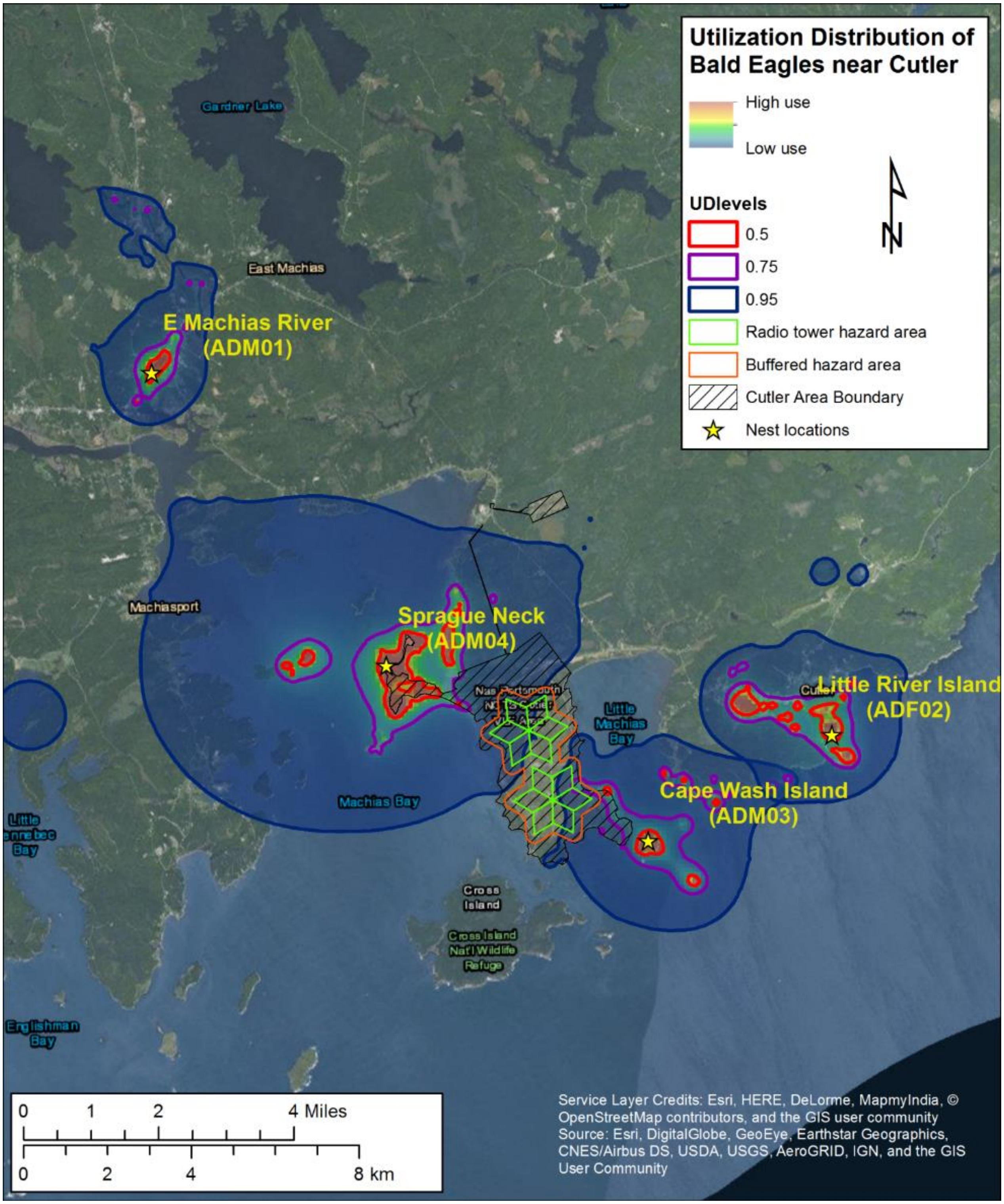


Figure 4. Utilization Distributions of Four GPS Transmitter Instrumented Bald Eagles within the Vicinity of NCTAMSLANT DET Cutler, Maine.

2.5 Avian Fatality Estimates

Although there are many examples of fatality monitoring studies that estimate the number of bird and bat fatalities due to collisions with structures, most of those studies take place at wind energy facilities. The Installation is a unique facility where fatality monitoring studies are unprecedented. Methodologies were refined with lessons learned over the 3-year period from 2015 through 2017.

The mean per plot fatality estimate for small and large birds for all 3 years of the study was 7.77 fatalities per plot. Small birds accounted for 65% of the fatalities and large birds 35% of the fatalities found during searches. Large birds identifiable to species were mostly gulls and ducks. A single American kestrel (*Falco sparverius*) and an unidentified accipiter hawk were the only raptors found during the searches. However, an injured bald eagle was incidentally observed on the Installation by staff during surveys traveling between search plots. Navy staff and the USFWS captured the individual and it was later euthanized due to injuries. The source of injury was not determined but was speculated to be the result from another eagle attack.

The overall mean per plot fatality estimate (7.77 fatalities per plot) is lower than the tall guy-wired communication tower post construction studies reported by Gehring et al. in 2011 (35 bird fatalities per tower) and close to the fatality rate for shorter towers without guy wires (8 fatalities per tower). The Installation has a high density of tall guy-wired towers, a horizontal sky mast, and a geographic coastal location. The Installation's 26 towers are all guyed with a maximum tower height of 1,000 feet (303 meters), with some guy wires extending down to the coastline while other wires connect across an elevated horizontal sky mast. Therefore, cumulative impacts are likely greater at the Installation than typical communication arrays with far fewer towers. Fatalities are clearly biased towards small birds during migration events and may be influenced by lighting. A proportion of the towers also contain Federal Aviation Administration compliant steady burning red lighting. In addition, some of the buildings within the tower field contain non-shielded lighting. Studies have shown that artificial lighting associated with large structures like those at the Installation can negatively impact birds and lead to collisions. Unlike passerines, nocturnal migration is not common for raptors and eagles and lighting may be less of a concern for these species.

Because no eagles were found within plots during the 3-year fatality survey, the primary input for the fatality estimation (observed number of carcasses found during standardized searches during the monitoring year) is zero, and therefore the fatality rate estimation for eagles is zero. Even though no eagle fatalities were documented during the survey, a clear risk remains and can be assessed with a Bayesian Collision Risk Model (Section 3.0).

2.6 Eagle Risk Evaluation Based on Survey Data

Bald eagles accounted for the highest number of observations of all raptor species observed during the fall 2016 and spring 2017 raptor migration study and were observed within the hazard area on 28 occasions during the migration surveys. The number of eagles observed within the hazard area suggests that bald eagles have a potentially greater risk than other raptor species for collision with Installation facilities. During the 2016–2017 eagle use study, bald eagle flight paths collectively illustrated a trend of avoidance in regard to the hazard area. However, bald eagles were observed within the hazard area for a total of 79.5 minutes (34.5 minutes of flight time) and high levels of use were recorded adjacent to the hazard area. Observed flight path lengths were greater in the winter, suggesting eagle exposure may fluctuate between seasons due behaviors associated with breeding, nesting, and shifts in prey base. Despite the high level of use adjacent to the Installation, use within the hazard area remained relatively low, suggesting resident birds exhibit avoidance of known hazards.

The eagle telemetry study revealed that multiple, active eagle nests were located with a 5-mile radius of the Installation and although high levels of use were recorded in the vicinity of the Installation, relatively few fixes were recorded within the hazard area. Most fixes recorded within the buffered hazard area (200 meters within hazard area) were the Cape Wash eagle, which has the closest nest to the Installation. Similar to findings from the eagle use study, results from the telemetry study suggest bald eagles may have a higher probability of entering the hazard area in fall and early winter.

Due to the presence of nests near the Installation and records of eagles within the hazard area, the Installation falls into ECPG *Category 1: High risk to eagles, potential to avoid or mitigate impacts low* because of the location of the eagle nests to the hazards. The ECPG states that the risk category of a project could change as measures to reduce risk are applied. Thus, the risk category is reevaluated after consideration of Avoidance and minimization measures (Section 4.0).

Refer to Summary and Recommendations for Future Study in the 2018 Biodiversity Research Institute report for additional avoidance information.

3.0 PREDICTING EAGLE FATALITIES

A USFWS eagle fatality predication model is provided in the ECPG document (USFWS 2003) and New et al. (2015) to estimate the potential number of annual bald eagle fatalities at a proposed wind facility. The risk of collision is modeled as the mean number of fatalities per year resulting from a Bayesian analysis of the input data, which assumes that risk is proportional to use (USFWS 2013). Bayesian models use existing information to estimate the statistical distribution (referred to as prior probabilities in Bayesian analysis) of variables of interest in a hypothesis test, and then use new data to update the distribution. The USFWS Bayesian model predicts collision risk at a wind farm based on the exposure of eagles to turbines as measured by point-count surveys, and the collision probability. Although data collected during eagle use surveys used a point-count format, the model is built with specific input parameters for wind facilities that factors in the number of turbines and rotor sweep zone to determine hazard area. Using tower information as surrogate input data would introduce additional uncertainty to the model and to further evaluate this model would require additional funding and was not part of Tetra Tech's scope of work. Therefore, Tetra Tech's risk assessment was based on the eagle exposure rates from the eagle use and eagle telemetry studies.

4.0 AVOIDANCE AND MINIMIZATION MEASURES

This step of the ECPG is designed more for preconstruction measures and because the facility has been constructed for over 50 years and the infrastructure that causes collision risk is mission critical, avoidance and minimization measures are limited. To date, most impact avoidance and minimization measures for the VLF area have been geared towards migratory, nocturnal passerines based on results of post-mitigation monitoring, with lighting mitigation the primary focus (Section 2.5). Lighting appears to be less of a risk for diurnal eagles and raptors (Manville 2005), however there are several potential mitigation measures for eagles at the Installation.

- Road-killed animals or other carcasses detected by Installation personnel on or near roads within the Installation boundaries should be removed promptly to avoid attracting eagles or other raptors to the Installation.

- Ospreys (*Pandion haliaetus*) commonly nest in communication towers and there is potential for eagles to take over nest sites. Inactive osprey nests have no special protections under the MBTA and may be removed, although the USFWS only recommends removal if there are no other alternatives. If there are concerns about an osprey or eagle nesting in a problematic location, consider deterring nesting attempts with spider netting or other physical barriers (USFWS 2016a).

- Installing day visual markers or bird deterrent devices on guy wires in known raptor or waterbird concentration areas, daily movement routes, major diurnal migratory bird movement routes, staging areas, or stopover sites may help prevent collisions by these diurnally moving species. However, the efficacy of bird deterrents on guy wires to alert night migrating species has yet to be scientifically validated (Manville 2016). The volume of guy wires and overhead wires at the Installation and the inability to retrofit on existing infrastructure may be prohibitive.

- Further evaluate habitat modifications at the Installation to minimize available prey to eagles. Some habitats may be considered jurisdictional resources and therefore may require federal and state permitting and approval.

- Evaluate the prey base on the Installation for eagles and to what degree waterfowl and ducks are using ponds near the hazard area of the Installation.

- Understand how mowing operations may impact eagles foraging at the Installation.

5.0 POST-MITIGATION MONITORING

The Navy has completed 3 years of spring and fall fatality studies to evaluate the baseline mortality of avian and bat species related to existing conditions at the Installation. No eagles were found during the fatality studies. Depending on project funding and federal budgets additional post-mitigation mortality surveys are recommended. Monitoring for non-raptor fatalities is the primary impetus for additional fatality surveys but information gathered from these surveys can contribute to information on eagles and raptors as well. Additional mitigation information is provided in the BBCS for the Installation. Since no eagles were found during previous fatality surveys, additional eagle use surveys on the Installation might be the best value in understanding use of the Installation by eagles post-mitigation.

6.0 ADAPTIVE MANAGEMENT

There is a lack of viable avoidance measures at the Installation because hazardous infrastructure is critical to the mission and modifications may not be an option. Therefore, adaptive management strategies may serve as an important conservation measure for eagles. Adaptive management depends heavily on collection of baseline information and in the case of the Installation, post-mitigation data as described in Section 5.0. The Navy is committed to avoiding take of bald eagles at the Installation, and has incorporated an adaptive management approach to respond to increased risk, or unforeseen fatality events, by monitoring changes in risk, and by identifying and correcting problems onsite.

Maine’s eagle population has steadily increased since the 1970s (Todd 2004) and an increasing population size or increase in nest density near the Installation would increase risk to eagles. The adaptive management framework outlined in Table 6 provides an increasing level of effort to understand risks and address eagle fatalities should they occur.

Table 6. Summary of Observations and Corresponding Adaptive Management Conservation Measures for Eagles.

Observations	Additional Conservation Measures that could be Implemented as an Adaptive Management Response
Post-mitigation monitoring (i.e. proposed 2-year fatality monitoring and ongoing lighting modifications as described in the BBCS).	If USFWS review of the post-mitigation fatality data determines that there is evidence that eagle use is increasing and avoidance measures (including lighting, carcass removal, or other measures) are unlikely to minimize the risk of take, then the Navy will discuss with the USFWS the need to apply for an Incidental Take Permit for bald eagles.
On an annual basis, monitor best available information from the USFWS and MDIFW on eagle population and nests within a 5-mile or 10-mile radius of the Installation.	If population is increasing or more active nests are within 5 miles of the Installation, conduct additional eagle use surveys to determine if there is an increase in the eagle exposure rate within the hazard area.
Active nests or perches on the Installation are encouraging utilization within or immediately adjacent to the hazard area.	Further evaluate above-ground perching opportunities within the VLF area of the Installation to determine if removal of onsite attractants reduces exposure of raptors to the Installation hazards.
Any eagle injured.	Notify the USFWS within 24 hours or next business day of the injury and facilitate an investigation into the circumstances leading to the casualty. This measure is intended to help focus the response appropriately to address the impact. **Coordinate with the USFWS to determine if a take permit is warranted**.
Any eagle taken.	Coordinate with the USFWS to determine the cause of mortality. If it is an obvious collision, determine if there are any factors that might influence risk. Assess eagle fatalities to determine if the cause or contributing risk factors can be determined (e.g., nest proximity, weather, presence of prey/carrion) based on information gathered by operational personnel and if management response is warranted and feasible. Coordinate with the USFWS about the findings from the assessment. Of primary concern is whether common elements between eagle fatalities exist that indicate the need to perform a more concentrated assessment of the cause of mortality.
If any two eagles taken within any 12-month period or two eagles taken during the proposed 2 years of additional fatality monitoring.	For project-caused fatalities perform additional observational or behavioral studies to further evaluate risk and inform potential conservation measures. For example, additional flight path monitoring that defines seasonal and diurnal flight patterns which may inform future risk reduction plans for the project. Use monitoring results to determine if a risk mitigation plan is appropriate. Coordinate with the USFWS about the findings.

6.1 Experimental Advanced Conservation Practices

A component of the ECPG, Advanced Conservation Practices (ACPs) are defined as "scientifically supportable measures that are approved by the [USFWS] and represent the best available techniques to reduce eagle disturbance and ongoing mortalities to a level where remaining take is unavoidable" (USFWS 2013). Because there is no standardized method, conservation measures are considered "experimental" because effectiveness remains unproven. The most common application of ACPs at wind facilities is curtailment of turbine operation to reduce collision risks at locations or times with elevated eagle use. Collision hazards at the Installation are static and opportunities for collision mitigation are limited. Due to limitations, a potential ACP if eagle take occurs at the Installation would be to establish an offset program.

Compensatory mitigation has been practiced in the U.S. since the 1970s with the goal of offsetting unavoidable damage to the environment caused by development activities in one area by providing compensation through restoring or conserving land in another area, ideally at an equal or higher ratio such that no net loss is achieved (Bull et al. 2014). Wetland banks are the most common application, but conservation or biodiversity offsets are becoming more popular (Burgin 2009).

Based on several statements in the ECPG, it does not appear that compensatory mitigation to offset mortality will be required for the Installation. The ECPG states that if eagle populations are not healthy enough to sustain additional mortality, applicants must reduce the unavoidable mortality to meet the no-net-loss standard (USFWS 2013). As the population in Maine is increasing (DeSorbo et al. 2015), and based on risk assessment from field studies, it is unlikely any potential take will exceed that which cannot be sustained by the local area population. However, as part of the Navy's good faith interest in advancing the conservation of eagles as well as other wildlife, the Navy may choose to pursue an offset program should take occur.

To compensate for known eagle fatalities at the Installation, the Navy could participate in habitat protection, habitat enhancement, and conservation banking to benefit the overall eagle population. Recent telemetry data gathered from eagles around the Installation and the region is providing a gap in knowledge regarding movement patterns and space use. Further analysis of this dataset while the radio transmitters are still functioning would be a valuable option to gain more insight. Non-breeding eagles have also been identified as playing an important role in the recovery of the eagle population, as survival rates for this demographic is the lowest (DeSorbo et al. 2015). Identifying and protecting winter roost locations in the region that are utilized by non-breeding eagles may serve as a surrogate mitigation strategy because of limited options for reducing direct mortality collisions at the Installation.

Another option for consideration is offsite conservation banking based on hot spots identified by the space use studies. Efforts could be made to conserve remote islands or other sites along the Maine coast that provide favorable habitat for eagles with low potential for human disturbance. While compensatory mitigation options outside of the Installation may be beneficial to eagles, implementation may be difficult due to jurisdictional, regulatory, and budgetary constraints.

7.0 CONCLUSIONS

The risk of take of bald eagles at the Installation is high. Eagles use the area on a year-round basis and more than 10 established nest sites occur within 5 miles of the Installation. At least three of the nest sites were confirmed as active in 2017 during the telemetry study. Resident birds demonstrated avoidance of the hazard area and risk may be greater for non-resident birds naive of the collision hazards at the Installation. Risk appears to be higher in the winter and fall periods because resident birds demonstrated limited UDs around active nest sites in the spring and summer. In contrast, birds passed through the hazard area with greater frequency in the fall and winter period. This could be due to more migrants passing through the region or a seasonal behavioral shift by resident birds.

Although risk is considered high and eagles have been documented within the hazard area, eagles have demonstrated an overall avoidance of the hazard area and no bald eagle deaths have been definitively attributed to collision. Therefore, the Navy has chosen not to pursue an eagle take permit for the Installation and the USFWS has not recommended that the Navy obtain an eagle take permit. Should an eagle be definitively injured or killed at the Installation, the Navy will review the causes with the USFWS to determine if collision was the cause and if it could be avoided in the future by adaptive management options. If deemed unavoidable obtaining an incidental take permit at that time would be decided between the Navy and the USFWS.

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APPENDIX K

BIRD AND BAT CONSERVATION STRATEGY

Bird and Bat Conservation Strategy

Naval Computer and Telecommunication Area Master Station Atlantic Cutler

Cutler, Maine

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PRE-FINAL – September2018

TABLE OF CONTENTS

APPENDICES

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

%	percent
ac	acre(s)
ATFP	Anti-Terrorism Force Protection
BBCS	Bird and Bat Conservation Strategy
BGEPA	Bald and Golden Eagle Protection Act
CFR	Code of Federal Regulations
DoD	Department of Defense
ECP Guidance	Eagle Conservation Plan Guidance Module 1 – Land-based Wind Energy, Version 2
ESA	Endangered Species Act
EPP	Eagle Protection Plan
FAA	Federal Aviation Administration
ft	feet/foot
ha	hectare(s)
Hazard Area	800-acre (324-hectare) area beneath all towers and guy wires in the Very Low Frequency area of the Installation
HF	High Frequency
IBA	Important Bird Area
INRMP	Integrated Natural Resources Management Plan
Installation	Naval Computer and Telecommunications Master Station Atlantic Detachment Cutler
m	meter(s)
MAPS	Monitoring Avian Survivorship and Productivity Surveys
MBTA	Migratory Bird Treaty Act
MDIFW	Maine Department of Inland Fisheries and Wildlife
MESA	Maine Endangered Species Act
MOU	Memorandum of Understanding
MTH	mean tower height

Navy	United States Department of the Navy
NCTAMSLANT DET Cutler	Naval Computer and Telecommunications Master Station Atlantic Detachment Cutler
NLEB	northern long-eared bat (*Myotis septentrionalis*)
RTE	rare, threatened, and endangered
SGCN	Species of Greatest Conservation Need
SSC	species of special concern
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VLF	Very Low Frequency

1.0 INTRODUCTION

Bird and Bat Conservation Strategies (BBCSs) are project-specific documents that outline a program to reduce the potential risks of bat and avian mortality that may result from the construction and/or operation of a project. This BBCS documents the bird and bat impact avoidance, minimization, and mitigation measures to be undertaken by the United States Department of the Navy (Navy) at the Naval Computer and Telecommunications Area Master Station Atlantic Cutler, located in Cutler, Maine (NCTAMSLANT DET Cutler or Installation). It has been developed in consideration of Installation operations and activities necessary to support the military mission and describes how the Navy has employed recommendations provided by the United States Fish and Wildlife Service (USFWS) to avoid and minimize impacts to wildlife, primarily birds and bats. Details are provided for the proposed post-mitigation monitoring, and the Navy's commitments to adaptive management for long-term operations of the Installation. Tetra Tech, Inc. was contracted to prepare this BBCS following completion of three years of spring and fall fatality monitoring at the Installation. Relevant avian and bat surveys are summarized in this document as necessary to supplement BBCS mitigation measures. Details regarding operation activities at the Installation that are the drivers for preparation of this BBCS are described in Section 1.4. Eagle conservation measures are not included in this document but are provided in a separate Eagle Protection Plan (EPP) that has been prepared for the Installation.

1.1 Organization of This Document

This BBCS is organized into sections that loosely follows the multi-tiered approach presented in the *Land-Based Wind Energy Guidelines* (USFWS 2012); however, since these guidelines are designed for wind energy projects, they are not completely applicable to communication sites such as the Installation. The USFWS also has published Interim Guidelines for Communications Tower Siting, Construction, Operation, and Decommissioning Recommendations (USFWS 2016a); however, these guidelines are limited in scope and are primarily focused on siting, and other tower sizing, lighting, and visual marker mitigation measures that could be applied during the planning and construction phases of communication tower projects. As the Installation is unique in terms of its military mission and having been previously constructed in the late 1950s and early 1960s, there are no specific guidelines available that completely suit Installation activities for reducing risks to birds and bats.

This document describes Installation avian and bat studies, and impact assessments that have been completed to date, as well as identifies adaptive management measures that will be reviewed and implemented over the long-term operation of the Installation to reduce risks to birds and bats. Appendix A includes a list of rare, threatened and endangered (RTE) avian and bat species that have been documented at the Installation. This BBCS is intended to be a living document that will be reviewed and updated periodically to include new survey data for the Installation, ongoing mitigation measures that are being implemented or revised to reduce bird and bat risk, and to incorporate new technologies and scientific information as they become available.

1.2 Regulatory Drivers

The Installation has received high level of attention from state and federal agencies in recent years because of its important ecological value as a stopover location for migratory birds, accompanied with the potential for bird collision with communication towers at the Installation (Tetra Tech 2014). Native birds and bats in North America are protected under a variety of federal and state laws and regulations. At the federal level, these include the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), and the Lacey Act. At the state level, regulatory protections for fish and wildlife species in Maine are provided under the Maine Endangered Species Act (MESA). These regulations are described in the following subsections.

1.2.1 **Endangered Species Act**

The ESA and its implementing regulations in Title 50 of the Code of Federal Regulations (CFR) Section 17 prohibit the take of any fish or wildlife species that is federally-listed as threatened or endangered without prior approval pursuant to either Section 7 or Section 10 of the ESA.

Section 3 of the ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct" (16 United States Code [USC] §1532 (19)). Harm, in this case, means an act that actually kills or injures a federally-listed wildlife species, and "may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" (50 CFR §17.3). To harass means to perform "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include but are not limited to, breeding, feeding or sheltering" (50 CFR §17.3). In addition, Section 9 of the ESA details generally prohibited acts and Section 11 provides for both civil and criminal penalties for violators regarding federally listed threatened or endangered species.

ESA Section 7(a)(2) requires each federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any federally listed threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat (16 USC §1536 (a)(2)). If the actions of a federal agency could affect a federally listed threatened or endangered species, the action must be addressed under Section 7 of the ESA (16 USC §1536 (a)(2)).

Section 10 of the ESA allows a non-federal applicant, under certain terms and conditions, to incidentally take an ESA-listed species that would otherwise be prohibited under Section 9 of the ESA. When a non-federal landowner wishes to proceed with an activity that is legal in all other respects, but that may result in the incidental taking of a listed species, an Incidental Take Permit, as defined under Section 10 of the ESA, must be obtained. Incidental take is defined as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (50 CFR §17.3). Under Section 10, a USFWS-approved Habitat Conservation Plan is required to accompany an application for an Incidental Take Permit to demonstrate that all reasonable and prudent efforts have been made to avoid, minimize, and mitigate for the effects of the potential incidental take.

1.2.2 **Migratory Bird Treaty Act**

Under the MBTA, 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 received any native migratory bird, part, nest, egg or product. USFWS has established a permitting scheme for a variety of intentional activities, such as hunting and scientific research, but has not done so for the incidental take of migratory birds during otherwise lawful operation of communication towers similar to those that support the military mission at the Installation. However, USFWS will exercise prosecutorial discretion and may not pursue enforcement action under the MBTA if good faith efforts consistent with USFWS guidelines have been undertaken to minimize impacts.

On July 31, 2006 the Department of Defense (DoD) and the USFWS entered into a Memorandum of Understanding (MOU) to promote the conservation of migratory birds in accordance with Executive Order 13186 – "Responsibilities of Federal Agencies to Protect Migratory Birds". The 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 MBTA (DoD and USFWS 2014). The MOU also describes how the USFWS and DoD will work together cooperatively to achieve these ends. The MOU does not authorize take of migratory birds; however, the USFWS may develop incidental take authorization for federal agencies that complete an Executive Order MOU.

The MOU specifically pertains to the following DoD activities:

- Natural resource management activities, including, but not limited to, habitat management, erosion control, forestry activities, agricultural out leasing, conservation law enforcement, invasive weed management, and prescribed burning;
- Installation support functions, including, but not limited to, the maintenance, construction or operation of administrative offices, military exchanges, road construction, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, non-tactical equipment, laundries, morale, welfare, and recreation activities, shops, landscaping, and mess halls;
- Operation of industrial activities;
- Construction or demolition of facilities relating to these routine operations; and
- Hazardous waste cleanup.

It is the intent of this document and ongoing coordination with USFWS and MDIFW representatives to foster successful implementation of the MBTA MOU, and improve the protection, conservation, and management of migratory birds occurring at the Installation.

1.2.3 Bald and Golden Eagle Protection Act

The BGEPA prohibits the take of any bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*), alive or dead, including any part, nest, or egg. "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" a bald or golden eagle. "Disturb" means to agitate or bother an eagle to a degree that causes or is likely to cause (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. However, USFWS established a voluntary permit in November 2009 to provide a mechanism to acquire permits for incidental eagle take associated with otherwise lawful activity (50 CFR Section 22.26). Issuance of such a permit would require consultation with USFWS and development of an EPP following the Eagle Conservation Plan Guidance Module 1 – Land Based Wind Energy (ECP Guidance) (USFWS 2013). Although take permits under the BGEPA are available for bald eagles nationwide and for golden eagles in the western U.S., take permits for golden eagles are not currently permitted in the eastern U.S. The ECP Guidance recommends preparation of an ECP or incorporation of ECP components into a BBCS for projects in areas with eagle-related risk. Bald eagle is known to occur at the Installation, and risks to eagles and adaptive management strategies for eagles are included a separate EPP that has been prepared for the Installation. Golden eagle has not been documented at the Installation.

1.2.4 Lacey Act

The Lacey Act was passed in 1900 to protect bald eagles, along with plants and other wildlife species, by making it a federal offense to take, possess, transport, sell, import, or export their nests, eggs and parts that are taken in violation of any state, tribal or U.S. law. It also prohibits false records, labels, or identification of wildlife shipped, prohibits importation of injurious species and prohibits shipment of fish or wildlife in an inhumane manner.

1.2.5 Maine Endangered Species Act

The MESA (12 Maine Revised Statutes Annotated □7751-7759) was passed in 1975 to protect vulnerable species in the state from extinction. The Maine Department of Inland Fisheries and Wildlife (MDIFW) administers MESA and is responsible for monitoring resident fish and wildlife populations. Based on scientific studies, MDIFW determines whether any species should be listed as either endangered (i.e., at risk of becoming extinct in all or a significant portion of its range) or threatened (i.e., likely to become endangered in the foreseeable future). If MDIFW finds that a species merits listing under the MESA, it may make a recommendation to the legislature, which makes the final decisions about listing species pursuant to MESA. Once a species is listed, MDIFW develops protection guidelines, including protecting the species' "essential habitat". As of 2017, 45 species of fish and wildlife were listed as endangered or threatened in Maine, either under MESA, the federal ESA, or both. While the federal ESA looks at species status from a national or range-wide perspective, MESA is only concerned with species disappearing from Maine. MESA does not provide formal protections to state species of special concern (SSC) but does monitor these species to determine if a recommendation for listing pursuant to MESA is warranted.

1.3 Installation Overview

NCTAMSLANT DET Cutler is located in the Town of Cutler, Washington County, Maine (Figure 1), and was commissioned in 1961. Construction of the Installation began in 1958, with services coming online on 23 June 1961. The primary mission of the military Installation is to provide communication services to ships and submarines operating in the North Atlantic, Arctic Ocean, and the Mediterranean Sea. From the time of inception until the end of the Cold War in 1989, NCTAMSLANT DET Cutler was considered pivotal in the Navy's master plan for instantaneous defense against Soviet Union aggression (Navy 2003). The official mission of NCTAMSLANT DET Cutler is to:

> *"Provide secure and reliable, Strategic and Tactical Command and Control (C2) Telecommunications services to U.S. and Coalition Submarine Services."*

The Installation occupies 3,003 acres (ac) (1,215 hectares [ha]) and comprises two primary parcels: the Very Low Frequency (VLF) and High Frequency (HF) areas. The focus of this BBCS

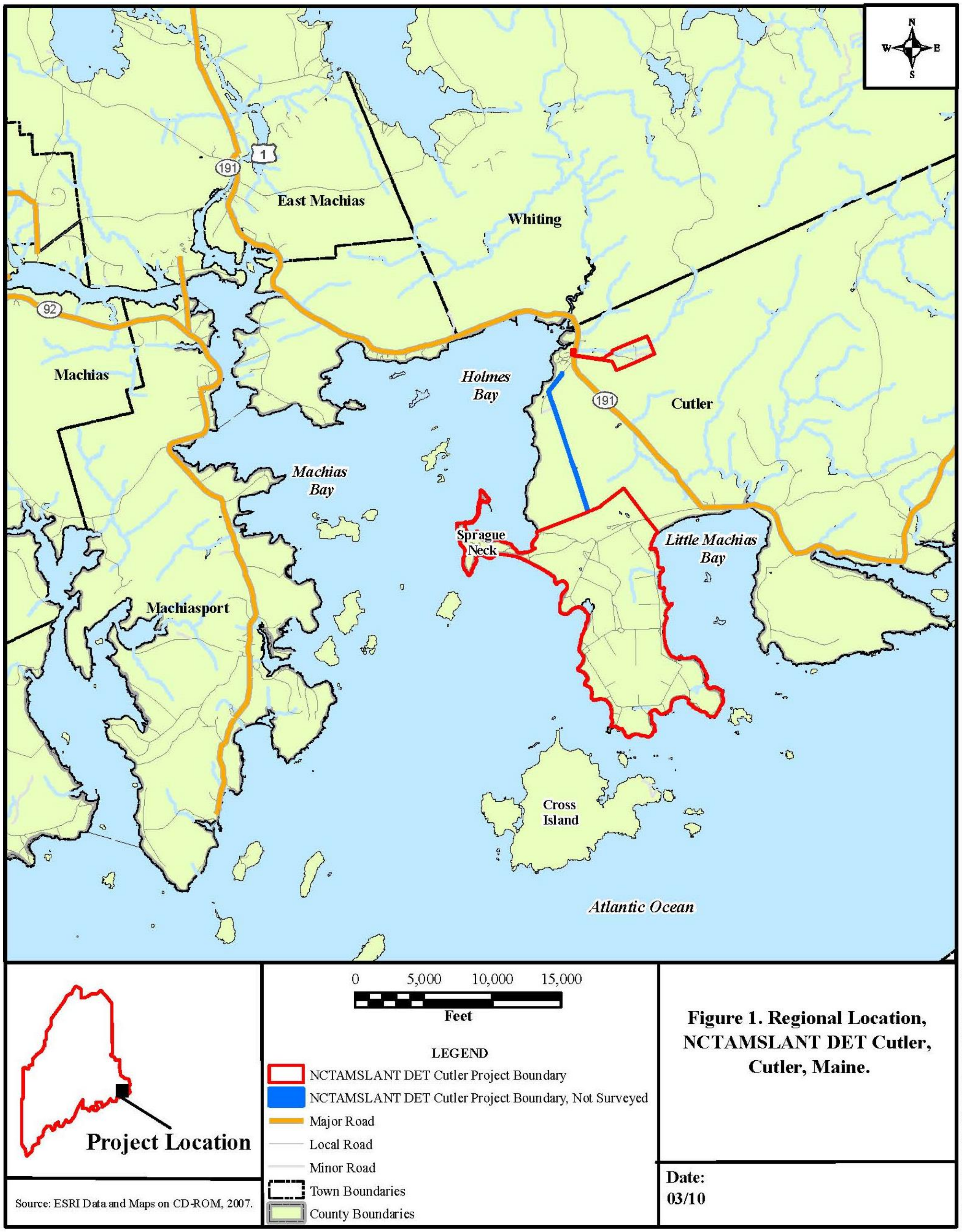
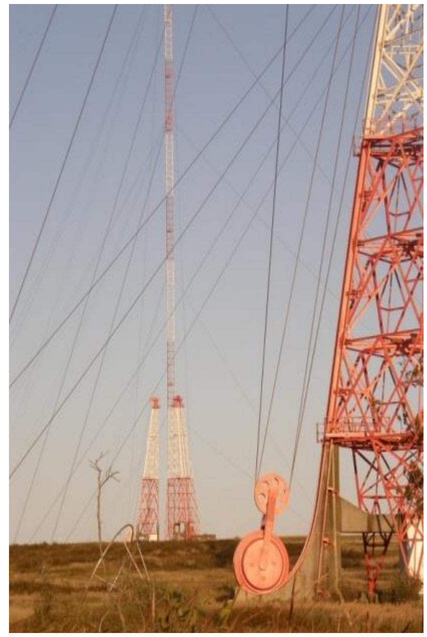


Figure 1. Regional Location Map for the Naval Computer and Telecommunications Area Master Station Atlantic Cutler, Cutler, Maine.

is to reduce bird and bat risk within the VLF area of the Installation. The HF site was decommissioned in 2016.

The VLF area is approximately 2,896 ac (1,172 ha) and is situated on a peninsula overlooking the Atlantic Ocean and is surrounded on three sides by Little Machias Bay to the east; Cross Island, Cross Island Narrows, Little Holly Cove, Big Holly Cove, and the Atlantic Ocean to the south; and Holmes and Machias bays to the west. The panels in each antenna array are supported by 13 main towers, including a center tower surrounded by an inner circular array of six towers and an outer circular array of six towers (Figure 2). The main towers are approximately 800 to 1,000 feet (ft) (244 to 305 meters [m]) tall, and each main tower is supported by one or two counterweights that are supported by approximately 200-ft (61-m) towers. Currently, 117 structures are located throughout the VLF area, including winch houses and electrical distribution buildings associated with the antennas and supporting towers, and support and operation facilities. The support and operation facilities include a centrally located transmitter building, two helix houses, a public works shop, a power plant building, and security and administrative buildings. The overall layout of Installation facilities has changed very little since the Installation came online in 1961.



VLF tower field.

The Installation Fire Station (located off-site), the HF area (consisting of a separate parcel located across Route 191 from the Fire Station), and the Sprague Neck peninsula portion of the VLF (approximately 160 ac [65 ha]) are all part of the Installation but are not used to fulfill the military mission. The Sprague Neck peninsula has been retained in its natural state, with the exception of a recreational cabin that remains. The Navy designated Sprague Neck Bar as an Ecological Reserve Area (ERA) in 1990. The site was selected as an ERA because it provides valuable habitat for a significant number of migratory shorebirds and waterfowl (DoD 1990). The Navy coordinated designation of the ERA with several agencies including USFWS, MDIFW, University of Maine, and The Nature Conservancy; however, no active management of this site has occurred since the ERA designation. Sprague Neck Bar is a long cobble bar extending north from the tip of the peninsula, covering approximately 30 ac (12 ha), and is vegetated predominantly by grasses.

1.4 Consultation History

The Navy has been consulting with the USFWS and MDIFW over the last 7 years. In addition to the avian and bat field surveys implemented recently, Tetra Tech consulted with MDIFW and Maine Department of Environmental Protection during implementation of the Integrated Natural Resources Management Plan (INRMP), and formal review of the INRMP by these and other interested state agencies is required every five years. The Navy coordinates reviews of bird and bat survey work plans with MDIFW and/or USFWS as applicable, prior to initiating field studies. Consultation with these agencies is conducted periodically as needed for conservation programs, protection of RTE species, and facility projects under their respective jurisdictions.

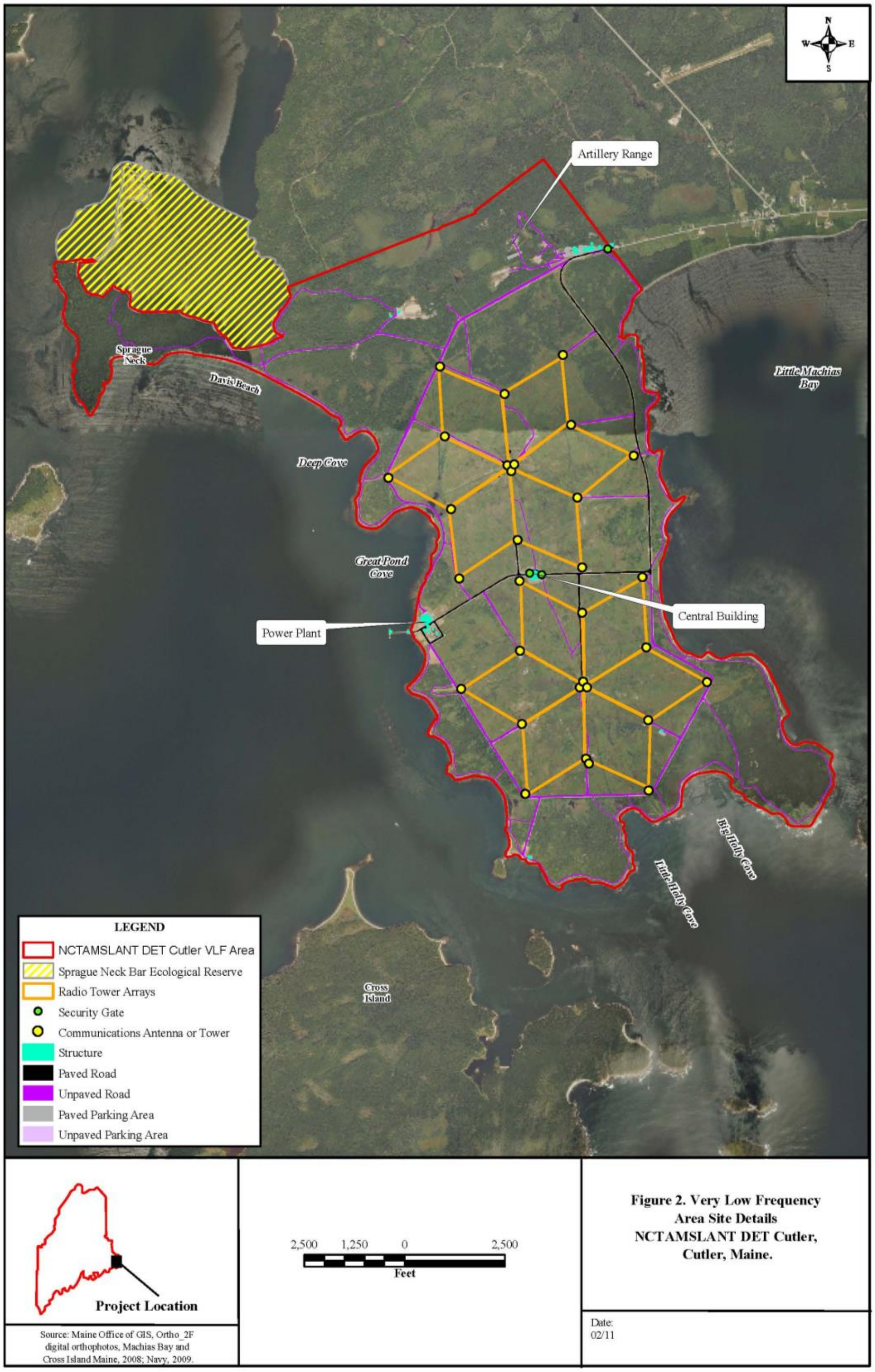


Figure 2. Site Details for the Very Low Frequency Area of the Naval Computer and Telecommunications Area Master Station Atlantic Cutler, Cutler, Maine.

2.0 INSTALLATION CHARACTERIZATION AND FIELD STUDIES

2.1 Installation Characterization

The Installation INRMP provides details of the existing physical and natural resources present at the Installation and natural resources management actions for protection and conservation of these resources. Numerous natural resources surveys have been completed at the Installation, and results of these surveys are incorporated into the Installation INRMP on a periodic basis.

Maine is part of the Atlantic Northern Forest bird conservation region and the Mid-Atlantic/New England/Maritimes water bird conservation region. Coastal regions of the state provide wintering, breeding, and migration habitat for loons, grebes, herons, ducks, geese, falcons, hawks, eagles, shorebirds, owls, nightjars, woodpeckers, songbirds, and others. The area supports substantially higher avian diversity and populations during the spring and fall migration periods and summer residency period. Population sizes and species diversity are substantially lower during the winter.

NCTAMSLANT DET Cutler is an Important Bird Area (IBA) recognized both in Maine and globally (Gallo et al. 2008). Due to the abundance of shorebirds that utilize the area and the presence of numerous species of conservation concern, Sprague Neck meets criteria established by the Maine IBA program. Maine Audubon, with assistance from MDIFW staff, identified sites across the state that provided important habitat for one or more species of breeding, wintering, or migrating birds (Gallo et al. 2008). These sites were then organized by areas (i.e., IBAs) based on their proximity to each other or by ecosystem in which they occur (Gallo et al. 2008). Machias Bay IBA includes the Sprague Neck, Machiasport, Old Man Island, and Libby Island sites.

The Installation represents one of the most species-rich areas, in terms of its size, in the northeastern U.S. for nesting bird species, with 122 species of confirmed breeders plus an additional 13 species classified as probable breeders (Navy 2012). Many bird species utilize Installation habitats as a stopover point during spring and fall migration periods, with 149 bird species documented as migrants either at NCTAMSLANT DET Cutler or within offshore areas within 500 ft (152 m) of the Installation. Six additional species of seabirds have been observed within one mile from shore. Since 1978, more than 286 bird species have been identified at the Installation.

2.2 Field Studies

Numerous avian and bat surveys have been completed at the Installation since 2009 (Table 1). The most recent surveys completed include eagle use, eagle tracking, shorebird, grassland bird, raptor migration, avian radar, and bat acoustics and mist-netting surveys. A 5-year monitoring avian survivorship and productivity survey (MAPS) is ongoing, with Year 4 of the study scheduled to occur in the summer of 2018. The eagle use survey, which included a radio-tracking component was completed in 2017, generated eagle use (tracking) data for resident eagles that utilize the areas in and around the Installation. Finally, three years of fatality monitoring was completed in the fall of 2017 for the VLF area. Results of these surveys serve as the baseline for bird and bat species that are known to occur at the Installation throughout the year, with the fatality monitoring data used to generate yearly fatality estimates for birds at the Installation. Fatality monitoring completed to date has not identified any bat fatalities.

Table 1. Avian and Bat Surveys Performed at the Naval Computer and Telecommunications Area Master Station Atlantic Cutler, Cutler, Maine.

Survey	Taxa	Survey Dates
Breeding Season Point-Count surveys	Avian species	2009
Grassland Bird	Grassland bird species	2009 2016
Shorebird	Shorebird species	2009 2014–2016
Bat Acoustics	Bat species	Fall 2013 2016
Bat Mist-netting	Northern long-eared bat (*Myotis septentrionalis*) and other bat species	2015 and 2016
Avian Acoustic	Avian species	2013 2016
Avian Radar	Spring and Fall Avian Migrants	2013 2016
Focused rare, threatened, and endangered species	Red knot (*Calidris canutus*) and piping plover (*Charadrius melodus*)	2016
Fatality Monitoring	Avian and bat species	Spring and Fall 2015–2017
Eagle Use	Bald eagle	2016/2017
Raptor Migration	Raptor species	Fall 2016 and Spring 2017
Monitoring Avian Survivorship and Productivity	Songbirds	2015–2017 (ongoing)
Eagle Capture and Radio-tracking	Bald eagle	2017

Results of avian surveys completed to date have identified three federally listed species, 15 state listed species, and 43 SSC in Maine as occurring at the Installation (Appendix A, Table 1). Results of bat surveys completed to date have identified one federally threatened species, which also is a Maine endangered species; two other species that are state endangered and state threatened; and five other bat species that are Maine SSC (Appendix A, Table 2). With the exception of the surveys identified in Table 1 that were completed in 2009, survey results are summarized in this section for all avian and bat surveys completed to date. Data from 2009 avian surveys were incorporated into the Installation INRMP and did not include a separate survey report.

2.2.1 **Avian Surveys**

2.2.1.1 Grassland Bird Surveys (2016)

Grassland bird surveys completed in the VLF in June 2016 identified 52 avian species. No RTE species were detected; however, three Species of Greatest Conservation Need (SGCN) in Maine within the grassland bird guild were detected, including bobolink (*Dolichonyx oryzivorus*), field sparrow (*Spizella pusilla*), and northern harrier (*Circus cyaneus*). Overall, 12 SGCN in Maine were detected, including rusty blackbird (*Euphagus carolinus*) (Tier 1 SGCN in Maine). Northern harrier and rusty blackbird are both Maine SSC. Savannah sparrow (*Passerculus sandwichensis*) was the most abundant species observed (26 percent [□] of observations) and common yellowthroat (*Geothlypis trichas*) was the second most abundant species (13□ of observations). Other abundant species detected included (in order of abundance): American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), alder flycatcher (*Empidonax alnorum*), American robin (*Turdus migratorius*), song sparrow, (*Melospiza melodia*), osprey (*Pandion haliaetus*), and swamp sparrow (*Melospiza georgiana*). Red-winged blackbirds (*Agelaius phoeniceus*) were common in tower fields. Although fewer stations were sampled within the HF area, species richness was comparable to the VLF tower field routes, with abundant osprey due to the presence of active nests in the tower array.

2.2.1.2 Shorebird Surveys (2014–2016)

A shorebird survey was completed during the 2014 fall migration period, the 2015 spring migration period, and the 2016 spring and fall migration periods. The 11 shorebird surveys completed in 2014 and 2015 identified 1,719 shorebirds at 10 Installation survey sites, including 15 shorebirds that were identified to species. Three Maine SSC species were identified during the surveys, including lesser yellowlegs (*Tringa flavipes*), semipalmated sandpiper (*Calidris pusilla*), and whimbrel (*Numenius phaeopus*). The nine shorebird surveys completed in 2016 identified 1,130 shorebirds at the 10 Installation survey sites, and also documented presence of lesser yellowlegs and semipalmated sandpiper (a Maine SSC). No state or federally listed shorebird species were observed during the surveys.

In both the 2014□2015 and 2016 surveys, semipalmated sandpiper accounted for the largest group recorded (n□346 and n□450, respectively), followed by semipalmated plover (*Charadrius semipalmatus*) (n□339 and n□307, respectively). In 2014□2015 least sandpiper (*Calidris minutilla*) (n□147) had the third highest observation count (n□147), whereas in 2016 the third highest observation count was observed for sanderling (*Calidris alba*) (n□217). Numbers of small sandpipers, or peeps, observed in 2014□2015 was 698, with only 16 peeps observed during 2016 surveys.

Most observations were made in August and September 2014 and 2016, during the peak of fall migration. Observations dropped off rapidly in October of 2014 and no shorebird observations were recorded during the one survey conducted during the winter of 2014. Similarly, observations in 2016 dropped off rapidly for the surveys completed on and after 12 September 2016, which was reflective of shorebird levels observed throughout the summer.

2.2.1.3 Avian Acoustic Surveys (2013 and 2016)

Tetra Tech conducted avian acoustic surveys in 2013 and 2016. A total of 387 individual birds of 43 species were identified during manual review of the acoustic recording subsample.

The most abundant species detected at the Installation was American crow (n□35), followed by American robin (n□32), and hermit thrush (*Catharus guttatus*) n□22). Several species closely associated with open water or wetlands, including American black duck (*Anas rubripes*) and American bittern (*Botaurus lentiginosus*) were detected, but the majority of birds identified fall under the broad classification of woodland passerines. The highest frequencies of occurrence followed similar patterns of abundance and detectability with American robin (73□), hermit thrush (60□), and American crow (50□) having the highest frequency of occurrence.

Avian acoustic surveys completed in 2016 identified four Maine SSC, including black-and-white warbler (*Mniotilta varia*), yellow warbler, American redstart, and white-throated sparrow.

2.2.1.4 Avian Radar Surveys (2013 and 2016)

Avian radar surveys were performed within the VLF area during the spring and fall of 2013 and 2016, which collected near-continuous radar data that were used to identify the spatial and temporal use of the Installation area by birds and bats during the spring and fall migration periods.

Target passage rates were greater during the fall migration period in both the Installation and nearshore environments. Overall, greater target passage rates occurred in the nearshore airspace in comparison to the area over the Installation for both seasons and both biological periods. A comparison of the two datasets indicate there are some significant differences in day and nighttime passage rates in both Installation and nearshore areas. During the spring migration period at the Installation, the average nighttime passage rates were 2.5 to 3 times higher in 2013 in comparison to observations made in 2016; however, daytime passage rates at the Installation were 1.5 to 2 times higher in 2016 in comparison to 2013 (Table 2). During the fall migration period the average passage rates during the day were about 6 times higher at the Installation and about 4 times higher in the nearshore environment in comparison to 2013 (Table 3). This suggests that passage rates during the day and night periods, as well as seasonally, are highly variable.

Table 2. Spring Passage Rates, NCTAMSLANT DET Cutler.

Statistics	Installation				Nearshore			
	Day		Night		Day		Night	
	2013	2016	2013	2016	2013	2016	2013	2016
Average total passage rate	117	227	667	227	215	321	895	358
Range total passage rate	25–262	0–721	95–1,918	0–838	59–374	0–1,362	91–2,334	0–1,700

Table 3. Fall Passage Rates, NCTAMSLANT DET Cutler.

Statistics	Installation				Nearshore			
	Day		Night		Day		Night	
	2013	2016	2013	2016	2013	2016	2013	2016
Average total passage rate	85	536	547	408	213	931	828	702
Range total passage rate	21–252	14–2,237	48–2,690	12–1,647	99–388	46–3,614	139–3,555	32–2,637

Peak spring migration occurred on 18 May in both areas in 2013, with peak spring migration also occurring on 18 May in the nearshore area in 2016. Peak spring migration at the Installation occurred 10 days later in 2016, with the highest total passage rate occurring on 28 May. Peak fall migration dates were significantly different in 2013 and 2016, with peak fall migration occurring on the night of 14 September and the day of 29 August in 2013. Peak fall migration in 2016 occurred much later, on 14 October for both areas for day and night. These datasets suggest that peak spring migration is expected to occur in mid-late May, whereas peak fall migration may be highly variable, ranging from late August to mid-September, or even later in mid-October.

In comparison to the 2013 datasets, average flight heights during spring migration were lower in 2016 for both areas, with the exception of higher flight heights observed for the nearshore area in 2016 in comparison to 2013 (Table 4). During fall migration, average flight heights were higher in both areas in 2016, with similar flight heights observed at night for both areas in 2013 and 2016 (Table 5). For both spring and fall migration periods the overall percentage of targets flying below mean tower height (MTH) at the Installation was lower in 2016 for both day and nighttime periods. Radar data showed that migrants are using the Installation as a stopover, with targets flying down into the Installation just before sunrise.

Table 4. Spring Flight Heights, NCTAMSLANT DET Cutler.

Statistics	Installation				Nearshore			
	Day		Night		Day		Night	
	2013	2016	2013	2016	2013	2016	2013	2016
Average mean target height (m)	316	217	372	276	218	287	340	333
Average median target height (m)	246	132	297	158	129	173	276	220
Average percent (%) of all targets below max tower height (0–303 meters)	55%	41%	46%	37%	n/a	n/a	n/a	n/a

Table 5. Fall 2016 Flight Heights, NCTAMSLANT DET Cutler.

Statistics	Installation				Nearshore			
	Day		Night		Day		Night	
	2013	2016	2013	2016	2013	2016	2013	2016
Average mean target height (m)	199	304	300	301	86	196	217	192
Average median target height (m)	150	256	246	251	38	137	155	130
Average percent (%) of all targets below max tower height (0–303 meters)	75%	58%	53%	57%	n/a	n/a	n/a	n/a

During nights of spring migration in 2013, target direction was generally northeast. Targets had an average flight direction of 51.4°azimuth and an angular concentration value (r) of 0.809. During the 2016 spring survey period the horizontal radar equipment within the radar unit was not operational, and as such, flight direction data are not available for this survey period.

During days of spring migration, target direction was generally northeast. Targets had an average flight direction of 57.9° azimuth and an angular concentration value (r) of 0.668. These data indicate that targets were a combination of migrants and local individuals, especially given the coastal location of the Installation.

During nights of fall migration, target direction spanned a large spectrum of movement. This night flight direction data may have been influenced by various biological factors such as nightly tracking of targets (i.e., shorebirds, seaducks, seabirds) clustered in the cove to the south. At night, targets had an average flight direction of 322°azimuth (angular concentration value [r] of 0.29) and 266°azimuth (angular concentration value [r] of 0.24) for 2013 and 2016, respectively; indicating that targets were a combination of migrants as well local individuals moving up and down the coast. Average target direction during the fall at night in 2013 was concentrated in the southwest, west, northwest, north, and northeast; and in 2016 was concentrated in the southwest, west, and northwest directions.

During days of fall migration in 2013, target direction had a general southwest orientation, but was more variable in comparison to target direction observed at night in 2016, but was still concentrated in the southwest, west, and northwest directions. Targets had an average flight direction of 250° azimuth (angular concentration value [r] of 0.39) in 2013, and 254°azimuth (angular concentration value [r] of 0.09) in 2016, indicating that targets were a combination of migrants as well as local individuals moving up and down the coast.

2.2.1.5 Focused Rare, Threatened, and Endangered Species Surveys (2016)

Focused surveys for red knot (*Calidris canutus*), a federally threatened species; piping plover (*Charadrius melodus*), a federally threatened species and Maine endangered species; and northern long-eared bat (*Myotis septentrionalis*) (NLEB) (mist-netting), a federally threatened species and Maine endangered species; were completed at the Installation in 2016 and 2017. Results for the bat mist-netting surveys are discussed in Section 2.2.2.2. Survey results did not detect red knot during the nine survey events conducted from the spring through the fall of 2016. During this survey period one piping plover, a federally threatened and Maine endangered species, was observed at Sprague Neck Bar on 01 September 2016.

2.2.1.6 Fatality Monitoring Surveys (2015–2017)

Three years of fatality monitoring were completed at the Installation, in the spring and fall of 2015 (Tetra Tech 2016), in the spring of 2016 (Tetra Tech 2017a), and during the spring and fall of 2017 (Tetra Tech 2018). For the purposes of this and other avian surveys completed for the Installation, the 800-ac (324-ha) area beneath all towers and guy wires is identified as the Hazard Area.

Observed fatalities during standardized searches analyzed using the Huso estimator (Huso 2011) estimated the adjusted number of fatalities for all 3 years of the Study within the mean study area for small and large birds combined was 1,245 fatalities. The mean per plot estimate was 7.77 fatalities per plot, and the mean adjustment factor was 16. The lowest study area total estimate by season from all 3 years was 372 fatalities (95□ CI □243–639) in fall 2017, and the highest estimate by season was 1,806 fatalities (90□ CI □243–639) in spring 2015. For small birds, the lowest study area total estimate was 247 fatalities (95□ CI □144–436) from fall 2017, and the highest estimate for small birds was 1,211 fatalities (90□ CI □748–2,249) from spring 2016. For large birds, the lowest study area total estimate was 124 fatalities (95□ CI □43–252) from fall 2017, and the highest estimate for large birds was 206 fatalities (90□ CI □143–361) from spring 2016. Poor visibility during the fall 2017 survey, due to the lack mowing with the search plots, likely impacted fatality searching and, ultimately, fatality estimates for that season.

The Installation is a unique facility and thus there are no similar documented studies that can serve as good comparisons to the results of this study. To place bird fatalities at the Installation in the context of other fatality studies, however, bird fatality estimates at 10 wind energy projects in Maine that also used the Huso estimator were reviewed. Wind energy projects in Maine range from 1.5 to 10.4 fatalities□turbine□year with a mean of 5.8 fatalities□turbine□year. Based on the 3 years of data collected for this study, the mean per plot bird fatality estimate at the Installation falls within the range for wind energy projects but is higher than average with a higher upper confidence limit.

2.2.1.7 Eagle Use Survey (2016 and 2017)

An eagle use survey was completed using a survey design based on standards described in USFWS' *Land-Based Wind Energy Guidelines* (USFWS 2012) and the ECP Guidance. The objective of the survey was to determine how eagles respond to communication towers and the associated wire array and evaluate the level of collision risk at the Installation's Hazard Area.

Eagle use surveys were completed once per month from November 2016 to October 2017 (12 days) at five point-count locations established around the perimeter of the VLF tower fields. One-hour point counts were conducted at each location during suitable weather conditions (i.e. no precipitation, favorable wind direction for migration, no fog). USFWS eagle nest data (USFWS 2017) was used to calculate the bald eagle inter-nest distance of nests identified in a 2014 survey within a 5-mi radius of the Installation.

Sixty-eight (68) bald eagles were observed during the sampling period, 42 of which were confirmed as adults, 11 immature and 15 unknown. A total of 18 eagles were observed in flight or perched within the Hazard Area during the survey. The majority of observations were made during the spring (21) and the least in the winter (9). Throughout the daylight period of the surveys, the fewest eagles were observed in the morning (14) and late-day (19), with the majority of observations made mid-day (35). Eagle flights did occur on the Installation and within the Hazard Area but collectively illustrated a trend of avoidance in regard to the Hazard Area. Eagles were observed as far north as Holmes Bay and overland of the peninsula east of Little Machias Bay nearing the town of Cutler, Maine. The majority of the flight paths occurred over open water in Little Machias Bay, and in the area surrounding Mink Island. There were no clear trends in flight locations based upon season; however, eagle flights observed in the summer were more linear and shorter in overall length (i.e., less time was spent soaring). Of the total flight path lengths observed, only 17.4% occurred within the Installation and 4% within the Hazard Area. Nearly half of the total flight paths were recorded in the winter and only 5% in the summer. Of the flights that occurred in the Hazard Area, nearly 40% of the flight lengths occurred in the spring.

Eagles were observed within the Hazard Area for a total of 79.5 minutes throughout the duration of the survey and includes two observations of eagles perching on towers within the Installation on 25 April 2017 (15 minutes and 30 minutes each at separate survey points). Excluding this data (since eagle exposure rates only include flight time per the ECP Guidance), total eagle exposure time for the survey was 34.5 minutes. Eagles were observed at eight perch locations during surveys and incidentally while on the Installation. Thirteen (13) primary nesting locations were identified within a 5-mile radius of the Installation, three of which were occupied by eagles that have been equipped by Biodiversity Research Institute with radio-tracking transmitters (see Section 2.2.1.10). The mean inter-nest distance was 2,044 m. One-half of the mean inter-nest distance (1,022 m) was used as an approximation of territory size and buffered around each nest location. Territory buffers at nest sites on Sprague Neck, Mink Island, and Cape Walsh overlapped with the Installation, but do not occur within the Hazard Area. It is unlikely that all the nest sites included in the analysis determining the mean-inter nest distance were active, therefore the territory size estimate is considered conservative.

Findings from this survey were used to develop a separate EPP that will be included as an element of the Installation INRMP. In addition, these findings are being used to determine if the need for an Incidental Take Permit for the Installation is warranted.

2.2.1.8 Raptor Migration (Fall 2016 and Spring 2017)

Raptor migration surveys were completed at the Installation in the fall 2016 and spring 2017 (10 surveys during each season) using the Hawk Migration Association of North America's program HawkWatch standard method and expanded to include information on potential hazards specific to the Installation. A total of 260 raptors representing 12 species were recorded, with bald eagle accounting for the majority of the observations (n=78, 30%) followed by American kestrel (*Falco sparverius*) (n=46, 18%). Flight path locations were concentrated within the Installation (32%) and along the coast (28%), while open water observations accounted for only 6%, with the remaining categories (bar, inland, combination, ridge) consisting of 34% of observations combined. A total of 77 raptors were observed within the Hazard Area, and bald eagle was the most commonly recorded species within this zone, representing 36% of the total observations.

2.2.1.9 Monitoring Avian Survivorship and Productivity (2015–2017, ongoing)

In June 2015 Biodiversity Research Institute initiated a 5-year MAPS study at the Installation. MAPS Protocols use standardized, constant effort mist-netting and banding during the breeding season at locations throughout North America. The methodology provides annual indices of adult population size and post-fledgling productivity from data on number and proportion of first year and adult birds captured. It also provides estimates of adult annual survivorship, population size, proportion of resident individuals in the adult population, recruitment to the adult population, and population growth from mark-recapture data of banded adult birds (DeSante et al. 2015).

In 2015 the survey captured a total of 108 birds representing 17 species were captured, of which 23 birds contained bands, and 84 birds were banded. In 2016 a total of 111 birds representing 18 species were captured, of which 34 birds contained bands, and 76 birds were banded. Of the banded birds captured, 11 individuals were originally banded in the 2015 survey effort, which represents a return rate of 13.1□ (11 of 84). In 2017 a total of 276 birds representing 23 species were captured, of which 196 birds were banded and 80 birds were captured with bands. Of the birds captured in 2017 that had been previously banded, 17 individuals were originally banded at the Installation in previous years of this MAPS survey, including nine originally banded in 2015 and eight originally banded in 2016.

2.2.1.10 Eagle Radio-Tracking

In 2017 an eagle radio-tracking project was implemented to provide information on bald eagle movements relative to the hazards associated with the Installation. Four resident, territorial adult bald eagles were captured in the vicinity of the Installation and fitted with global positioning system transmitters, including one bald eagle that occupied a nest located on Sprague Neck at the Installation. Data collected between 2–5 June 2017 and 28 November 2017 determined that the range area for these eagles were between approximately 9 and 90 kilometers, with distribution generally centered around nest sites. Movement data collected as part of this survey does not suggest that bald eagles in the vicinity of the Installation exhibit high use of the Hazard Area, relative to their use of the surrounding region. Nesting territories located on or closer to the Installation have a higher probability of entering or perching within the Hazard Area in comparison to individuals that were documented to nest further from the Installation. Based on the survey data, bald eagles are expected to exhibit higher use of the Installation in the winter months in comparison to the summer and fall months due to increased used of terrestrial-based food resources such as carrion and road-killed mammals.

2.2.1.11 Other Avian Surveys

Other historical avian surveys conducted at the Installation have identified grasshopper sparrow (*Ammodramus savannarum*) (a Maine endangered species), upland sandpiper (*Bartramia longicauda*) (a Maine threatened species), and short-eared owl (*Asio flammeus*) (breeding population is a Maine threatened species) (Navy 2012). Short-eared owl was reported as a fatality during 2016 fatality surveys (Tetra Tech 2017a). Other birds of prey, such as the snowy owl (*Bubo scandiacus*) and rough-legged hawk (*Buteo lagopus*) occur at the Installation during the winter months (Navy 2012, Tetra Tech pers. comm. 2017).

2.2.2 **Bat Surveys**

Two categories of bats occur in Maine: long-distance, migratory, tree or tree crevasse roosting bats (Lasiurines), and bats that hibernate in regional hibernacula or human-made structures and generally make shorter regional movements (Myotids and allies). A fungal disease epidemic, white nose syndrome, is known to occur in Maine, and affects bats that hibernate. Over the past decade, this disease has decimated populations of Myotids throughout North America (USFWS 2015). In response to these rapid population declines the USFWS listed NLEB, which occurs in Maine, as threatened. Little brown bat (*Myotis lucifugus*) is currently not listed or protected by the federal ESA, however, the species is under consideration for listing by USFWS are part of a discretionary status review in 2023 per the USFWS national listing workplan (USFWS 2016b). However, little brown bat is a Maine endangered species.

2.2.2.1 Bat Acoustic Surveys (2013 and 2016)

Bat acoustic surveys were completed at the Installation in 2013 and 2016. Tetra Tech designed the acoustic monitoring surveys in accordance with the recommendations outlined within Tier 3 of the voluntary USFWS Land-Based Wind Energy Guidelines (USFWS 2012) and the 2016 Range-Wide Indiana Bat Summer Survey Guidelines for presence/absence surveys (USFWS 2016c). To ensure that the greatest period of bat activity was surveyed, bat detectors were programmed to begin recording an hour before sunset and stop recording approximately an hour after sunrise each day.

Results for acoustic sampling at four Installation locations in 2013 and five locations in 2016, documented all eight bat species that occur in Maine: big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), eastern small-footed bat, little brown bat, NLEB, and tri-colored bat (*Perimyotis subflavus*). NLEB is a federally threatened species and a Maine endangered species. Little brown bat is a Maine endangered species and eastern small-footed bat is a Maine threatened species. Tri-colored bat is currently under USFWS review for federal listing. Big brown bat, silver-haired bat, eastern red bat, hoary bat, and tri-colored bat are all Maine species of special concern.

2.2.2.2 Bat Mist-Netting (2015 and 2016)

Mist-netting completed at the Installation in did not capture any bats. Mist-netting completed in 2016 captured two eastern red bats during the 09–11 August 2016 nine net-night survey. Both bats captured were reproductive adult males. No bats exhibited any noticeable wing damage due to white nose syndrome (bats were 0 on Reichard Wing Damage Index). Both bats exhibited physical wing damage, such as pinholes or healed tears, that are common and do not signify poor health of the individual or species. An emergence count was conducted for three nights at the suspected roost site at the abandoned cabin on Sprague Neck. No bats were observed leaving the cabin or picked up in the portable bat acoustic detector on any night.

3.0 IMPACT ASSESSMENTS

The following sections describe Installation activity risks to birds and bats. The impact assessment utilizes fatality data and estimates from spring and fall fatality monitoring completed at the Installation in 2015–2017. This impact assessment is limited to bird and bat risk from collision with Installation infrastructure, mainly towers and guy wires, and does not include an assessment of risk from electrocution or disturbance. Comparison of fatality estimates to other similar facilities is not feasible, due to the limited data available on bird and bat risk assessments and fatality data for communication sites. Communication studies are cited where available and applicable to the Installation.

3.1 Fatality Estimates

Birds have been identified as a group potentially at risk of collisions with structures within the landscape such as communication towers, wind turbines, lighthouses, and power lines, as well as displacement due to the presence of the associated structures (Shire et al. 2000, Manville 2005, Erickson et al. 2005, Drewitt and Langston 2006, Arnett et al. 2007, Gehring et al. 2009, Gehring et al. 2011). Longcore et al. (2012a) has been estimated annual bird mortality at communication towers is 6.8 million in the U.S. and Canada, most of which are expected to be neotropical nocturnal migrants (Shire et al. 2000, Longcore et al. 2013). Avian collision mortality occurs during both the breeding and migration seasons, but observed mortality at communication towers, buildings, wind turbines, and other man-made structures suggest that the majority of fatalities occur during spring and fall migration (National Research Council of the National Academies 2007). Bird fatality rates have been observed to peak during the spring and fall migration seasons at most wind energy facilities (Erickson et al. 2014). Based on fatality studies at wind generation facilitates, shorebirds and cranes appear to have a low risk of colliding with wind turbines or communication towers.

Collisions with meteorological towers at wind projects have been well documented, and in some cases, collisions with guyed meteorological towers have represented greater risk of avian collision in comparison to wind turbines (Johnson et al. 2000). Avian risk of collision fatality at towers (including meteorological towers and communication towers) varies depending on tower height, lighting, color, structure, and the presence of guy wires (The Ornithological Council 2007). Avian risk increases with tower height (Longcore et al. 2008). Guywires substantially increase the risk of avian collision since birds are suspected to collide more frequently with guywires and not as frequently collide with the tower itself, as documented collisions are substantially lower at unguyed towers (Longcore et al. 2008). One study showed that unguyed, shorter towers (381–479 ft [116–146 m] above ground level), had fewer avian fatalities than taller (□ 1,001 ft [305 m]) towers with guy wires (Gehring et al. 2011). Taller guy-wired towers averaged 35 bird fatalities per tower during a 20-day sampling period, whereas shorter towers averaged eight bird fatalities for the same sampling period (Gehring et al. 2011).

Currently, 117 structures are located throughout the VLF area including support and operation facilities, which includes electrical distribution buildings associated with the antennas and supporting towers. The Installation communication towers and guy lines present direct and indirect risks to birds and bats through three primary factors: 1) direct collision, 2) construction, operation and maintenance activities, and 3) loss of energy reserves when circling towers

(Gehring and Walter 2012, USFWS 2016d). Direct mortality through collision is the greatest threat to raptors (Erickson et al. 2005, Gehring et al. 2011, Longcore et al. 2012a and 2012b), and collision risk for eagles was the focus of this study.

The mean per plot fatality estimate for small and large birds for all three years of the Installation fatality study was 7.77 fatalities per plot. This rate is lower than the tall guy-wired communication tower post construction studies reported by Gehring et al. in 2011 (35 bird fatalities per tower) and close to the fatality rate for shorter towers without guy wires (eight fatalities per tower) (Tetra Tech 2018). The Installation's 26 towers are all guyed with a MTH of 303 m, with some guy wires extending down to the coastline while other wires connect across an elevated horizontal sky mast. Thirteen of the 26 towers also contain Federal Aviation Administration (FAA) compliant red strobed and non-strobe lighting.

Studies have shown that artificial lighting associated with large structures similar to those at the Installation can negatively impact birds and lead to collisions (see Section 3.4). Recent work has been conducted to better understand fatality rates at communication towers and to evaluate bird-friendly lighting options and best management practices to help mitigate collision risk (Longcore et al. 2008, Gehring et al. 2009, Longcore et al. 2012a). In 2015, the FAA released a new advisory circular which addresses nocturnal migrants and is allowing more bird friendly lighting regimes (flashing lights) to be compliant. The radar data, coupled with the fatality estimates, provides evidence that nocturnal migrants are flying within the Installation array of towers during both the spring and fall migration periods. The fatality data collected to date shows a proportion of these migrants are colliding with the Installation infrastructure. Weather events that overlap with peak migration increases the risk for collision.

Recent fatality results from wind energy projects can provide an additional means of evaluating large structures and impacts to birds and bats in greater detail (Erickson et al. 2001, Drewitt and Langston 2006, and Strickland and Morrison 2008). Migrant passerines (e.g., songbirds) are found more often in post-construction mortality monitoring compared to other bird groups (Arnett et al. 2007), which is similar to results reported at communication towers (Shire et al. 2000, Gehring et al. 2011). However, it is estimated that fewer than 0.01□ of migrant songbirds that pass over wind farms are killed based on radar data and fatality monitoring (Erickson 2007). In spring 2016, the Installation fatalities were less than 0.9 □ of the total number of diurnal and nocturnal migrants that flew over the Installation when the radar data (total count of biological targets) and fatality data (spring 2016 fatality estimate) were compared. This suggests that the majority of migrants whose flights are below MTH are not colliding with the towers or guy wires. The spring 2016 data are used for this comparison as it is the only migration period where both fatality data and radar data were simultaneously collected.

Based upon the 2016 spring and fall radar data, and previous radar data collected during the spring and fall of 2013, there is strong indication that the Installation is situated within a migratory flight corridor for birds (Tetra Tech 2017b). Fatality surveys are the best assessors of risk that the towers pose to nocturnal and diurnal migrants. Peak spring migration occurred on 18 May in both areas in 2013, with peak spring migration also occurring on 18 May in the nearshore area in 2016 (Figure 3). Peak spring migration at the Installation occurred 10 days later in 2016, with the highest total passage rate occurring on 28 May. Peak fall migration dates were significantly different in 2013 and 2016, with peak fall migration occurring on the night of 14 September and

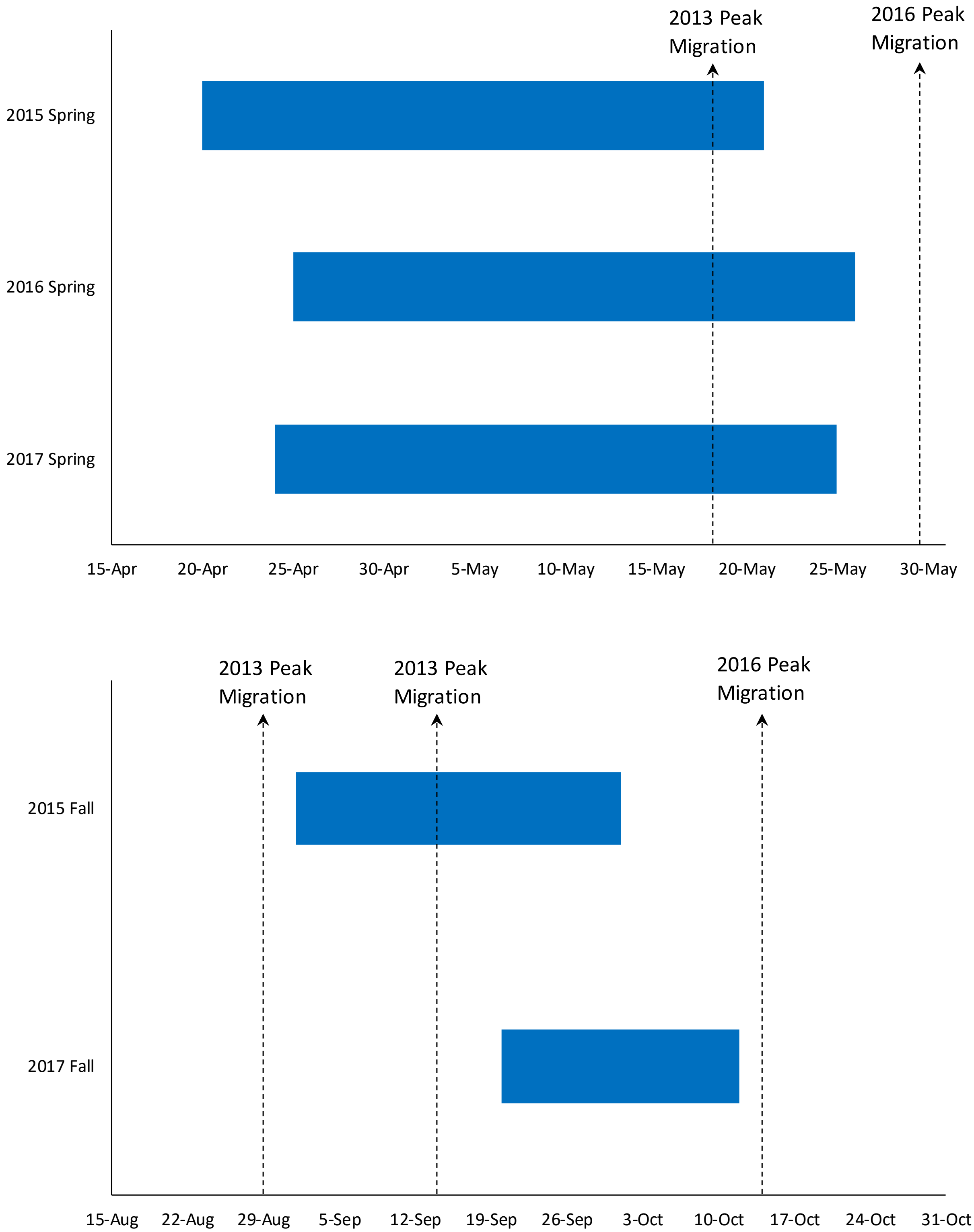


Figure 3. Fatality Surveys in Relation to Peak Bird Migration Periods Detected by Radar, NCTAMSLANT DET Cutler.

the day of 29 August in 2013. Peak fall migration in 2016 occurred much later, on 14 October for both areas for day and night (Figure 3). Timing of future fatality searches should be adjusted, and the number of search weeks increased to coincide with known peak migration events which can vary by species group. These datasets suggest that peak spring migration is expected to occur in mid-late May, but peak fall migration may be highly variable, however, ranging from late August to mid-September, or even later in mid-October. The greatest risk of lighting affecting birds at the Installation would be during periods of inclement weather or dense fog that occur during peak migration periods when density of avian species at the Installation is expected to be highest.

3.2 Impact Assessment – Avian Species

Maine serves as a critical resting and feeding stopover location in the fall for shorebirds migrating from the breeding grounds in the Arctic to South America (Audubon 2009). The Installation is a common stopover point during migration for many avian species. Generally, it is thought that the fall peak migration period in Maine is in August, when adults begin to arrive, and continues into September with the arrival of juveniles (MDIFW 2015). However, the avian data collected at the Installation suggests peak migration is variable from year to year and can occur anywhere from August to October.

The risk analysis for migratory bird and bat mortality at a particular location with large structures is based on target passage rates below MTH. Avian radar data collected at the Installation indicated that the majority of targets flew below MTH during the day and night at the Installation during the spring migration, whereas during the fall migration period day and night time average flight heights were just above (day) and just below (night) the MTH. The Installation had a lower passage rate and lower flight heights than the nearshore airspace during the spring migration period; however, in the fall the Installation had a lower passage rate and higher flight heights in comparison to the nearshore airspace. It should be noted that passage rates in both areas were much higher in the fall compared to the spring. The 2016 avian radar data suggests that while there is some level of avoidance occurring at the Installation, risk of collision with Installation infrastructure is higher during fall migration due to the higher number of birds flying in close proximity to MTH and the increased volume of birds flying near the Installation.

Use of avian acoustics, like traditional bird surveys, is hit or miss for documenting rarer species. Low detection probability and actual abundance can make documenting presence difficult and non-detection does not necessarily mean a species is not present. Repeat visits and visits during optimal survey conditions will increase the likelihood of detection. Species accumulation curves and presence absence models have determined that repeat visits increase the probability of detection and there is an optimal level of effort to determine presence (Cowell et al. 2004, Gu and Swihart 2004). Further, additional focus could be made for habitat type or time of year to maximize the likelihood for species presence. The benefit of avian acoustics is the ability to tailor sample schemes to best suit survey objectives. In addition, as auto identification software continues to improve, data archives can be revisited to address novel inquires.

3.3 Impact Assessment Raptors and Owls (except Eagles)

Merlin (*Falco columbarius*) and peregrine falcon (*F. peregrinus*) follow the coast during migration and were commonly observed hugging the coast line especially during the fall migration period.

Bald eagles accounted for the highest number observations of all raptor species observed during fall 2016 and spring 2017 raptor migration surveys, Eastern breeding populations of merlin typically migrate along the coast or offshore (Warkentin et al. 2005). Similarly, peregrine falcons have clearly defined migration routes along coastal areas and barrier islands (White et al. 2002). Peregrine falcons were removed from the federal ESA in 1999 but remain listed as endangered in Maine because the breeding population is still low (MDIFW 2003). Recommended protections in Maine are specific for avoidance of eyries (nests of a hawk, eagle, falcon or other bird of prey), particularly during the nesting season. The nearest known eyries occur at Acadia National Park and the nearest documented peregrine falcon stopover location is on Great Wass Island (Maine Coastal Atlas 2009, National Park Service 2017).

A relatively low number of broad-winged hawks (*Buteo platypterus*) were observed during the surveys, which is likely attributed to the coastal location of the Installation. This species typically skirts large inland bodies of water during migration but will cross over larger bodies such as the Bay of Fundy (Goodrich et al. 2014).

Raptor use, and collision risk is not only isolated to migratory periods in the spring and fall. Species including bald eagle, American kestrel, northern harrier, and rough-legged hawk utilized the Installation year-round, during the breeding season, or for overwintering. When free of snow cover, the tree-less habitat within the Installation provides suitable winter habitat for rough-legged hawk (Bechard and Swem 2002) and snowy owls. Perch locations provided by towers and guy lines may even provide preferential perch sites, increasing raptor densities during certain times of the year (Reinert 1984). Fortunately, for species such as the northern harrier that hunt low to the ground, appear to avoid hazards such as towers and guy wires, and risk of collision is predicted to be low (Garvin et al 2011, Tetra Tech unpublished data). Norther harriers are frequently observed flying all around the Installation (Tetra Tech unpublished data). Migrating eagles may be at greater risk of collision than migrating raptors because of the high level of use in areas on and surrounding the Installation during the spring and fall period. Data provided by telemetry surveys, which tracked radio-tagged resident bald eagles near the Installation, provided valuable information on potential “learned” avoidance and greatly supplement information collected during the raptor migration survey and eagle use surveys completed for the Installation. Owl use of the Installation has been poorly studied; however, one snowy owl carcass was found during the three years of fatality surveys that were recently completed for the VLF area of the Installation.

3.4 Impacts Assessment – Bats

Very little information on bat fatalities exists for communication towers. Migratory bats travel long distances at altitudes occupied by communication towers (and wind turbine blades), making them susceptible to collisions. The probability of fatality events increases during periods of unstable weather, such as just before or after the passing of a storm front (Arnett et al. 2008), or in the case of the Installation, fog that obscures the Installation during tidal events. Species that have the highest risk of fatalities at wind facilities are tree, foliage, or cavity roosting migratory bats (Kunz et al. 2007, Arnett et al. 2008). Nearly 75% of all bat fatalities have been associated with migratory tree bats, including hoary bat, eastern red bat, and silver-haired bat. All three of these species occur within the Installation (see Section 3.0) and have been found during fatality searches at other wind energy projects in Maine. However, the three-year fatality study of the VLF area of the Installation did not identify any bat fatalities (Tetra Tech 2018). Due to the lack of documented bat fatalities at the Installation, collision risk to bats is expected to be low. No known winter hibernacula are present at the Installation or nearby.

3.5 Installation Lighting Assessment

Although rare, mass avian fatalities at wind projects have been attributed to improper lighting at operations and maintenance buildings, especially in combination with low visibility such as conditions that can be created by dense fog as well as in the context of a dark landscape. Large-scale night migration-related mortality events of the type seen at communications towers (Erickson et al. 2002) also have been documented, and these too are rare. Nocturnal migrants aggregate at artificial light sources when they become disoriented or “trapped” by lights (Longcore et al. 2008). The potential for this phenomenon to occur is increased when fog is present to reflect the light, and when inclement weather or topographic factors influence migrating birds to fly at lower heights above ground level (Longcore et al. 2008). Post-construction studies have documented avian fatality events caused by wind facility lighting at night (such as steady burning lights at substations or operations and maintenance buildings, or lighting above tower doors) during periods of inclement weather (i.e., rain or fog). Minimization measures for facility lighting have since been developed at wind facilities to reduce these mortality risks to birds. In addition, the Installation is located along a dark coast line and it is known that nocturnal migrants in poor visibility conditions can be attracted to artificial lights. An image of the Installation at nighttime is provided in Figure 4.

Figure 4. Image of the Installation at Nighttime, NCTAMSLANT DET Cutler.

Episodic events involving up to 500 bird carcasses during migration are rare but have been recorded on three occasions. Each occasion was associated with lighting that attracts or disorients birds. The first documented episodic mortality event at a wind facility occurred in heavy fog during spring migration in May 2003 at Mountaineer Wind Energy Center in West Virginia and consisted of 33 passerine fatalities, as reported by Kerns and Kerlinger 2004. Weather conditions and the location of the carcasses suggested that the birds were attracted to bright sodium vapor lights present at a substation located adjacent to three turbines. After these lights were extinguished, no other episodic events occurred at the substation or adjacent turbines (Kerns and Kerlinger 2004). Two additional episodic mortality events were observed in West Virginia during 2011, as reported by Stantec Consulting Services, Inc. (2013) and Steelhammer (2011). In October 2011, 484 bird carcasses were found at the Laurel Mountain Substation, near a wind facility, after several days of fog, cold weather, and winds (Stantec Consulting Services, Inc. 2013). Eight 250-watt high pressure sodium lamps were on at night during the event and were assumed to have attracted birds during adverse weather conditions. Similarly, in September 2011, at the Mount Storm Wind Energy Facility in West Virginia, 59 bird carcasses were found on one day, 31 of which were found at one turbine whose internal nacelle light had been inadvertently left on overnight (Steelhammer 2011). The previous night's weather had been foggy, and the nacelle light was thought to have attracted the birds to the turbine. All these facilities in West Virginia are located in remote and dark areas with minimal lighting from nearby population centers, similar to the Installation.

Current federal regulations specify the use of nighttime lighting for aviation safety on all structures greater than 200 ft (61 m) above ground level (Longcore et al. 2008). Strobe or flashing lights on towers decrease the risk of bird collisions compared to steady-burning lights (Longcore et al. 2008). However, Kerlinger et al. (2010) found no significant difference between fatality rates at wind turbines with FAA lights as opposed to turbines without FAA lighting. Tower lighting at the Installation is pursuant to FAA aviation hazard lighting standards. The Navy uses the minimum number of aviation hazard lights acceptable to the FAA, which currently includes six L864 red aviation hazard lights installed on all of the VLF towers. The lighting pattern consists of three solid and three strobe at 30 flashes per minute at each of the 13 towers with lighting. Other facility lighting includes exterior building lights, including lighting at the TDECK, Power Plant, and Maintenance Buildings. Current lighting at the Installation has been designed to be compliant with the Navy's Anti-Terrorism Force Protection (ATFP) Security Standards, and as such, any changes to Installation lighting would require ATFP review and approval.

In August 2017, the Navy conducted a nighttime assessment of the Installation to determine how facility lighting may be impacting birds and bats and its overall appearance along the dark coast (Figure 4). It was noted that most exterior lighting lacked down shielded lights, with interior lights at the power plant as well as exterior lighting having intense visibility against the darker landscape, much more so than the communication towers. The VLF lighting should be evaluated more closely to determine if lighting can be modified while still providing a safe and secure environment. These bright lights act as an insect attractant and were very noticeable in the context of the dark coastline. Attraction of insects to exterior building lighting also may attract birds and bats that forage for insect prey at night. The presence of fog, which occurs frequently at the coastally-located Installation, often magnifies the intensity of exterior lighting during nighttime periods.

4.0 IMPACT AVOIDANCE AND MINIMIZATION MEASURES

The Navy will be implementing a number of impact avoidance and minimization measures for the VLF area, and has committed to additional avoidance and minimization, if necessary, based on results of post-mitigation monitoring (see Section 5.0). Installation impact avoidance and minimization decisions are covered in Section 6.0.

4.1 Impact Avoidance and Minimization

Few adaptive management strategies are available for the Installation because the infrastructure is unique, and it is critical to the military mission. One action related to reducing exposure to the Hazard Area would be to remove perches that may attract raptors and owls to the Installation. No eagles were observed flying from the perches through the Hazard Area, but the perches may serve as an ecological trap. The negative impacts of removing a valuable perch adjacent to foraging areas verses the potential of attraction towards a collision hazard should be considered before actions are taken. Further, it may be beneficial to leave structures intact that are utilized by resident birds with experience and awareness of the nearby hazards. For example, the Cape Walsh eagle was observed during the eagle use survey that was perched on a nesting platform at the edge of the Hazard Area, typically avoided entering the Hazard Area, although the core of its range was immediately adjacent to the Installation (DeSorbo 2017). Several actions unrelated to direct collision also exist as described in the communication tower best practices document (USFWS 2016d). Disturbance impacts should be avoided during the nesting season at the eagle nest located on Sprague Neck, which should not be an issue given the remote location of this nest at the Installation, away from primary operation activities.

Ospreys are known to nest directly in the communication towers. If their presence is determined to be a detriment to the military mission, existing nests should be removed outside of the breeding season and nest construction should be discouraged in the future. However, if the presence of nesting ospreys does not interfere with the military mission, maintenance activities should be avoided within the breeding season in nest towers if possible. A MBTA Depredation Permit is required to remove active nests from structures prior to any removal action. Vegetation management (i.e., mowing) should take place outside of the breeding season as well so to not disturb potential northern harrier nests as well as other nesting passerines. The Installation INRMP addresses mowing requirements and typically does not allow mowing during the nesting season for grassland associated bird species, unless there is a critical mission requirement. However, an approval process is currently in place to allow for mowing during the nesting season, on a case-by-case basis. Mowing outside of the breeding season also would likely result in fewer injuries or death to small mammals, thus reducing potential attractants for scavengers such as crows, ravens, raptors, owls and eagles.

To compensate for known owl fatalities at the Installation, efforts could be made to participate in conservation efforts in the region to benefit the overall owl population. Identifying and protecting winter roost locations in the region may serve as a collaborative conservation activity for NCTAMSLANT DET Cutler and serve as a surrogate mitigation strategy because of limited options for reducing direct mortality collisions at the Installation. Updates to the Installation INRMP that are in progress will include identification of potential Installation projects that would improve owl conservation, including surveys to identify owl winter roosts on the Installation.

Impact avoidance and minimization measures that will be employed at the Installation include implementing alterations to facility lighting, altering mowing regimes within the tower fields, and removal of carcasses from Installation roadways and other areas of the Installation.

Lighting

With the objective of maintaining a secure facility and reducing the lighting along the dark coast, lighting mitigation will be focused within the VLF area of the Installation. At the maintenance building, power plant, and Naval operations buildings, lights will be shielded downward, and existing lighting replaced to include motion-activated timed settings, when applicable and allowable under ATFP requirements. These techniques will help protect migratory birds as they are sometimes drawn to light sources during migration activities at night, and during foggy or inclement weather conditions. Currently most of the indoor lighting is exposed to the outdoors by the various windows. Lighting at the power plant will be evaluated and recommendations on reducing their intensity and brightness will be provided to Naval Facilities Engineering Command for consideration.

The Navy has begun to identify areas where down shields on outdoor lighting fixtures with motion-activated timed lighting could be installed. Non-essential lighting that is not needed for security or safety reasons could be removed or replaced with more bird friendly technology. However, before any of these changes could be implemented, they must be reviewed to determine if motion lights are compliant with ATFP standards and requirements. Command approval for all changes to installation infrastructure and lighting is required to ensure mission compatibility. Recommendations and changes are routed through the Naval Facilities Engineering Command Public Works Department-Maine Natural Resource Program for compliance with natural resource laws and the installations INRMP. Down-shields and/or motion sensors can be installed where permitted by ATFP requirements.

Vegetation Management

The current mowing regime at the Installation is a benefit to both grassland and early successional species, thus resulting in higher overall species diversity. Intermittent mowing schedules appear to create highly preferential habitat for the savannah sparrow, which was the most abundant species observed during surveys and accounted for one quarter of all observations. Preferred nesting habitat is abundant at the Installation and includes grass clumps or low shrubs such as blueberry (*Vaccinium* spp.), raspberries and blackberries (*Rubus* spp.), bayberry (*Myrica* spp.), and wild rose (*Rosa* spp.). In optimal habitats, territories can be dense with mean size ranging from 0.03 to 0.86 ha, with nests sired by the same male being as close as 2.2 m (Wheelwright and Rising 2008). Laying multiple clutches a year is common when first attempts are early in the season and successful, although predation by both avian (northern harriers, gulls, ravens) and mammalian (raccoons, skunks) predators is common (Wheelwright and Rising 2008).

Due to poorly drained soils, extensive wetlands within the tower fields, and the intermittent maintenance needs associated with the towers, not all areas can be mowed regularly and, therefore, portions of the tower fields are covered in dense green ash (*Fraxinus pennsylvanica*) and willow (*Salix* spp.). This dynamic creates a patchwork of early successional and well-established shrub species—a boon for species that prefer nesting in wet thickets. As a result, other common species encountered during the survey were common yellowthroat and alder flycatcher, which are two species that are more closely associated with wet-shrub rather than grassland habitat (Guzy and Ritchison 1999, Lowther 1999). As an indication of the amount of shrub habitat present within the survey areas, common yellowthroat was detected during 97% of the point counts.

Vegetation over 3 feet in height has been shown to impact communication ability at the Installation. The ability to increase the mowing frequency in the tower fields is complicated by several factors that occur during the growing season, including soil conditions. Poorly and somewhat poorly drained soils prevail throughout the tower fields and remain too “soft” to allow mowing throughout the growing season. Because of the soft soils, the fields are highly susceptible to rutting from machinery. Additionally, the presence of a subsurface grounding mat consisting of gridded copper wire can be easily damaged by machinery and rutting. Therefore, mowing is generally restricted to the winter months when the ground is frozen.

The Navy is in the process of determining if an increase in the mowing frequency of the tower fields to reduce the attractiveness of the grassland habitat to ground-nesting grassland bird species is feasible. Keeping the length of the grass at 6 inches or less, similar to techniques employed around airfields to deter grassland birds, would make this habitat less attractive to grassland bird species. This in turn would reduce the density of grassland birds that forage and nest within the tower field habitats, and thereby reduce their potential for collision with the towers and/or guywires. In lieu of applying a more intense mowing regime to the entire tower field areas, additional fatality monitoring can utilize historic collisions and fatalities location data to identify high use/high risk areas where a more intense mowing regime can be applied to deter grassland bird nesting and foraging.

<u>Disposal of Road-killed Animals and Other Carcasses</u>

Road-killed animals or other carcasses detected by Installation personnel on or near roads within the Installation boundaries will be removed promptly to avoid attracting raptors and owls to the Installation.

5.0 POST-MITIGATION MONITORING AND ADAPTIVE MANAGEMENT STRATEGIES

This section describes the Navy’s commitment to post-mitigation monitoring at the Installation and describes the proposed adaptive management strategy for responding to unanticipated levels of bird, bat, raptor or owl mortalities.

5.1 Fatality Monitoring

The Navy has completed three years of spring and fall fatality studies to evaluate the baseline mortality of avian and bat species, related to existing conditions at the Installation. As part of the ongoing update to the Installation INMRP, potential projects will be identified to complete additional post-mitigation mortality surveys, preferably within the first 5 years of implementation of the avoidance and minimization measures identified in Section 4.0. However, implementation of these post-mitigation fatality surveys are dependent upon the availability of funding and Installation command priorities.

If implemented, the post-mitigation fatality surveys would follow the methodology previously used in conducting fatality surveys at the Installation, and would include carcass searches, searcher efficiency trials, and carcass persistence trials to estimate and compare avian and bat collision mortality rates for the pre- and post-mitigation conditions. Surveys would be conducted twice per year, over five consecutive weeks during the spring and fall migration periods (01 April through 15 October). Ideally, the first year of surveys would take place within 1 year of completion of the avoidance and minimization measures identified in Section 4.0, followed by one additional year of fatality studies within 5 years of completion of the avoidance and minimization measures identified in Section 4.0, which will include adjustments, if necessary, to the study protocol. Upon completion of each year of surveys, a summary report of findings would be submitted to Maine Department of Environmental Protection, MDIFW and USFWS.

5.2 Incidental Bat Mortalities

The USFWS must be notified within 24 hours of any mortality of a NLEB. The carcass should be collected and eventually submitted to the USFWS Maine Field Office. Since no NLEB, or other bat species, fatalities have been detected at the Installation to date, documentation of incidental bat mortalities are expected to be rare.

6.0 ADAPTIVE MANAGEMENT STRATEGIES

Adaptive management is defined in the Land-Based Wind Energy Guidelines (USFWS 2012) as "…an iterative learning process producing improved understanding and improved management over time… [that] promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders."

Adaptive management depends heavily on collection of baseline data, and in the case of the Installation, post-mitigation data as described in Sections 4 and 5. The Navy proposes to continue to update its existing fatality mortality dataset with post-mitigation fatality data to determine the effectiveness of the implemented mitigation measures that have been designed to reduce Installation risk to birds and bats. The Navy will submit results of these post-mitigation surveys to regulatory agencies for review and comment. Additionally, the Navy intends to continue to monitoring bird and bat use at the Installation periodically over the long-term, as well as periodically review existing data and science-based research materials that can be used in adaptive management strategies and to make better informed decisions regarding avoiding and minimizing impacts to birds and bats that occur at the Installation.

The Navy also will continue to collaborate with USFWS and MDIFW to evaluate the need for additional mitigation measures and based on the fatality results from the post-mitigation studies, if implemented. The Navy prepared this BBCS and has committed to programming of post-mitigation fatality monitoring; however, these can be completed only if funding is approved for these surveys. This BBCS is being integrated into the INRMP update that is ongoing, and implementation of strategies identified in this document will be reviewed during annual INRMP reviews, as well as reviews of this document for operation and effect.

The Navy has designed measures to avoid, minimize and potentially mitigate impacts to bird and bat species caused by Installation facilities required to support the military mission. Recent fatality monitoring indicates a low percentage of protected species have been killed as a result of collision with the guy wires and towers, with a majority of fatalities consisting of gulls and nocturnal migrants. Fatality monitoring conducted at the VLF to date has not documented any bat fatalities, so the baseline risk to bat species is considered low. The Navy's adaptive management approach is designed to be responsive to Installation impacts to birds and bats. Avoidance and minimization measures that are proposed, will be implemented continue to be maintained and monitored for the life of the Installation, irrespective of impacts documented during post-mitigation monitoring; unless these measures are documented to have an increased risk to birds and bats in comparison to baseline conditions. The Navy's adaptive management response measures will be implemented if impacts to avian and bat species are greater than anticipated, even with mitigation measures in place that are intended to reduce risk to birds and bats, and the Navy identifies additional measures that are needed to reduce these impacts. Additional adaptive management response measures that have been identified may be used to supplement the adaptive management measures and may include scientifically supportable measures that have not been identified at this time. Table 6 summarizes the Navy's adaptive management approach, avoidance and minimization measures, adaptive management response measures, and additional adaptive management measures.

6.1 Adaptive Management for Birds

The Navy is committed to avoiding and minimizing losses of migratory birds at the Installation and they have incorporated an adaptive management approach to respond to unforeseen fatality events by identifying and correcting problems onsite. The likelihood of migratory bird fatalities may be evenly spread throughout the year, or may be concentrated during particular time periods, such as during spring and fall migration. Additionally, fatalities may be clustered around certain towers within the VLF, such as those located closest to the shoreline, or the guy wire network located within the interior of the tower fields. The Navy has assessed the rate of fatalities throughout the VLF tower fields in an effort to compare Installation-specific fatalities to fatality estimates for other similarly siting communication tower facilities in eastern North America.

Although federal courts are divided concerning the intent of MBTA, USFWS interprets the incidental take of one individual of any species protected by the MBTA as violation of the law. USFWS has recognized, however, that avoiding all take of migratory birds is unlikely at any project. The Navy has implemented the avoidance and minimization measures identified in Table 6 to reduce the likelihood of fatalities associated with ongoing operation of the Installation. If these avoidance and minimization measures are not sufficient to reduce the likelihood of take, the Navy will implement avoidance and minimization measures and supplement these measures with additional avoidance and minimization measures where appropriate.

Table 6. Summary of Avoidance, Minimization, and Adaptive Management Conservation Measures for Birds and Bats.

Avoidance/Minimization Measures	Additional Conservation Measures that could be Implemented as an Adaptive Management Response
Operations and Maintenance	**Adaptive Management**
BIRDS	
(1) Install downward projecting lights that are activated by motion sensors on the exterior of Installation buildings and structures of the Very Low Frequency area (VLF). This measure minimizes attracting nocturnal migrants during foggy or inclement weather conditions.	(1) In coordination with MDIFW and USFWS, evaluate post-mitigation fatality data to assess current avian and bat impacts; and determine if additional practicable measures should be employed to reduce impacts and minimize fatalities. This measure is intended to focus the response appropriately to address the impact.
(2) Implement a more frequent mowing regime within the tower fields to reduce attracting ground-nesting grassland bird species to nest and/or forage within grassland habitats of the tower fields. This measure minimizes attracting grassland birds to the hazardous areas of the tower fields.	(2) Maintain a dark coastline during the spring and fall migration seasons.
BIRDS (raptors/owls, excluding eagles)	
(1) Prompt removal of carcasses observed on or along Installation roadways, or other areas of the Installation by Installation personnel. This measure minimizes attracting raptors and owls to the Installation.	(1) Notify USFWS within 24 hours or next business day of the injury or death of a raptor or owl and facilitate an investigation into the circumstances leading to the casualty. This measure is intended to help focus the response appropriately to address the impact.
(2) Eliminate above-ground perching opportunities within the VLF area of the Installation, to the extent practicable. This measure reduces exposure of raptors to the Installation hazards by minimizing attractants onsite.	(2) Remove or rectify any causes of raptor injuries or fatalities that can be practicably removed or changed. This measure is intended to eliminate hazards that may increase risk or impacts to raptors and owls.
BATS	
(1) Conduct any forest clearing needed after 31 October and prior to 01 April except as agreed upon through coordination with USFWS. This measure is intended to avoid cutting down trees that may house roosting bats.	(1) Consult with the USFWS Maine field office if a fatality is documented for next steps.
(2) Eliminate ponding water following construction. This measure is intended to minimize on-site attractants to bats.	
(3) Notify USFWS within 24 hours of any mortality of listed bat species, including northern long-eared bat. The carcass will be collected and eventually submitted to the USFWS Maine Field Office.	
(4) Install downward projecting lights that are activated by motion sensors on exterior of Installation buildings and facilities within the Very Low Frequency area. This measure minimizes known attractants for bats.	

- The Navy will coordinate with MDIFW and USFWS to evaluate the post-mitigation fatality data collected to date to assess current avian and bat impacts at the Installation; and determine if additional practicable measures should be employed to reduce impacts and minimize fatalities. This measure is intended to focus the response appropriately to address the impact.

- Maintain a dark coastline and reduce nighttime lighting at the Installation especially during the spring (April 15 to May 31) and fall migration seasons (Sept 1 to Oct 31).

Although marking all guyed met tower wires per Avian Power Line Interaction Committee guidelines (Avian Power Line Interaction Committee 2006, 2012) can help minimize collision risks with towers and guywires by providing visual markers, this option is not feasible, as deflector materials are comprised of metal components, which have a high potential to be damaged or removed by VLF transmission energies. Although the guywires associated with the towers are not directly charged with energy, they do conduct enough energy by association, that could result in any metal components, such as markers, to be blown off.

6.2 Adaptive Management for Raptors/Owls (except Eagles)

The Navy is committed to avoiding take of raptors and owls at the Installation and has incorporated an adaptive management approach to respond to increased risk, or unforeseen fatality events, by monitoring changes in risk, and by identifying and correcting problems onsite.

The risk of take of raptors and owls at the Installation is moderate, as raptors are known to use the Installation during the spring, summer, and fall seasons; and owls utilize the Installation during winter/early spring months. Several raptors/owls have been documented at the Installation and vicinity.

Based on the results of baseline raptor surveys, there is the potential for Installation operations to result in take of raptors and owls. Take of raptors/owls is prohibited under the MBTA, and Lacey Act, and the Navy intends to avoid take of raptor species by monitoring raptor use every two years, dependent upon available funding. Additionally, the Navy will continue to adaptively manage the Installation based on the results of the post-mitigation fatality surveys.

If during the post-mitigation monitoring period there is sufficient evidence that the Installation VLF facilities pose a risk to raptors/owls, then the Navy will discuss potential adaptive management measures with USFWS. If raptor nesting activity significantly increases above current levels by year five of post-mitigation or thereafter, then the Navy will consult with USFWS to develop and implement additional take avoidance measures. The Navy expects that any avoidance measure implemented would be based on the best available science, would target those seasons when raptors and owls are expected to be at the greatest risk, and will be agreed to by USFWS.

- Navy personnel will remove or rectify any causes of raptor injuries or fatalities that can be practicably removed or changed. This measure is intended to eliminate hazards that may increase risk or impacts to raptors and owls.

- The Navy will notify USFWS within 24 hours or next business day of the injury or death of a raptor or owl and facilitate an investigation into the circumstances leading to the casualty. This measure is intended to help focus the response appropriately to address the impact.

- Navy will share with USFWS in a timely manner the results of post-mitigation fatality monitoring data, if and when these surveys are implemented. If after reviewing the fatality results in a given year, USFWS and the Navy agree that there is evidence that raptor/owl use is increasing and avoidance measures (including lighting, carcass removal, or other measures) are unlikely to minimize the risk of take, then the Navy will discuss with the next appropriate steps to take with USFWS.

6.3 Adaptive Management for Bats

The Navy is committed to avoiding and minimizing the loss of bats at the Installation and has incorporated an adaptive management approach to respond to unforeseen fatality events by identifying and correcting problems onsite. The Navy will assess the rate of bat fatalities at the Installation in an effort to compare Installation-specific bat fatalities to fatality estimates available for other communication tower projects. Individual towers or guy wires also may be assessed to determine if additional tower-specific avoidance and minimization measures need to be applied. Current research at the Installation has not documented any bat fatalities.

The Navy will implement the avoidance and minimization measures identified in Table 6 to reduce the likelihood of fatalities associated with impacts previously identified from the three years of fatality monitoring data collected in the VLF area of the Installation. Due to the recent federal listing of the NLEB as well as other state listed bat species, the Navy will report any NLEB mortality or other state listed species to USFWS within 24 hours. The Navy will continue to work with USFWS to minimize risk of take at the Installation and evaluate the application of avoidance and minimization measures where appropriate. If these avoidance and minimization measures are not sufficient to reduce the likelihood of take, the Navy will implement conservation and adaptive management response measures and will evaluate the application of additional avoidance and minimization measures where appropriate.

- Navy will consult with the USFWS Maine Field Office if a bat fatality is documented to determine the next steps.

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Appendix A. Rare, Threatened, and Endangered Avian and Bat Species, NCTAMSLANT DET Cutler

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Appendix A. Table 1. Special Status Avian Species Identified at NCTAMSLANT DET Cutler during Field Surveys.

Common Name	Scientific Name	Federal	State
Waterfowl – Ducks and Geese			
Barrow's goldeneye	*Bucephala islandica*	~	ST
Greater scaup	*Aythya marila*	~	SSC
Harlequin duck	*Histrionicus histrionicus*	~	ST
Loons, Grebes, and Cormorants			
Great cormorant	*Phalacrocorax carbo*	BCC non-breeding	ST (breeding)
Greater shearwater	*Puffinus gravis*	BCC non-breeding	~
Horned grebe	*Podiceps auritus*	BCC non-breeding	~
Pied-billed grebe	*Podilymbus podiceps*	BCC	~
Red-throated loon	*Gavia stellata*	BCC non-breeding	~
Cranes and Rails			
Herons and Bitterns			
American bittern	*Botaurus lentiginosus*	BCC	~
Black-crowned night heron	*Nycticorax nycticorax*	~	SE
Great blue heron	*Ardea herodias*	~	SSC
Snowy egret	*Egretta thula*	BCC	~
Raptors – Hawks and Owls			
Bald eagle	*Haliaeetus leucocephalus*	BCC breeding BGEPA	~
Northern harrier	*Circus cyaneus*	~	SSC
Peregrine falcon	*Falco peregrinus*	BCC breeding	SE (breeding)
Short-eared owl	*Asio flammeus*	~	ST (breeding)
Gulls, Terns, and Alcids			
Arctic tern	*Sterna paradisaea*	BCC	ST
Atlantic puffin	*Fratercula arctica*	~	ST
Bonaparte's gull	*Larus philadelphia*	~	SSC (breeding)
Common murre	*Uria aalge*	~	SSC
Common tern	*Sterna hirundo*	~	SSC
Laughing gull	*Larus atricilla*	~	SSC
Least tern	*Sternula antillarum*	~	SE
Razorbill	*Alca torda*	~	ST
Roseate tern	*Sterna dougallii*	FE	SE
Shorebirds – Sandpipers, Plovers, and Curlews			
Hudsonian godwit	*Limosa haemastica*	BCC non-breeding	~

Common Name	Scientific Name	Federal	State
Lesser yellowlegs	*Tringa flavipes*	BCC non-breeding	SSC
Piping plover	*Charadrius melodus*	FT	SE
Purple sandpiper	*Calidris maritime*	BCC non-breeding	~
Red knot	*Calidris canutus* ssp. *rufa*	FT BCC non-breeding	SSC
Red-necked phalarope	*Phalaropus lobatus*	~	SSC
Semipalmated sandpiper (eastern)	*Calidris pusilla*	BCC non-breeding	SSC
Solitary sandpiper	*Tringa solitaria*	BCC non-breeding	~
Upland sandpiper	*Bartramia longicauda*	BCC	ST
Whimbrel	*Numenius phaeopus*	BCC non-breeding	SSC
Flycatchers			
Eastern kingbird	*Tyrannus tyrannus*	~	SSC
Eastern wood pewee	*Contopus virens*	~	SSC
Least flycatcher	*Empidonax minimus*	~	SSC
Olive-sided flycatcher	*Contopus cooperi*	BCC	SSC
Chickadees, Creepers, Wrens, and Jays			
Sedge wren	*Cistothorus platensis*	~	SE
Warblers			
American redstart	*Setophaga ruticilla*	~	SSC
Bay-breasted warbler	*Dendroica castanea*	BCC	~
Black-and-white warbler	*Mniotilta varia*	~	SSC
Canada warbler	*Wilsonia canadensis*	BCC	SSC
Chestnut-sided warbler	*Dendroica pensylvanica*	~	SSC
Prairie warbler	*Dendroica discolor*	~	SSC
Tennessee warbler	*Vermivora peregrina*	~	SSC
Yellow warbler	*Dendroica petechia*	~	SSC
Thrushes			
Bicknell's thrush	*Catharus bicknelli*	BCC	SSC
Veery	*Catharus fuscescens*	~	SSC
Wood thrush	*Hylocichla mustelina*	BCC	SSC
Mimids and Cuckoos			
Brown thrasher	*Toxostoma rufum*	~	SSC
Yellow-billed cuckoo	*Coccyzus americanus*	~	SSC
Sparrows, Towhees, and Finches			
Eastern towhee	*Pipilo erythrophthalmus*	~	SSC
Evening grosbeak	*Coccothraustes vespertinus*	~	SSC (breeding)

Common Name	Scientific Name	Federal	State
Fox sparrow	*Passerella iliaca*	~	SSC
Grasshopper sparrow	*Ammodramus savannarum*	~	SE
Nelson's sharp-tailed sparrow	*Ammodramus nelsoni*	BCC	SSC
White-throated sparrow	*Zonotrichia albicollis*	~	SSC
Blackbirds and Orioles			
Rusty blackbird	*Euphagus carolinus*	BCC	SSC
Eastern meadowlark	*Sturnella magna*	~	SSC
Swallows, Swifts and Goatsuckers			
Barn swallow	*Hirundo rustica*	~	SSC
Chimney swift	*Chaetura pelagica*	~	SSC
Northern rough-winged swallow	*Stelgidopteryx serripennis*	~	SSC
Purple martin	*Progne subis*	~	SSC
Tree swallow	*Tachycineta bicolor*	~	SSC
Whip-poor-will	*Antrostomus vociferous*	~	SSC
Larks			
Horned lark	*Eremophila alpestris*	~	SSC (breeding)

BCC – USFWS Bird of Conservation Concern; **BGEPA** – Bald and Golden Eagle Protection Act; **(breeding)** – only breeding population has the protection status; **FE** – federally endangered **FT** – federally threatened; **SCC** – Maine Species of Special Concern; **SE** – Maine endangered; **ST** – Maine threatened

Appendix A. Table 2. Bat Species List and Likelihood of Occurrence, NCTAMSLANT DET Cutler.

Common Name	Scientific Name	Protection Status	Habitat Association	Likelihood of Occurrence	Reason for Likelihood	Species Identified during Passive Acoustic Monitoring
Big brown bat	*Eptesicus fuscus*	Maine Species of Special Concern	Habitat generalist found in a variety of habitats, including agricultural croplands; associated with human habitation structures	High	Suitable habitat at Installation, species range overlaps Installation, and known occurrences counties adjacent to Washington County	Definitive
Eastern red bat	*Lasiurus borealis*	Maine Species of Special Concern	Found in hardwood deciduous forests; generally found in close association with riparian areas	High	Suitable habitat at Installation, species range overlaps Installation, and known occurrences in counties adjacent to Washington County	Definitive
Hoary bat	*Lasiurus cinereus*	Maine Species of Special Concern	Forested upland habitats, including mixed northern hardwoods	High	Suitable habitat at Installation, species range overlaps Installation, and known occurrences near Installation	Definitive
Silver-haired bat	*Lasionycteris noctivagans*	Maine Species of Special Concern	Closely associated with conifer and mixed hardwood forests; generally found in association with riparian areas	High	Suitable habitat at Installation and species range overlaps Installation	Definitive

Common Name	Scientific Name	Protection Status	Habitat Association	Likelihood of Occurrence	Reason for Likelihood	Species Identified during Passive Acoustic Monitoring
Eastern small-footed bat	*Myotis leibii*	Maine Threatened Species	Closely associated with conifer and mixed hardwood forests; generally found in association with riparian areas, and rocky outcroppings or talus slopes	Likely	Suitable habitat at Installation and species range overlaps Installation	Definitive in past surveys, absent in 2016
Little brown bat	*Myotis lucifugus*	Maine Endangered Species	Found in close proximity to a water source for foraging, and in close proximity to human-made structures	Likely	Suitable habitat at Installation and species range overlaps Installation	Definitive
Northern long-eared bat (NLEB)	*Myotis septentrionalis*	Federally Threatened and Maine Endangered Species	Found in dense forest areas, and forages in a variety of habitats; closely associated with cave structures	Likely	Suitable habitat at Installation and species range overlaps Installation	Definitive
Tri-colored bat	*Perimyotis subflavus* [formerly *Pipistrellus subflavus*]	Maine Species of Special Concern; under review for federal listing	Found along edge habitats between agricultural croplands and native grassland	Likely	Suitable habitat at Installation and species range overlaps Installation	Definitive

Note – All eight species of bats identified in the table have been confirmed as occurring at the Installation based on acoustic monitoring results from studies completed in 2013 and 2016.

APPENDIX L

DEER MANAGEMENT PROGRAM DEVELOPMENT GUIDELINES

Appendix L - Deer Management Program Development Guidelines

A regulated hunting program could serve as the foundation for a sound deer management program at Naval Station Cutler, and the opportunity exists for development and implementation of such a program at Naval Station Cutler. Implementation of effective deer management practices would maintain deer populations at levels intended to:

- Ensure the present and future well-being of the species and its habitat;
- Provide a sustained yield of deer for use by licensed hunters; and,
- Allow for compatibility between deer populations and human land use practices, as well as with other plant and animal communities.

Regulated hunting is generally acknowledged to be an effective deer population management tool. Hunting is an efficient method that can provide immediate population reduction, and is the least expensive technique for removing deer. Although the use of fencing and repellents can be practical to address site specific problems, these measures are not feasible for large areas such as Naval Station Cutler due to the size of the base, and in consideration of the daily operations and training measures that could be impaired.

In addition to being an effective population management tool, hunting would provide an important recreational opportunity for base employees. While hunting with firearms is typically a more effective management tool than bowhunting, bowhunting is better suited for Naval Station Cutler, primarily because the use of firearms for hunting may present a safety hazard, and could result in equipment damage. A bow-hunting program is proposed for Naval Station Cutler to address the current over population of deer at the facility.

Implementation of a regulated hunting that allows public access to the base is not possible due to security or safety issues, and public access restrictions. As such, the developed hunting program would be limited to base employees, and other persons authorized access by the base commander.

Development of a deer management plan should include an overview of the basic procedures and requirements for hunting at Naval Station Cutler, including but not limited to the following components:

- Designate authority who will oversee and manage the deer management program;
- Describe disciplinary action for violations to the prohibitions and mandatory provisions of the deer management program;
- Provide figures and descriptions of the designated hunting compartments;
- Describe seasonal requirements (including hunting days and times);
- Develop game requirements (e.g., white-tailed deer only) and take limits;
- Determine use of tree stands;
- Identify eligible personnel, age requirements, permit and license requirements, and required hunting safety courses;

- Develop notification and check-in/check-out requirements; and,
- Determine weapon and ammunition allowances and requirements, including transportation requirements.

Specific Naval Station Cutler hunting rules should be written to conform to overall deer management objectives for the region as established by the MDIFW, and MDIFW should be consulted for technical guidance in operation of deer hunting at the installation. This is particularly important in terms of determining the appropriate doe harvest, as deer population growth cannot be controlled without the harvest of does. If implementing a bowhunting program at Naval Station Cutler presents logistical problems including how to operate it, the EC should contact other DoD NRMs who have recently implemented hunting programs on their installations for advice. In addition, a formal deer inventory should also be conducted at Naval Station Cutler in order to properly assess the deer population at the installation. These data will factor into the hunting limits defined in the deer management and hunting program. These recommendations will in turn help address any potential negative impacts to habitat that may be occurring from the overpopulation of deer at Naval Station Cutler.

APPENDIX M

NSA CUTLER
OSPREY MANAGEMENT PLAN

Osprey Nesting Management Plan

Naval Computer and Telecommunications Area Master Station
Atlantic Detachment

175 Ridge Road
PO Box 9608
Cutler, Maine 04626
03 February 2007

POC: Jim Holmes, Site Telecommunications Manager
Work: 207-259-8321
Cell: 207-263-6495
HF Site workers: Pat Walsh and John Molinsky
Author: CAPT Gary M. Andres, USNR

Purpose: provide a working management plan for nesting osprey (*Pandion haliaetus*) on the lands and structures of the Naval Computer and Telecommunications Area Master Station - Atlantic Detachment, Cutler, Maine (NCTAMSLANT Det Cutler).

Installation: NCTAMSLANT Det Cutler is located in Washington County on the coast in northeastern Maine; located approximately 75 miles east of Bangor, 140 miles northeast of Brunswick NAS, and 20 miles south of the Canadian border; its isolated location is further emphasized by its distance from major highways in a lightly populated area. The site's location falls within the Maine Department of Inland Fisheries and Wildlife, Wildlife Management District 27 (WMD 27), Region C, characterized by boreal forest, wetland bog, riparian, small bare and forested islands and rocky shoreline habitat. The lands around the installation are predominantly spruce-fir forests with limited agricultural use (including blueberry barrens) along the coast. Inland, intensive timber harvesting over the past 20 years has created a diversity of young age-classed forest stands. The three broad habitat types include coastal islands and estuaries, coastal plain, and interior forests (Schaeffer, 2005).

Commissioned in 1961, the mission of the installation is to provide and support quality communications to the operating forces of the Atlantic Fleet, the shore commands of the Northeast Region and the fleet operating in the Atlantic and Arctic Oceans and the Mediterranean Sea. Initially, the site included three separate parcels with a combined area of 3,000 acres, several miles of coastline and over 150 buildings and structures; the most notable feature of the installation are the various antenna arrays that cover almost 2000 acres and consist of 26 towers ranging in height from 800 to 1,000 feet.

In October 2000, due to the ability to remotely operate some of the site's communication functions from more centralized locations (i.e. Norfolk, VA), the military presence was eliminated. The site is currently operated by Department of Navy civilian personnel, many with previous experience at NCTAMSLANT Det Cutler as military technicians. As a result, the administrative base and support portion was transferred to the local government and is being developed as a vacation community. The remaining two portions are the high frequency (HF) site (inland) and the larger very low frequency (VLF) site on a rocky peninsula and Sprague Neck.

Both the HF and VLF sites provide ideal osprey nesting sites on the antenna arrays and support towers.

Authority (Legal and policy requirements): The osprey is federally protected by the Migratory Bird Treaty Act (16 USC 703-712) and state protected by Title 12 (Conservation), Part 13 (Inland Fisheries and Wildlife), Subpart 4 (Fish and Wildlife), subsection 11854 (nests and eggs), subsection 11855 (hunt, possess, transport, buy or sell), and subsection 12404 (general protection of).

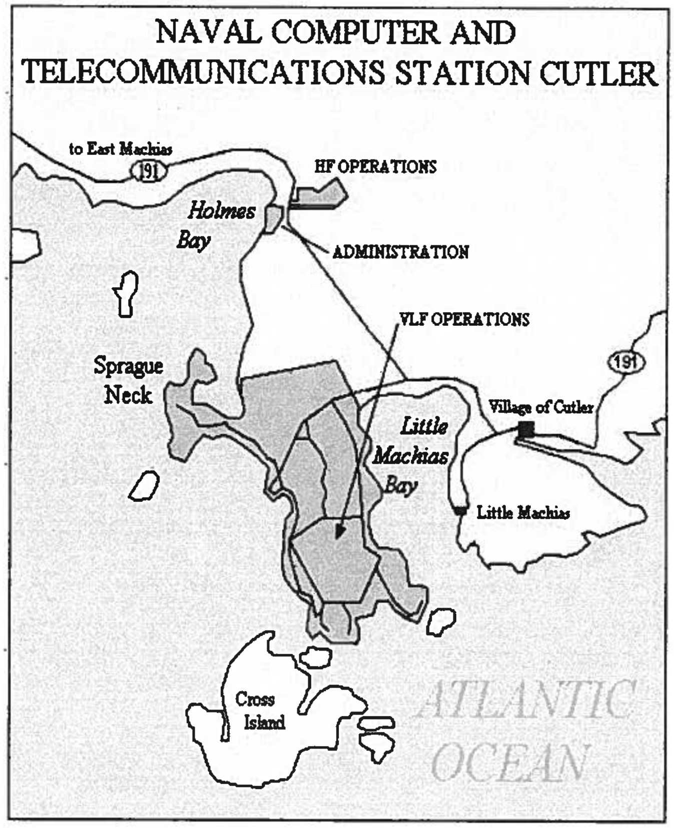
The Migratory Bird Treaty Act, administered by the U.S. Fish and Wildlife Service, is the foundation for migratory bird conservation and protection in the United States. It is a strict liability statute wherein proof of intent is not an element of a taking violation. Wording of the Act is clear in that most actions that result in a "taking" or possession (permanent or temporary) of a protected species can be a violation.

The Department of Defense (DoD) and Secretary of the Navy (SECNAV) further mandate the appropriate management and conservation of natural resources on military installations through various instructions including DoD Instruction 4715.3 (Environmental Conservation Program) and SECNAV Instruction 5090.8A (Policy for Environmental Protection, Natural Resources, and Cultural Resources Programs).

Management Need: In the past three years, Cutler personnel have observed an increase in incidents of osprey nesting on antenna arrays and support towers (Consultation with NCTAMSLANT Det Cutler personnel, 2006). Until recently, when nesting birds were present on an antenna structure, technicians were able to select alternate antennas and wait until the fall when the birds migrated. Unique to the HF site, energizing an antenna with nesting birds present puts them at a radiation risk. The increase in recent years of nesting pairs using antennas and support structures is possibly due to one of two (or both) factors: 1) the natal site fidelity of surviving birds and 2) possible increase in localized timber cutting 'chasing' birds to the protection of the installation's lands and waters. As a result, antenna use and tower maintenance is impacted. Regardless of why osprey prefer the structures over natural nest sites, if mission efficiency is to be maintained, and assuming that osprey numbers in the area will escalate in coming years, Navy Region Mid-Atlantic decided to draft an osprey management plan.

NCTAMSLANT Det Cutler "Google Earth" Image

NCTAMSLANT Det Cutler VLF Site



Osprey Information

Introduction:
Only one of the five subspecies of osprey occurs in North America: Pandion haliaetus carolinensis, (Zarn, 1974). In North America, osprey are found from central Alaska east to Newfoundland and south to Mexico; they winter in the southernmost United States and in Central and South America anywhere near water where the combination of a good fish supply and adequate sites for nesting/perching exist, and especially where the water is shallow and contains numerous schooling fish populations, (Bonney, et al, 1981). Often, nest sites are rebuilt and reused each year eventually becoming a large, intact mass of driftwood, bones, seaweed and trash lined with grass or other soft material.

Although some ornithologists have observed osprey consuming mammals, birds, reptiles, amphibians and some invertebrates, they depend almost exclusively on fish. While they have little difficulty in capturing fish, success is dependent on numerous factors such as abundance of prey, clarity of the water, surface water temperature, and tidal changes. Osprey numbers were in serious decline during the late 1950's to early 1960's. In fact, the habitats of some osprey populations were literally poisoned by pesticides and pollutants diminishing the numbers in both Europe and North America (Gill pg 436). Since the 1970's, regulatory controls and active protection and management have dramatically returned the osprey's numbers.

Migration and nesting behavior:
In North America, adult birds begin to arrive on nesting grounds from mid-March to early April and continue arriving for one month (Zarn, 1974). Pair bonding and nest site selection in some individuals or populations may carry over from year to year. French (1972), observed that some pairs engaged in courtship and copulated at or near established nests which they did not subsequently use; others repaired nests then failed to use them or attempted nest construction before using an already existing nest. Poole noted (1982) that ospreys in the northeastern coastal United States show great fidelity to their natal site when returning to breed (in one study, Poole (1982) noted that 73% of males and 36% of females settle in or near(<10km) their natal colony). Regardless, nest construction and maintenance continues through April into early May. Where ospreys are not abundant, they are solitary nesters; otherwise they will nest in loose colonies.

Both sexes build or repair the nest; the male gathers much of the material and the female arranges it. Material is added throughout the season. Egg laying takes place at the end of April or beginning of May and may extend into early June with a clutch size of 1 to 4, but most usually 3 (Bonney, et al, 1981).

Raising and Fledging:
Incubation begins with the second or third egg and takes from 33 to 35 days (Bonney, et al, 1981). Males share in incubating the eggs, but once the first one hatches, he ceases to aid in incubation or brooding. Once hatchlings reach 6-10 days, both adults cease incubating unhatched eggs. In some cases, osprey that have experienced nesting failure construct a "frustration" nest after abandoning the first; however they do not attend the nest after construction ends (Zarn, 1974). Female osprey, like some other raptor species, molt while incubating their eggs (Gill, 1990) thus decreased activity minimizes their daily energy needs. The male (does not molt until after the breeding period), will feed the females regularly on the nest. The loss of the female's feathers and insulating down may be advantageous in temperature regulation of the exposed nesting platform.

Young birds hatch at intervals, with the oldest sometimes "bullying" younger birds, and while the youngest is rarely killed, it may die if food becomes scarce. The female remains on the nest constantly for first 30 days of the brooding period but any brooding afterwards is weather-driven (Zarn, 1974). By the time they reach seven weeks in age, the adult osprey will move to nearby perches during daylight, but brood in the nighttime hours. At five to six weeks old, young osprey begin wing flapping exercises and make their first flight at approximately eight to ten weeks. Unlike many birds that are susceptible to predation during attempts at flight, a young osprey (Gill, 1990) launches itself on its first flight wobbling and flapping uncertainly, quickly developing the necessary flight skills to gain altitude and climb steadily to circle and practice steering. Young osprey will continue to associate with the parent birds and nest site for about two months after fledging.

Osprey begin to migrate south in mid to late September continuing through October. Adults that experienced nesting failure migrate earlier than those that are successfully raising young (Zarn, 1974).

Habitat:
In seeking a management plan that promotes nesting, feeding, and raising osprey while at the same time preserving mission integrity at NCTAMSLANT Det Cutler, habitat needs and environmental factors must be considered.

One of the tools used in developing this plan was the U.S. Fish and Wildlife Service's (USFWS) Gulf of Maine's (GOM) Osprey Habitat Model (2000) which is based on Maine's Division of Inland Fisheries and Wildlife (MDIF&W) data identifying over 800 osprey nest sites throughout the state. This information was in turn digitized by USFWS / GOM; they determined that bare ground, palustrine scrub/shrub, palustrine emergent, palustrine coniferous and coniferous forested habitats had far greater frequency (2.5 to 10 times) than would be expected by chance, followed closely by palustrine deciduous and upland mixed forest by roughly half. They ranked foraging habitat within .5-2km from nest sites selecting riverine, lake and shallow coastal waters. The GOM Habitat Model (2000) for Osprey further classified most of the likely foraging waters adjacent to NCTAMSLANT Det Cutler as "low value foraging habitat" (with the exception of a few locations along the south shore of Sprague Point and adjacent to Cross, Scotch and Mink Islands identified as "likely feeding areas"). Incidentally, all sites identified within the boundary of the installation were classified as "medium value nesting". This is important because to be successful in discouraging use of the antennas and support structures and encouraging use of both natural sites and artificial platforms, serious consideration should be given to providing alternate locations in relation to the best feeding waters (Andres, personal observation).

Tall dead snags, surrounded by water, provide the ideal nesting site for ospreys; in the absence of that, they will nest in live trees with dead crowns, tall stumps or on man made structures. If suitable sites do not exist on or near the water, they may nest a mile or more from water as long as a food supply is readily available. The mean height of nests in some studies exceeded 25 meters, but some populations nest as low as 3 m above the water.

Jamieson (1982, et. al.) noted that osprey in northeastern Nova Scotia used two different habitats not unlike the two "sites" at NCTAMSLANT Det Cutler: birds chose to nest within 3.5 km of estuaries and those nesting inland (usually beside lakes and streams). This study also suggested that "coastal males" caught primarily flounder but that the "inland males" caught a greater variety of species such as yellow perch, suckers, herring and flounder. He further reported that the inland males shifted fishing sites at different times (to exploit changing foraging opportunities) versus coastal males that remained with coastal water feeding. This may prove an important point as the Cutler staff investigates discouraging active nesting on the antennas and structures.

Observations by USFWS and USDA personnel to NCTAMSLANT Det Cutler in the summer of 2006 seemed to suggest that the birds at the HF site exhibited signs of a loose colony; whereas the birds at the VLF site exhibited signs of independent nesters. (This is not to suggest that there is not some social foraging occurring between the HF and VLF site birds). Flemming and Bancroft (1991) suggest that colonial osprey provide more food to their young enhancing their reproductive success *possibly* as a result of social foraging saving time and energy in locating prey. They also noted that fledging success was greater for osprey nesting in coastal habitat than those nesting inland but that the rate of those nesting on structures solitarily was higher than those solitarily on natural sites even though both were of the same proximity to estuarine foraging areas. They concluded that it is likely that enhanced opportunities for social foraging by colonially nesting osprey can result in greater number of young birds fledged.

Another observation made by USDA and USFWS personnel in 2006 was that artificial nest platforms provided at the VLF site were too low in height when compared to the antenna structures located nearby. Some NCTAMSLANT Det Cutler osprey pairs have nested in excess of 100-200 feet above the ground while artificial platforms are situated only 8 to 10 feet high. Cutler personnel stated that they used excess antenna masts as support poles, but that they used them in shorter sections. It stands to reason that to encourage use of the artificial sites close to feeding waters, higher structures need to be considered somewhere on the installation. Higher platforms often experience stabilization problems, so site managers need to consider stabilization along with location, alternate perches, protection from the weather, visibility of the water, access to foraging waters, protection from predators and possibly protection from human disturbance.

In general, predation is usually minimal due to the attentiveness of the adult birds, but some predation by raccoon, great blue heron, gulls and ravens can potentially occur. While there is no evidence that predators on eggs and hatchlings is an issue at NCTAMSLANT Det Cutler, site managers have to consider the possibility to be successful in encouraging the birds to nest on alternate platforms or in a natural setting somewhere else on the site. It is well documented (Hagan and Walters,1990) that detection of predators is improved by flocking and that nests in center of colonies suffer less predation than those on the periphery of a site. In one osprey population in North Carolina, they further noted that mean flight distances to foraging areas are less for average colony members than for average members of dispersed population, thus there may be an energy benefit to colonies as well.

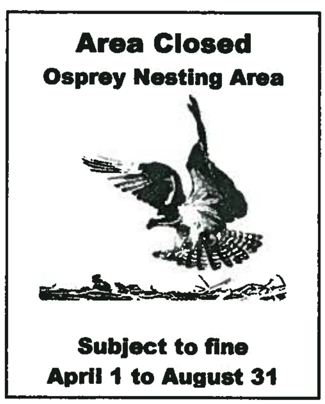
Some factors that serve to limit osprey numbers and productivity are important locally while others exert at least some pressure on every sizeable osprey breeding population (Zarn, 1974). French (1972) noted that onshore winds and fog could dissuade osprey from nesting close to the water as winds destroyed nests and fog restricted visibility and hampered feeding activity. High winds destroy nests and nesting snags throughout the year; lightning has also destroyed nests and killed young. Logging operations that clear snags and larger over story trees, especially within 2 miles of fishing waters, destroy preferred habitat (Kahl, 1972). Adams and Scott (1979) noted that osprey in coastal regions where timber is commercially harvested can tolerate some disturbance associated with harvesting. They suggest, however that tree harvesting be restricted to a minimum of 100m from established Osprey nest sites until sufficient data is collected for that site that supports otherwise.

Proposed three-tier management

I. Promote natural sites (Classifications based on USFWS GOM's Osprey Habitat Model 2000): The wooded area on Sprague Neck was once used as a military recreation site. It is forested with old growth spruce, fir and hemlock (classified high value nesting) and is situated near extensive mudflats (shallow water cove) providing "low value foraging". However, the 'Neck" juts into Machias Bay to the west and south and Holmes Bay to the north providing access to areas classified as "likely feeding areas" on the west side of the Bay and nearby Chance, Salt, Round, Bare, Bar and Yellow Head Islands.

The Sprague Neck wooded area at NCTAMSLANT Det Cutler offers the best potential *natural* nesting site on the installation. If at all possible and as long as it does not impact the site's military mission, this suitable habitat should continue to be protected from unnecessary clearing and or cutting. Particularly, a buffer of between 200 to 300 feet along the water's edge containing snags or live suitable trees for nesting, perching and roosting, should be established. Snags with broken tops and live trees at least 15 meters tall make good nest trees (Kahl, 1971) and these should be protected.

Zarn (1974) also recommended that signage be erected along established buffer shorelines; this serves to inform site employees, contractors, potential visitors and recreational and fishery-related watermen of active osprey nesting in the buffer zone and that these areas are closed to unnecessary access from 01 April to 31 August. While there is currently no plan to allow public access to the Sprague Neck area, personal observations (Andres, 2006) noticed a high amount of clamming – shell fishing of the mudflats north of the Neck at low tide. Posting of signs along the shoreline stating that the area is protected and off-limits (stating possible fines) adds another layer of protection to the military installation. This type of signage is often more effective to discouraging trespass as it appeals to more people than simple "keep out" signs. (Additional signage may be required to inform the public that the base is closed year round).



Sign Example
14" x 11"

II. Providing alternate site on viable platforms: Successful use of artificial nest platforms by osprey is well documented; the challenge at NCTAMSLANT Det Cutler is to encourage them to use platforms rather than the antenna arrays at both the HF and VLF sites.

The HF site is an inland 15 acre site surrounded by early success ional softwood forest. The area immediately surrounding the antennas is maintained in a natural grassland–shrubland habitat, bisected by stream flowage into a man-made reservoir. There are 18 active and 22 electrical antennas on this site; during the 2006 breeding season, five of these had active nests and produced young. The VLF site consists of 2800 acres of rocky shoreline, grassland, wetland, and forest. Due to its location on a peninsula, it is far less susceptible to human disturbance except for installation activities inland and the lobster, shellfish and fin fishing industries that access adjacent waters. The Sprague Neck section is heavily forested and is situated between Holmes Bay (shallow estuary) and the deep water Machias Bay. This area provides an exceptional opportunity to provide a natural nesting area. It is the larger antenna site that proves to be the greatest challenge as it includes 26 antenna masts and support towers with heights from 300 to 800 feet. These structures, with platforms at various heights provide stable platforms with unlimited visibility and have proved attractive to nesting osprey. Constructed artificial sites will have to compete with these towers.

Due to the differences in the HF and VLF sites, the management strategy may vary with regards to the location, height platform, and how many artificial nest sites are erected, maintained and monitored. Platforms for artificial nesting sites should not be erected if they are not monitored for use, predation and maintenance. As a result of a conversation with the Site Manager (Andres, Conant, Holmes, 2007), the decision was made to not promote osprey nesting at the HF with artificial platforms.

Van Daele (1982) noted that Osprey are adaptable and highly mobile raptors allowing them to nest successfully in a wide variety of conditions and that they easily adjust to 'some' human disturbance. He found that osprey pairs nesting on artificial sites were the most productive because the sites provided stable support minimizing the chance of blow-down during severe windstorms. Most of these sites were also isolated (by either height or location) from human disturbance. (He further noted however, that while other sites have experienced like results, success on artificial structures is not higher than natural sites in all instances). The Van Daeles also noted that osprey nesting near humans eventually tolerate human activities while those nesting away tolerate less, but that those nesting near humans generally stay on nest longer and were more territorial during human approaches than those nesting away from human activity (particularly during the incubation period).

Artificial nest sites should be considered only in those areas where timber management or protection from disturbance is not an issue. Since osprey may use the same sites as they or other individuals have used in previous years, efforts should be directed towards improving those sites that do not interfere with NCTAMSLANT Det Cutler's mission. Since some of the sites pose potential health hazards (HF radiation), or the presence of their nests interferes with movement of the VLF arrays, efforts should be undertaken to discourage their use of the antenna structures and to encourage nesting elsewhere.

Proactive nest management requires regular observation and documentation. Nest status is determined by the bird's activity at any given time which in turn determines the action needed to manage that nest. If use by osprey of a particular nest site is either detrimental to the bird's health (radiation hazards) or impacts the site's communication mission, efforts should be undertaken to discourage a pair's continued use of the site *during construction prior to laying eggs*. Removal of the nesting material during the nest building process is the recommended action and will likely require more than one visit to the site to discourage "rebuilding". The Site Manager may want to consider a "structural bird deterrent" device; this can be anything that interferes with nest-building and discourages the bird from continued use of the nest site. If the Site Manager chooses this method, regular observations of the site have to occur as osprey often find ways to circumvent these devices. **Important note: Once the first egg is laid, the nest becomes active and proper removal requires contracting with a licensed wildlife damage control agency and/or licensed wildlife rehabilitator.**

Under Avian Protection Plan (APP) guidelines, nesting platforms have proven to be valuable tools in dealing with problem nests in other arenas (i.e. powerline poles, etc.); however, nesting platforms are most successful when placed near the location of the initial nesting effort and some sort of structural bird deterrent is placed at the initial location. The new platform pole should be as tall (or taller) than the existing location. (Due to the extremely high location of past nests at the VLF site, this may not be practical as some pairs have been observed nesting at heights in excess of 100 feet).

To encourage use of alternate nest sites, they should be designed / situated in such a way to be attractive to the pair (i.e. close to water, cleared of nearby vegetation, situated near a perching post, isolated from human disturbance, etc.). A consistent monitoring program assists the Site Manager by providing a historic perspective of past use of individual nest sites, trends, and location and nest platform effectiveness. If a nest platform has not been used for two to three consecutive years, the Site Manager will reevaluate and possibly relocate it.

It is surmised that the VLF osprey choose the sites for a number of reasons: stability in high winds, high from human disturbance, clear view, numerous perching locations in view of the nest, and safety from predators (unknown predation on eggs by other avian or mammalian species). While Zarn (1974) noted that osprey readily nest on artificial structures, those areas that have an adequate fishery but lacking structures, should receive primary attention in nest structure placement. Artificial sites should offer an elevated, unrestricted view and access to a food supply.

Discussions with the telecommunications manager (Andres-Holmes, 2006) reveal that occasionally, antenna masts/structures are replaced. The older units have been used for platforms, but in most cases, are placed much lower than the selected site. Consideration should be given to placing platforms on structures as high as possible (ideally between 15 and 30 m above the site within view of the water's edge). These platforms should be "pre-weaved" with driftwood and debris removed from other nests to encourage adult osprey to select and use the platform. Artificial nest sites should be numbered, maintained and monitored for success to help determine future artificial site selection. Artificial sites that have not been used for two consecutive seasons should be relocated. Stability of nesting platforms is important; guide lines may be necessary in areas where the platform sways. If an artificial platform is successful, every effort should be taken to prevent unnecessary disturbance to the nesting birds.

Chemical application. With regards to pesticide or herbicide applications, because of the deleterious effects on osprey reproductive success, no organochlorine pesticides should be used in osprey fishing waters, or in any watershed upstream from such waters. Before implementing any chemical control procedure, fully ascertain its effect on osprey reproductive success and /or food supplies (Johnson and Melquist, 1973; Roberts, 1970).

Platform design. Rhodes' (1972) nest structures were erected on both 20 foot and 14 foot 5 inch diameter creosoted poles; however, he raised his on saltmarsh with relatively little to compete with height-wise. Tops of his poles were notched on either side and held secure by two 2x4's bolted horizontally in place. Additionally, 2 2x2s added to the top of this "cross-wise" to provide a flattened area; welded wire was attached to the top and weaved with naturally occurring down fall and driftwood imitating natural nests. The entire structure was then placed in a hole 5 feet deep leaving a structure above ground reaching only 15 ft (9 ft in the case of14 foot poles). After five years however, he found that the elevated platforms productivity was slightly less than natural sites. Artificial platforms at NCTAMSLANT Det Cutler may utilize excess tower sections or radio masts, so platforms will be modified accordingly.

Osprey platform diagram

Additionally, it is well documented that adult osprey prefer sites where alternate perches are available. Zarn (1974) stated that, aside from placement of artificial nesting platforms, serious consideration should be given to placement of an accessory perching post near the platform. Osprey will utilize almost any elevated structure as a perch, provided it remains within site of the nest, for sunning and protection from the wind. Kahl and Garber (1972) both found that the optimum accessory perch averaged 19m in height and 89 m in distance from the nest.

III. Active Nest Removal: It is recognized that the U. S. Navy has a mission need for the telecommunication services provided by NCTAMSLANT Det Cutler that are unique to this site's design and location; it is equally recognized that the Department of the Navy has an obligation to protecting our nation's natural resources. While recognizing the need to take every precaution to protect wildlife resources, it cannot do so at the risk of decreasing mission efficiency or effectiveness. Conversely, it cannot promote the protection of a wildlife resource in a situation that may adversely affect the health of a given population.

This portion of the management plan is the most sensitive from a biological, political and legal standpoint. **An active nest is defined as any nest or nest site that the adult osprey has laid eggs or is raising hatchlings in.** In partnership with the USDA, the USFWS, and at the direction of Commander, Navy Region Mid-Atlantic's Environmental Programs, the following is recommended as a resource management policy to protect nesting ospreys at NCTAMSLANT Det Cutler.

While every precaution should be taken to discourage an adult pair of osprey from constructing a nest in a location detrimental to the mission or the bird, once a nest is active, and it is determined that continued use by the osprey negatively impacts the military mission or the osprey's health (i.e. radiation hazards from electromagnetic energy), the Site Manager is required to work with a certified Wildlife Biologist in safe removal of the eggs / hatchlings. DoN will contract / provide the required funding to work with a USDA-Wildlife Services, Wildlife Biologist to remove and/or transport the eggs / hatchlings from the nest to a federally permitted wildlife rehabilitator where they will be cared for until released into the wild.

If the Site Manager decides that an active nest impacts the mission or endangers the bird, he alone will determine the action to be taken in coordination with USDA-Wildlife Services, USFWS and MEDEP. In accordance with the attached Migratory Bird Depredation Permit, Commander, Navy Region Mid-Atlantic, Regional Environmental Coordinator, NCTAMSLANT Det Cutler, is authorized to remove **20 active nests per year** due to the interference with the site's mission.

Only once the eggs or hatchlings are safely removed will the Site Manager authorize removal of the nest material. If viable, safe or practical to do so, serious consideration should be given to removing the nest intact to a nearby site so that the adult birds can complete 'naturally' raising the hatchlings. However, if this is not possible, the eggs or hatchlings must be moved and transported by a trained Wildlife Biologist or a permitted wildlife rehabilitator.

Osprey activity should be monitored and documented, noting sites where osprey pairs are congregating so that early removal of the nest **prior to becoming active** can take place. Regardless how many times the technician removes inactive nest material, it does not count against the permitted twenty. If possible, removed nesting material should be preserved and used on alternate artificial nest platforms.

Monitoring, documenting and use of structural bird deterrent devices

Long term management success of any species requires consistent, regular monitoring and documentation including documenting arrival, pair numbers, locations, brood observations, and departure dates. This will result in program improvement with each subsequent year and program integrity. Additionally, it can facilitate future wildlife management plans and support the Department of the Navy's stand that they are acting in the best interest of the species if the program is brought into question.

Using past year observations, the NCTAMSLANT Det Cutler nesting sites should be labeled by region or area on the installation (i.e. HF, VLF, Spragues Neck). Since each antenna and support tower presumably has an identifying number that will identify potential nests sites, artificial platforms should be numbered as well. The numbering system should remain consistent with subsequent year. At the VLF site, each tower is segmented into sections and they should be numbered as well (to assist in tracking "nest above ground" height preferences over time).

As stated earlier, arrival of the first osprey to the Cutler area during a given year may occur as early as mid-March; subsequent arrival of other individuals will occur through mid-April. Observing the first bird of the season initiates the monitoring phase. All potential nesting areas should be checked no less than once a week. More frequent checks may be necessary if discouraging nesting at a particular site or monitoring progress of hatchlings. Bird use or interest of any site should be documented in log format. (See attached recommended format).

Once an adult bird exhibits nest building behavior (i.e. two birds perched nearby, movement back and forth of material, etc), the Site Manager needs to be notified. He will determine, based on material on nest and estimated building time, to remove the material. Once done, the bird may continue to build the nest at this location so the site should be visited daily until the bird is discouraged and chooses another location. All activity associated with the nest removal should be logged and maintained.

Osprey timetable in northeastern Maine (estimated):

Mid-March to mid-April: osprey arrive
April to early May: nest construction
End April to early June: egg laying
33-35 days end May to early July: incubation
6-10 days after last egg hatch: both adults cease incubation
Possible frustration nesting occurs
Next 30 days, female remains on/near nest
5-6 weeks after hatch: wing flapping exercises begin
8-10 weeks after hatching: first flights
2 months: young associate with adult birds

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OSPREY ACTIVITY LOG
NCTAMSLANT Det Cutler, Cutler, Maine

Date	Time	Site Number		Comments