



U.S. Fish & Wildlife Service

# Maine Coastal Islands National Wildlife Refuge

*Final Environmental Impact Statement for  
the Comprehensive Conservation Plan*

*April 2005*



**Cover Photos:** Cross Island, *USFWS*  
Harbor seal, *USFWS*  
Atlantic puffin, *USFWS*  
Roseate tern, *Gil Lopez-Espina*



*This goose, designed by J.N.  
“Ding” Darling, has become a  
symbol of the National Wildlife  
Refuge System.*

The *U.S. Fish and Wildlife Service* is the principal Federal agency responsible for conserving, protecting, and enhancing fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The Service manages the 95-million acre National Wildlife Refuge system comprised of more than 545 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological services field stations. The agency enforces Federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid Program which distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

Comprehensive Conservation Plans provide long term guidance for management decisions and set forth goals, objectives, and strategies needed to accomplish refuge purposes and identify the Service’s best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.



U.S. Fish & Wildlife Service

# Maine Coastal Islands National Wildlife Refuge

*(formerly Petit Manan National Wildlife Refuge Complex)*

*Final Environmental Impact Statement for the  
Comprehensive Conservation Plan*

*April 2005*

U.S. Fish and Wildlife Service  
Refuge Headquarters  
P.O. Box 279, Water Street  
Milbridge, ME 04658-0279

# Maine Coastal Islands National Wildlife Refuge

## Final Environmental Impact Statement

### April 2005

#### Abstract

**Type of action:** Administrative  
**Lead agency:** U.S. Department of the Interior,  
Fish and Wildlife Service  
**Responsible official:** Marvin Moriarty, Regional Director, Region 5  
**For further information:** Refuge Manager  
P.O. Box 279, Water Street  
Milbridge, ME 04658-0279

The Final Environmental Impact Statement for Maine Coastal Islands National Wildlife Refuge fully compares four management alternatives. Its eleven appendices provide additional information supporting our analysis. A brief overview of each alternative follows.

#### Alternative A Current Management

**Refuge expansion of 1,034 acres and continued current management.** This is the “no action” alternative required by regulations under the National Environmental Policy Act of 1969. Although it would expand the Petit Manan Refuge by 1,034 acres beyond the current approved boundary, selecting this alternative would otherwise maintain the status quo in refuge management actions over the next 15 years. Thus, it provides a baseline for comparing or contrasting the three “action” alternatives.

#### Alternative B Preferred Alternative

**Refuge expansion of 2,459 acres and notably expanded management and recreation.** Selecting this alternative would expand the Petit Manan Refuge by 2,306 acres beyond the current approved boundary on 87 nationally significant seabird, wading bird, or bald eagle coastal nesting islands and 153 acres of wetlands on the mainland. It would add six new seabird restoration projects to our present six, and intensify the focus of our biological programs on birds of high conservation priority in the Gulf of Maine. It would increase opportunities for wildlife-dependent recreation, especially in our environmental education and interpretation programs, build new trails on the Gouldsboro Bay, Sawyers Marsh, and Corea Heath divisions, and open the Petit Manan Point Division for deer hunting. And, it would recommend that 13 Refuge islands in 8 wilderness study areas be included in the National Wilderness Preservation System. Refuge staffing and budgets would increase commensurately. We recommend this alternative for approval.

#### Alternative C

**Refuge expansion of 6,463 acres and greatly expanded management and recreation.** Selecting this alternative would expand the Petit Manan Refuge by 6,463 acres beyond the current approved boundary, adding 6,310 acres on all or parts of 151 seabird or bald eagle nesting islands and 153 acres of wetlands on the mainland. Its wilderness proposal mirrors the proposal in alternative B. It would create 12 new seabird restoration projects, and allow trapping under refuge regulations on three mainland divisions and Bois Bubert and Cross islands. New trails would be developed on refuge mainland divisions, the same as alternative B. This alternative would also require the greatest budget and staffing increases.

#### Alternative D

**No refuge expansion beyond the current approved boundary and reduced management with minimal human intrusion.** This alternative adopts a custodial or low intervention approach to management. Selecting it would neither expand a refuge nor recommend wilderness designation. It would restore only minimal seabird habitat, focus our public use, environmental education and interpretation on offsite programs, and close all refuge islands to public access. Except for our emergency intervention to avert or mitigate catastrophic events, it would leave refuge habitats and species to the effects of environmental processes.

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## Chapter 1



*John Hollingsworth Memorial Trail Shoreline, Petit Manan Point Division*  
USFWS photo

# The Purpose of and Need for Action

- Introduction
- The Purpose of and Need for Action
- Project Area
- Service Policies, Mandates, and National and Regional Conservation Plans Guiding the Project
- Refuge Purposes and Land Acquisition History
- Existing Refuge Operational Plans (“Step-down” plans)
- Refuge Vision Statement
- Refuge Goals
- The Comprehensive Conservation Planning Process
- Issues, Concerns and Opportunities
- Issues Outside the Scope of this EIS
- Plan Amendment and Revision

## Introduction

This final Environmental Impact Statement (EIS) for Maine Coastal Islands National Wildlife Refuge (Refuge) (formerly called Petit Manan National Wildlife Refuge Complex) combines two documents required by Federal laws: a CCP, required by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57) (Refuge Improvement Act) and an EIS required by the National Environmental Policy Act of 1969 (NEPA). The final decision from this document will result in a CCP for the Refuge. The CCP will guide management decisions and actions on Refuge lands over the next 15 years. It will also be used as a tool to help the State of Maine natural resource agencies, our conservation partners, Tribal governments local communities, and the public understand and support Refuge priorities.

This document has six Chapters and eleven Appendices. Chapter 1 is the Purpose of and Need for the Action and it sets the stage for Chapters 2 through 4. It...



*Petit Manan Island*  
USFWS photo

- describes the purpose and need for a CCP for the Refuge;
- identifies national and regional mandates and plans that influenced this document;
- highlights the purposes for which each of the five refuges in the Refuge were established and their land acquisition histories;
- identifies the status of refuge management plans;
- presents the vision and goals for the Refuge;
- explains the planning process used to develop this document; and,
- describes the issues and concerns addressed during the planning process.

Chapter 2, Description of the Alternatives, presents four management alternatives, including current management and the Service's Preferred Alternative, which offer different strategies for meeting goals and objectives and responding to issues.

Chapter 3, Description of the Affected Environment, describes the existing physical, biological, and human environment.

Chapter 4, Environmental Consequences, evaluates the environmental consequences of implementing each of the four proposed management alternatives.

Chapter 5, Consultation and Coordination with Others, summarizes public and partner involvement in the planning process.

Chapter 6, List of Preparers, credits Service and non-Service contributors.

Eleven appendices provide additional documentation and reference information used in compiling this document.

## The Purpose of and Need for the Action

Our proposed action is to develop a CCP for the Refuge that best achieves the Refuge's purposes, vision, and goals; contributes to the National Wildlife Refuge System (Refuge System) mission; adheres to Service policies and mandates; addresses significant issues; and incorporates sound principles of fish and wildlife management.

NEPA regulations require an evaluation of a reasonable range of alternatives, including the proposed action and *no action*. This final EIS evaluates four alternatives designed to represent different ways of achieving all or most of the criteria noted above. We generated each alternative assuming its potential to be fully developed into a final CCP. Our analysis includes the predicted socioeconomic, physical, cultural, and biological benefits and consequences of implementing each alternative. For the remainder of this report, the Service's Preferred Alternative, described in detail as Alternative B in Chapter 2, defines the proposed action.

Developing a CCP with partner and public involvement is vital to the future management of every national wildlife refuge. A CCP's *purpose* is to provide the Refuge with strategic management direction for the next 15 years by:

- providing a clear statement of desired future conditions for habitat, wildlife, visitor services, staffing, and facilities;
- providing State agencies, refuge neighbors, visitors, and partners with a clear explanation of the reasons for management actions;
- ensuring refuge management reflects the policies and goals of the Refuge System and legal mandates;
- ensuring the "compatibility" of current and future public use;
- providing long-term continuity and direction for Refuge management; and,
- providing direction for staffing, operations, maintenance, and annual budget requests.

The present *need* to develop the Refuge CCP is manifold. First, the 1997 Refuge Improvement Act requires that all national wildlife refuges have CCPs in place by 2012 to help fulfill the mission of the Refuge System. Second, the Refuge lacks a master plan to accomplish the actions noted above in an environment that has changed dramatically since the Refuge was first established. For example, its island holdings have more than tripled, significant mainland acquisition has also occurred, staffing has increased, a second office has opened, pressures for increasing public access continue to grow, and new ecosystem and species plans have been developed with direct bearing on Refuge management. Third, we also

want to evaluate the need and establish criteria for a proposed new Refuge Headquarters and Coastal Education Center. Proposed site criteria are presented in Chapter 3 under Refuge Administration. Fourth, we have developed strong partnerships, vital to our continued successes. We feel it is our responsibility to clearly develop our priorities through this plan. Finally, we need a CCP to guide us in future land protection that promotes the conservation of nationally significant coastal habitats and Federal trust species.

Our planning process allows Maine State agencies, Tribal governments, the public, and our partners to actively engage in its development so we are better able to resolve management issues and concerns. All of these reasons clearly underscore the need for the strategic direction provided in a CCP.

## Project Area

*“...is comprised of five separate refuges: Cross Island, Petit Manan, Seal Island, Franklin Island, and Pond Island.”*

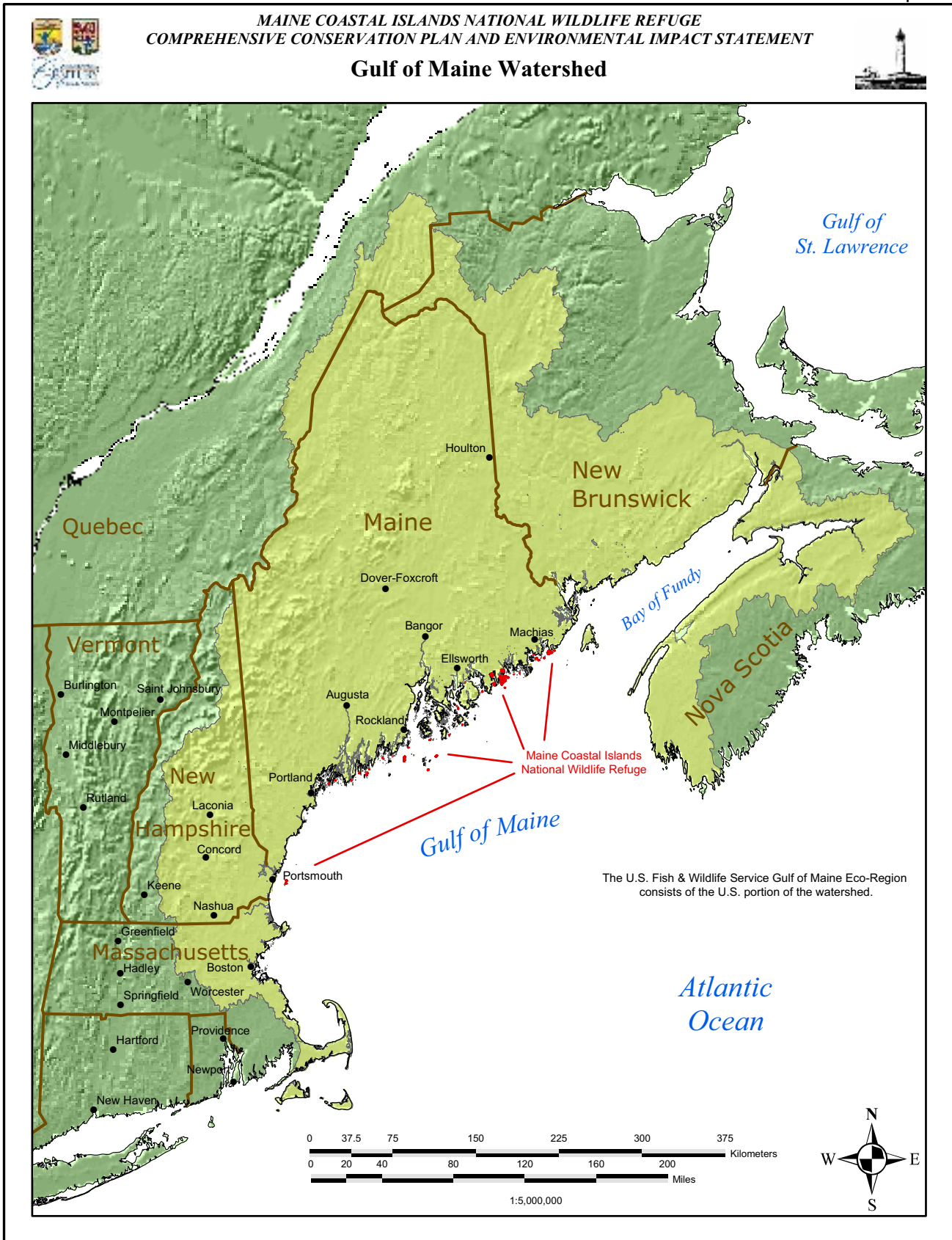
The Refuge lies within the Gulf of Maine Watershed in the State of Maine (Map 1-1). It is comprised of five separate refuges: Cross Island, Petit Manan, Seal Island, Franklin Island, and Pond Island. Each have separate establishment histories and refuge purposes as described below, but are referred to collectively as the “Maine Coastal Islands National Wildlife Refuge.” Seal, Franklin, and Pond islands are single island refuges. Cross Island Refuge is a six island complex, while Petit Manan Refuge includes 33 islands and 3 mainland divisions: Petit Manan Point (2,195 acres), Sawyers Marsh (933 acres), and Gouldsboro Bay (607 acres) divisions. One additional division, Corea Heath (400 acres), is a pending transfer from the U.S. Navy to Petit Manan Refuge. All totaled, the Refuge includes approximately 7,961 acres of diverse coastal Maine habitats including forested and non-forested offshore islands, coastal salt marsh, open field, and upland mature spruce-fir forest. The acreage is considered approximate because of the variability in the accuracy of our sources. We use surveyed acres, the most accurate, where available; otherwise, we may

use less accurate deed acres or GIS-generated mapping acres. Also, it is important to note that Service acquisition of approved islands has been on-going during development of this EIS. Refuge Headquarters would have the most up-to-date ownership information.

The project analysis area includes lands owned by the Service, as well as lands evaluated for future Service acquisition. As such, all 42 Refuge islands, the four mainland divisions, and Machias Seal Island which is managed by the Service under a Memorandum of Understanding (MOU) with the State of Maine, are included. In addition, a mainland parcel in the town of Cutler called “Sprague Neck,” and 151



*Cross Island with Double Head Shot islands in the background*  
USFWS photo



Maine coastal nesting islands considered nationally significant, but currently not in permanent protection (see the Maine Coastal Islands Project discussion below) are included.

Given the geographic distribution of the lands evaluated in this plan, the project analysis area stretches along the entire 200 air-miles of the Maine coastline, from approximately the New Hampshire border, downeast to Cobscook Bay (Refer to Maps 1-2 to 1-12 at end of chapter).

## **Service Policies, Mandates, and National and Regional Conservation Plans Guiding the Project**

### **The U.S. Fish and Wildlife Service and its Mission**

This section presents hierarchically, from the national to the local level, highlights of Service policy, legal mandates and regulations, and existing resource plans and conservation initiatives which directly influenced development of this draft CCP/EIS.

The U.S. Fish and Wildlife Service (Service) administers the National Wildlife Refuge System. The Service is part of the Department of Interior. Its mission is:

*“Working with others, to conserve, protect, and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people.”*

By law, Congress entrusts national resources to the Service for conservation and protection: migratory birds and fish, Federal-listed endangered and threatened species, inter-jurisdictional fishes, wetlands, certain marine mammals, and national wildlife refuges. The Service also enforces Federal wildlife laws and international treaties on importing and exporting wildlife, assists with state fish and wildlife programs, and helps other countries develop wildlife conservation programs.

The Service manual contains the standing and continuing directives to implement its authorities, responsibilities, and activities. This manual can be accessed at:

<http://www.fws.gov/directives/direct.html>

Special Service directives which affect the rights of citizens or the authorities of other agencies are published separately in the Code of Federal Regulations (CFR) and are not duplicated in the Service manual. Most of the current regulations that pertain to the Service are issued in 50 CFR parts 1-99. CFRs can be accessed at:

<http://www.access.gpo.gov/nara/cfr/index.html>

### **The National Wildlife Refuge System and Its Mission**

The National Wildlife Refuge System (Refuge System) is the world’s largest collection of lands and waters set aside specifically for the conservation of wildlife and ecosystem protection. Over 540 national wildlife refuges are part of the national network today. They encompass more than 95 million acres of lands and waters in all 50 states and several island territories. At least 40 million visitors hunt, fish, observe and photograph



wildlife, or participate in environmental education and interpretive activities on refuges across the nation each year.

In 1997, the National Wildlife Refuge System Administration Act of 1966 was amended by the National Wildlife Refuge System Improvement Act (Refuge Improvement Act; Public Law 105-57). This legislation established a unifying mission for the Refuge System, a new process for determining compatible public use activities on refuges, and the requirement to prepare CCPs for each refuge. The Refuge Improvement Act states that first and foremost, the Refuge System must focus on wildlife conservation. It further states that the Refuge System mission, coupled with the purpose(s) for which each refuge was established, will provide the principal management direction on that refuge.

The mission of the Refuge System is:

*“To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (Refuge Improvement Act; Public Law 105-57)*

The Refuge Improvement Act declares that all existing or proposed refuge uses must be “compatible” with the refuge’s purpose and consistent with public safety. “Compatibility” is determined by the refuge manager after evaluating an activity’s potential effect on refuge resources and determining it supports the Refuge System mission and does not interfere with or detract from the refuge purposes and goals. Six wildlife-dependent public uses were designated in the legislation to receive enhanced consideration on refuges and in CCPs. The six priority uses are: hunting, fishing, environmental education and interpretation, and wildlife observation and photography.

The Refuge System manual provides a central reference for current policy governing the operation and management of the Refuge System not covered by the Service manual, including technical information on implementing refuge policies and guidelines. This manual can be reviewed at Refuge Headquarters.

### **Fulfilling the Promise**

This report on the National Wildlife Refuge System is the culmination of a yearlong process involving teams of Service employees who examined the Refuge System within the framework of Wildlife and Habitat, People and Leadership. The report was the result of the first-ever System Conference held in Keystone, Colorado in October 1998, attended by every refuge manager in the country, other Service employees, and scores of conservation organizations. The heart of the report is the collection of vision statements and 42 recommendations. Many “Promises Teams” have been formed to develop strategies for implementing the recommendations. We utilized

information from such teams as Wildlife and Habitat Goals and Objectives, Strategic Growth of the Refuge System, Invasive Species, and Inventory and Monitoring. Their recommendations helped guide the development of goals, strategies and actions in this draft CCP/EIS.

### Other Mandates

While Service and Refuge System policy and each refuge's purpose provide the foundation for management, national wildlife refuges are administered consistent with a variety of other Federal laws, executive orders, treaties, interstate compacts, and regulations pertaining to the conservation and protection of natural and cultural resources. The *Digest of Federal Resource Laws of Interest to the USFWS* lists them and can be accessed at:

<http://laws.fws.gov/lawsdigest/indx.html>

Chapter 4, Environmental Consequences, specifically evaluates compliance with the Clean Water Act, Clean Air Act, the National Historic Preservation Act, the Archeological Resources Protection Act, and the Endangered Species Act. This final EIS is written to fulfill compliance with NEPA.

### National and Regional Plans and Conservation Initiatives Guiding Project

#### North American Waterfowl Management Plan (NAWMP; update 2004)

This plan outlines the strategy among the United States, Canada, and Mexico to restore waterfowl populations through habitat protection, restoration, and enhancement. Implementation of this plan is accomplished within 15 habitat "Joint Venture" partnerships in the U.S. and Canada and 3 species Joint Ventures: Arctic goose, black duck, and sea duck. Our project area lies within the Atlantic Coast Joint Venture which includes all the Atlantic Flyway states from Maine to Florida and Puerto Rico. Six priority focus areas are identified for Maine. Five of these areas are coastal and consist of 51,831 acres of wetlands and associated uplands in need of protection and management. Most of the Refuge mainland lies in the Downeast Focus Area. A map of focus areas in Maine can be viewed at:

<http://www.acjv.org>

The waterfowl goal for the Atlantic Coast Joint Venture is to:

*"Protect and manage priority wetland habitats for migration, wintering, and production of waterfowl, with special consideration to black ducks, and to benefit other wildlife in the joint venture area."*

Both the Black Duck and Sea Duck joint venture plans are also relevant to our project. Black ducks utilize the Refuge during fall migration, and many sea duck species winter in Maine's coastal waters. Specifically, many islands in our project area are important common eider nesting sites.

We used these plans as we developed goals and objectives for waterfowl and their habitats, and for land protection. The 2004 update for the North American Waterfowl plan can be accessed at:

<http://northamerican.fws.gov/NAWMP/nawmphp.htm>

The Black Duck Joint Venture Plan (Final Draft - Strategic Plan, April 1993) can be accessed at:

<http://www.pwrc.usgs.gov/bdjv/bdjvback.htm>

The SeaDuck Joint Venture can be accessed at:

<http://seaduckjv.org>

### **North American Waterbird Conservation Plan (Version 1, 2002)**

This plan is an independent partnership among individuals and institutions with interest and responsibility for conserving waterbirds and their habitats. The plan is just one element of this multifaceted conservation program. The primary goal of the plan is to ensure the distribution, diversity, and abundance of populations and habitats of breeding, migratory, and non-breeding waterbirds are sustained or restored throughout the lands and waters of North America, Central America, and the Caribbean. The plan provides a framework for conserving and managing colonially nesting water-dependent birds. In addition, it will facilitate continent-wide planning and monitoring, national- state-provincial conservation action, regional coordination, and local habitat protection and management. Regional planning information is being prepared for the Mid-Atlantic New England Working Group.

We used the plan in the development of objectives, actions and strategies for protecting and managing waterbirds. This plan can be accessed at:

<http://www.nawcp.org>

Additional information is available at the following web site:

<http://birds.fws.gov/regionalplanninginternal/MANEM/>

### **U.S. Shorebird Conservation Plan (2001 Update) and Northern Atlantic Regional Shorebird Plan (Draft 2002)**

This plan is a partnership effort being undertaken throughout the United States to ensure that stable and self-sustaining populations of all shorebird species are restored and protected. Collaborators include local, state, and Federal agencies, non-governmental organizations, business-related sectors, researchers, educators, and policy makers. The plan was closely coordinated with NAWMP and Joint Venture professionals, as well as the Partners In Flight and North American Waterbird Plan teams as they concurrently developed their revised national plans. These experts helped set conservation goals for each region of the country, identified critical habitat and research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face. The partnerships responsible for development of the plan are remaining active and are working to improve and implement the plan's many recommendations.

The U.S. Shorebird Plan identifies three primary objectives:

1. Development of a standardized, scientifically-sound system for monitoring and studying shorebird populations that will provide practical information to researchers and land managers for shorebird habitat conservation;
2. Identification of the principles and practices upon which local, regional and national management plans can effectively integrate shorebird habitat conservation with multiple species strategies;
3. Design of an integrated strategy for increasing public awareness and information concerning wetlands and shorebirds.

Regional plans, such as the North Atlantic Regional Shorebird Plan, are being developed as part of the overall strategy. The North Atlantic Plan is in draft, but provides detailed information on shorebird species of high conservation concern within the region. Once completed, the plan will enhance shorebird diversity and individual species' populations through regional population, habitat, research, and education goals and objectives, and identifying specific management needs and projects to implement.

We used this regional plan in developing our Species of Concern List (Appendix B). The national plan can be accessed at:

<http://shorebirdplan.fws.gov/USShorebird.htm>

The website for accessing the regional plan is:

<http://shorebirdplan.fws.gov/RegionalShorebird/RegionalPlans.htm>

### **Regional Wetlands Concept Plan – Emergency Wetlands Resources Act (1990)**

In 1986, Congress enacted the Emergency Wetlands Resources Act to promote the conservation of our nation's wetlands. The act directed the Department of Interior to develop a National Wetlands Priority Conservation Plan identifying the location and types of wetlands that should receive priority attention for acquisition by Federal and state agencies using Land and Water Conservation Fund appropriations. In 1990, the Service's Northeast Region completed a Regional Wetlands Concept Plan to provide more specific information about wetlands resources in the Northeast. A total of 850 wetland sites were identified for protection because of their value, scarcity, and vulnerability. In Maine, 71 wetland sites were identified, with 34 sites (43,445 acres) located within 10 miles of the coastline. We used this information as we developed our land protection strategies.

### **Roseate Tern Recovery Plan, Northeastern Population (First Update 1998)**

This revised roseate tern (*Sterna dougallii*) recovery plan was completed in 1998. The plan summarizes life history, ecology, population status, and



*Roseate tern with fish*

Photo courtesy of Gil Lopez-Espina

known threats to the recovery of this Federal-listed endangered species. The following recovery objectives were established:

**Primary objective:** To increase the Northeast nesting population of roseate terns (U.S. and Canada) to 5,000 breeding pairs. This total should include at least six large colonies with high productivity within the species current geographic distribution.

**Secondary objectives:**

1. To expand the number of roseate tern breeding colonies to 30 or more sites; and,
2. To expand the breeding range to historically occupied areas south of the current range.

Over 50 specific tasks are identified that need to be undertaken to meet recovery objectives. We used this plan as we developed management goals and objectives for roseate tern.

### **Northern States Bald Eagle Recovery Plan (1983)**

This plan describes actions believed necessary to assure the survival and recovery of bald eagles in the 24 states encompassed by the plan. The primary objective is to reestablish self-sustaining populations of bald eagles throughout the Northern States Region. The initial tentative goal is to have 1,200 occupied breeding areas distributed over a minimum of 16 states with an average annual productivity of at least 1.0 young per occupied nest. Specific recovery tasks fall into four general categories:

1. Determine current population and habitat status;
2. Determine minimum population and habitat needed to achieve recovery;
3. Protect, enhance, and increase bald eagle populations and habitats; and
4. Establish and implement a coordination system for information and communication.

A proposal to de-list the bald eagle nationally is pending, but the Service remains concerned with permanent habitat protection.

We utilized this plan as we developed goals and objectives and our land acquisition proposal.

### **Partners In Flight Landbird Conservation Plans**

In 1990, Partners in Flight (PIF) was conceived as a voluntary, international coalition of government agencies, conservation organizations,



academic institutions, private industry, and other citizens dedicated to reversing the population declines of bird species and “keeping common birds common.” The foundation of PIF’s long-term strategy for bird conservation is a series of scientifically-based bird conservation plans, using physiographic provinces as the planning units. There are two physiographic plans that cover our Project Area, and they are described in more detail below.

The goal of each PIF plan is to ensure long-term maintenance of healthy populations of native birds, primarily non-game birds. Within each physiographic area, the plans rank bird species according to their conservation priority, describe desired habitat conditions, develop biological objectives, and recommend conservation measures. Habitat loss, population trends, and vulnerability of a species and its habitats to regional and local threats all factor into the priority ranking. Many of the top ranked species in the two plans below either breed or migrate through the Refuge.

At this writing, final plans are not yet available; however, we referenced the draft plans as we developed habitat goals and objectives.

These plans can be accessed at:

<http://www.partnersinflight.org>

#### Physiographic Area 27 - Northern New England (October 2000)

The scope of this plan covers some of our inland Refuge lands. Northern hardwood and mixed forest objectives emphasize maintaining stable populations of wood thrush, black-throated blue warbler, Canada warbler, northern goshawk, sharp-shinned hawk, and Cooper’s hawk. The plan assumes that maintaining habitat for species such as goshawk, sharp-shinned and Coopers hawks, which typically have larger home ranges, will adequately provide habitat for most other landbirds of conservation concern dependent on this forest type.

Objectives for early successional forest/edge habitat emphasize golden-winged warbler, chestnut-sided warbler, and American woodcock. Objectives for mature conifer (spruce-fir) forest habitat emphasize Blackburnian warbler, bay-breasted warbler, and black-backed woodpecker.

#### Physiographic Area 28 - Eastern Spruce-Hardwood Forest (Draft June 2000)

The scope of this plan covers most of the Refuge mainland and all the islands. Maritime marsh and estuary objectives in this plan emphasize

maintaining stable populations of Nelson's sharp-tailed sparrow and American black duck. Northern hardwood and mixed forest objectives emphasize maintaining stable populations of Canada and black-throated blue warbler.

Mature conifer (spruce-fir) forest objectives emphasize maintaining stable populations of black-throated green, Northern parula, and Blackburnian warbler; spruce grouse; olive-sided flycatcher; boreal chickadee; pine grosbeak; and red crossbill. Objectives for early successional forest/edge habitat emphasize species such as American woodcock, olive-sided flycatcher, and Nashville and chestnut-sided warbler. Objectives for freshwater emphasize the American black duck.

### **Tern Management Plan (June 2002)**

The Tern Management Plan provides historic background, a review of factors limiting populations, life history information, and techniques for managing and monitoring the tern species nesting from New York to Newfoundland. The plan also identifies research needs and assesses the size and distribution of tern populations within the region. Primarily, it focuses on coastal populations of common, Arctic, roseate, and least terns. The document provides specific management techniques to help achieve the goals set forth in several previous planning approaches that have been developed across the Northeast region. We used this plan in developing our tern objectives and strategies.

### **Birds of Conservation Concern 2002 Report and the Atlantic Northern Forest Bird Conservation Region Blueprint (draft 2003)**

This report was developed by the Service in consultation with the leaders of ongoing bird conservation initiatives and partnerships such as Partners In Flight, the North American Waterbird Conservation Plan, and the U.S. Shorebird Conservation Plan. It fulfills the mandate of the 1988 amendment to the Fish and Wildlife Conservation Act of 1980 (100 Public Law 100-653, Title VIII) requiring the Secretary of the Interior, through the Service, to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." The report is actually a series of 45 lists that identifies bird species of conservation concern at national, regional, and landscape scales. Essentially, these are the birds deemed to be the highest priority for conservation action. It includes a principal national list, seven regional lists corresponding to the Service's seven regional administrative units, and species lists for each of the 37 Bird Conservation Regions in the U.S. designated and endorsed by the North American Bird Conservation Initiative (NABCI)

These bird conservation regions are ecologically-based units, as defined by NABCI for planning, implementing, and evaluating bird conservation



*Common tern chick*

Photo courtesy of Gil Lopez-Espina

efforts. The Refuge lies in the Atlantic Northern Forest Bird Conservation Region (BCR). In this BCR, sixteen bird species were listed. A draft blueprint for this region presents a strategic design of the key components to implement in order to maintain healthy populations of birds native to the BCR. Specifically, the blueprint establishes a series of goals for the partnership to help move towards its vision of sustained bird populations; it presents the biological foundation upon which recommendations are based; and it lays out a framework for implementing and evaluating the recommended actions.

It is hoped that these regional and national reports will stimulate coordinated efforts by Federal, state, and private agencies to develop and implement integrated approaches for the conservation and management of these birds deemed to be in the most need of conservation action.

We considered each of these species in developing our Species of Management Concern List (Appendix B) and to help us focus our habitat objectives, actions and strategies.

### **Gulf of Maine Rivers Ecosystem Plan (1994)**

Implementing an ecosystem approach to resource management is one of the Service's national priorities. Nationally, and within the last decade, the Service has initiated new partnerships with private landowners, State and Federal agencies, corporations, conservation groups, and volunteers to form 52 ecosystem or ecoregional teams across the country, typically using large river watersheds to define ecosystems. Each team works on developing goals and priorities for research and management within their ecoregion.

The Gulf of Maine Ecosystem team, composed of Service personnel and representatives from several State natural resource agencies, developed a Priority Resources Plan (September 1994) for this ecoregion which is depicted on Map 1-1. The following seven priorities were identified in the plan, each involving numerous action strategies:

1. Recover populations and habitats of the following endangered/threatened species: Karner blue butterfly, bald eagle, piping plover, roseate tern, and Plymouth redbelly turtle.
2. Restore, protect and enhance habitats for migratory birds, anadromous fishes and listed/candidate species in the following watersheds: Penobscot River, Kennebec/Androscoggin River.
3. Restore, protect and enhance coastal habitats for Federal trust resources of concern, (for example: common loon, Atlantic puffin, common eider,



osprey, terns, black duck, American woodcock, bald eagle, piping plover, American shad, river herring, and Atlantic salmon) in the following areas: Plum Island Sound, Great Bay, Southern Maine (York to Cape Elizabeth), Mid-Coast Maine (Casco Bay to Muscongus Bay), Eastern Maine (Schoolic to Cutler), and Cobscook Bay.

- 4 Restore, protect and enhance populations of migratory bird species of special emphasis, for example: common loon, Atlantic puffin, Arctic tern, common eider, common tern, harlequin duck, least tern, black duck, and American woodcock.
5. Rebuild American shad and river herring populations in the following rivers: Merrimack, Saco, Kennebec/Androscoggin, Penobscot, and St. Croix.
6. Restore and rehabilitate Atlantic salmon populations in the following rivers: St. Croix, Dennys, Pleasant, East Machias, Machias, Narraguagus, Ducktrap, Sheepscoot, and Penobscot.
7. Manage Service lands to protect, enhance, and restore native communities to maintain biodiversity.

#### **Maine Coastal Nesting Islands Project**

The Maine Coastal Nesting Islands Project is a partnership established to identify and protect seabird, wading bird, and eagle nesting habitat on Maine's coastal islands. The partnership is sponsored by the Service's Gulf of Maine Coastal Program and the Refuge. Federal, State, and non-governmental organization biologists share data on historic and active seabird, wading bird and eagle nesting sites and the ownership status of nesting islands. Partners include MDIFW, Maine Coast Heritage Trust, The Nature Conservancy (Maine Chapter), National Fish and Wildlife Foundation, Maine State Planning Office's Coastal Program and Land For Maine's Future Program, local land trusts, National Audubon Society, and private land owners. Information is shared among these entities on an annual basis. Approximately every three years, data from Maine's 4,617 coastal islands is analyzed to determine species distribution and population trends and to update island protection status.

The most recent analysis used data from 2002. Six hundred and sixteen islands were determined to have nesting populations of seabirds, wading birds, or bald eagles, or a combination of the three. Of these 616 islands, 377 were determined to be "nationally significant" because they met one or more of the following criteria established by the partnership:

- One percent or more of the State population of a seabird species – common, roseate, or Arctic tern; Atlantic puffin; razorbill; black guillemot; black-backed, herring, or laughing gull; common eider; great or double-crested cormorant; or Leach's storm-petrel – nests on the island; or



*Atlantic puffin*  
USFWS photo

- One percent or more of the State population of a wading bird species – great blue heron, black-crowned night heron, snowy egret, glossy ibis, little blue heron, tri-colored heron, or cattle egret – nests on the island; or
- Federal-listed (endangered) roseate terns nest, or historically nested, on the island; or
- Federal-listed (threatened) bald eagles have productively nested on the island for several years (on larger islands only the immediate area around the nesting site, approximately 125 acres, is considered nationally significant); or
- the island population of any one nesting seabird species does not meet the 1% criteria, but it is important because it supports a diverse population of seabird species, including:
  - four or more seabird species nest on the island; or
  - three species nest on the island, at least one of which represents >0.5% of the statewide nesting population; or
  - the island has important seabird, wading bird, or eagle nesting habitat based on an annual biological review of the data.

The 377 nationally significant coastal nesting islands identified represent 8% of the total number of Maine islands and less than 4% of the total island acreage. They include 170 islands with nesting seabirds present (including five with roseate terns). Many of these species spend the majority of the year at sea and occur nowhere else in the United States. Twenty islands have nesting wading birds present, and 119 islands support bald eagle nesting.

The current level of protection afforded these 377 nationally significant coastal nesting islands falls into three categories:

- A. Two hundred twenty-six (226) have permanent or long-term protection. The majority are managed by either the U.S. Fish and Wildlife Service or the Maine Department of Inland Fisheries and Wildlife, both of whom have the legislative authority and responsibility to maintain and enhance populations of seabirds, wading birds, and eagles. This category also includes three islands managed by the National Audubon Society, with a primary objective of protecting and restoring seabird populations.
- B. Twenty-five (25) are in Federal, municipal, or private ownership and presently have some degree of protection but may not be permanently

protected or managed to maintain and enhance populations of seabirds, wading birds, or eagles; and

C. One hundred twenty-six (126) are in private ownership and lack permanent or long-term protection and/or management to maintain and enhance seabird, wading bird, or eagle populations.

We used the information from this project to develop our Land Protection Plan for the Refuge (Appendix A). Our primary focus for acquisition is on nationally significant islands in categories B and C.

### **Maine Department of Inland Fisheries and Wildlife Species Assessments**

Maine Department of Inland Fisheries and Wildlife (MDIFW) is developing species assessments and management plans for more than 70 species and species groups within the state. The plans will cover all hunted, trapped, and threatened and endangered species, as well as several additional species of management concern. The purpose of these assessments is to assemble the most current information and professional judgements available into one document. Each plan serves as a basis for selecting management goals, objectives, and strategies over a 15-year time-frame, with abbreviated updates compiled every five years. At least 10 completed assessments relate to seabirds, waterbirds, or migratory landbirds of interest to the Refuge. We used these plans in developing our Species and Habitats of Conservation Concern List (Appendix B) and our management objectives and strategies.

## **Refuge Purposes and Land Acquisition History**

As described above under the section titled “Project Area”, the Refuge spans the entire Maine coastline. It includes lands in the towns of Cutler, Machiasport, Jonesport, Roque Bluffs, Addison, Milbridge, and Steuben in Washington County; the towns of Gouldsboro, Winter Harbor, Swan’s Island, Tremont in Hancock County; the towns of Vinalhaven, Saint George, and Friendship in Knox County; the towns of Boothbay, South Bristol, and Southport in Lincoln County; the town of Phippsburg in Sagadahoc County; the town of Harpswell in Cumberland County; and the town of Kittery in York County. The Refuge Headquarters is currently located in Milbridge, with a staffed, satellite office in Rockport.

The Service has acquired lands for the Refuge through a variety of acquisition methods. These include gifts from private individuals, land trusts, statewide and national conservation groups, and transfers of title from the U.S. Coast Guard and U.S. Navy. In addition, when funds are available, we have purchased through fee title acquisition or conservation easement, important mainland and nationally significant coastal nesting islands. All acquisitions have been from willing sellers or donors. Most of the land within our approved acquisition boundary has been acquired. Those lands not yet acquired within our approved boundary, and lands we propose for

an expansion of the current boundary, are described in our Land Protection Plan (Appendix A).

Historically, our land acquisition funds come from two sources: the Land and Water Conservation Fund, appropriated annually by Congress, and the Migratory Bird Conservation Fund, which is replenished through the sale of Federal duck stamps. Annual expenditures for the Refuge’s land acquisition program have recently averaged approximately \$1 million/year.

The rate of our coastal island acquisition began a steady increase in 1993, and since that time, the Service has acquired an interest in 31 islands. All of these have become part of the Refuge, although they may lie closer to Rachel Carson or Moosehorn refuges. This allows us to concentrate our expertise and the logistical resources needed to manage seabirds on off-shore islands.

The purposes and land acquisition history for each of the five individual refuges in the Maine Coastal Islands Refuge are presented below. All acreages presented are rounded to the nearest whole number and represent U.S. Geological Survey (USGS) land acres above the mean high water mark.

**Seal Island National Wildlife Refuge**

This refuge is 65 acres and was established in 1972 because of its “...particular value in carrying out the national migratory bird management



*Aerial view of Seal Island*  
USFWS photo

program.” It was established under authority of 16 U.S.C. 667b, an Act Authorizing the Transfer of Certain Real Property for Wildlife or Other Purposes, 16 U.S.C.667b-667d, as amended. It was acquired in transfer from the U.S. Navy.

**Franklin Island National Wildlife Refuge**

This refuge is 12 acres and was established in 1973 because of its “...particular value in carrying out the national migratory bird management program.” It was established under authority of 16 U.S.C. 667b, an Act Authorizing the Transfer of Certain Real Property for Wildlife or Other Purposes, 16 U.S.C.667b-667b, as amended. It was acquired in transfer from the U.S. Coast Guard.

**Pond Island National  
Wildlife Refuge**

This refuge is 10 acres and was established in 1973 because of its “...particular value in carrying out the national migratory bird management program.” It was established under authority of 16 U.S.C. 667b, an Act Authorizing the Transfer of Certain Real Property for Wildlife or Other Purposes, 16 U.S.C.667b-667d, as amended. It was acquired in transfer from the U.S. Coast Guard.

**Petit Manan National  
Wildlife Refuge**

This refuge is currently 5,771 acres and consists of 33 islands and three mainland divisions. The fourth mainland division, Corea Heath, is a pending U.S. Department of Navy transfer. The Petit Manan National Wildlife Refuge was originally established in 1974 “...for use as an inviolate sanctuary, or any other management purposes, for migratory birds.” It was established under authority of the Migratory Bird Conservation Act, 16 U.S.C. 715d. In addition to the Migratory Bird Conservation Act, the succession of islands and mainland parcels acquired after 1974 were acquired with one or more of the following purposes:

*“...suitable for - (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species” (Refuge Recreation Act, 16 U.S.C. 460k-1); or*

*“...particular value in carrying out the national migratory bird management program” (An Act Authorizing the Transfer of Certain Real Property for Wildlife, or other purposes, 16 U.S.C. 667b-667d)*

*“...the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions...” (Emergency Wetlands Resource Act of 1986, 16 U.S.C. 3901(b), 100 Stat. 3583).*

Its acquisition history is described in Table 1-1.

**Cross Island National  
Wildlife Refuge**

This six island refuge is 1,703 acres and was established in 1980 “...for use as an inviolate sanctuary, or any other management purposes, for migratory birds.” It was established under authority of the Migratory Bird Conservation Act, 16 U.S.C. 715d. Its acquisition history is described in Table 1-2.

**Table 1-1 History of acquisition at Petit Manan Refuge**

Calendar Year*	Acres**	Acquisition Method	Parcel Acquired
1974	10	transfer of island from Coast Guard	Petit Manan Is.
1976	2,166	3 donations, 2 fee purchases, and 1 transfer; includes both islands and mainland	Petit Manan Pt Div.
1978	5	1 island transfer from Coast Guard	Little Nash Is (portion of)
1979	1,130	1 donation of an island	Bois Bubert Is (portion of)
1987	25	1 land exchange for tract on mainland	Bois Bubert Is (portion of)
1992	13	1 donation of tract on mainland	Sawyers Marsh Division (portion of)
1993	33	2 fee purchases; 1 island, and one tract on mainland	Bois Bubert Is (portion of)
1994	252	3 donations and 3 fee purchase; includes both islands and mainland	Metinic (portion of), E&W Barge, Bar, Ship and Trumpet Is; Goulds. Bay Div (portion of)
1995	322	2 donations and 7 fee purchase; includes both islands and mainland	Metinic (portion of), Halifax, Outer White, Lt Roberts, Roberts, Lt Thrumcap Is; Goulds. Bay Div (portion of)
1996	31	2 donations and 1 fee purchase; includes both mainland and islands	Metinic (portions of), and Abbot, Sally Is
1997	12	2 fee purchases of islands	Bois Bubert Is (portion of); E Brothers Is
1998	1008	2 donations and 4 fee purchases; includes both islands and mainland, and 2 conservation easements	Upper Flag, John=s Is; Sawyers Marsh Div (portion of), and Goulds. Bay Div (portion of); Inner White Is (easement) and Lower Mark Is (easement)
1999	187	4 islands transferred from Coast Guard, and 3 fee purchases of islands	Ram, Lt. Libby, Inner Sand, Matinicus Rock, Two Bush, Outer Heron Is, and Egg Rock
2000	39	3 fee purchases; includes both island and mainland	Schoppee and Lt Marshall Is; Goulds. Bay Div (portion of)
2001	366	2 fee purchases; includes both islands and mainland, and 1 conservation easement on an island	Crane Is (easement); Sawyers Marsh and Goulds. Bay Div (portions of)
2002	60	2 conservation easements on islands	Smuttynose and Malaga Is (easements)

\* Acquisition is ongoing; check with the Refuge Headquarters for latest island purchases.

\*\* Island acres are approximate, as many were not surveyed, but are based on original deed acres or GIS mapping.

**Table 1-2 History of acquisition at Cross Island Refuge**

Calendar Year	Acres*	Acquisition Method	Parcel Acquired
1980	1,538	donation of 6 islands	Cross Is (portion of); Old Man, Mink, Outer and Inner Double Head Shot, Scotch Is.
1986	165	land exchange for tract on island	Cross Is (portion of)

\* Island acres are approximate, as many were not surveyed, but are based on original deed acres or GIS mapping.

## Existing Refuge Operational Plans (“Step-down” plans)

The Service Manual, Part 602, Chapter 4 (Refuge Planning Policy) lists over 25 step-down management plans that are generally required on refuges. These plans contain specific strategies and implementation schedules for achieving refuge goals and objectives. Some plans require annual revisions, others are on a 5-to-10-year revision schedule. Some require additional NEPA analysis, public involvement, and compatibility determinations before they can be implemented. Below we provide the current status of step-down plans needed for the Refuge. Those that are currently up-to-date are incorporated by reference into this final EIS. Additional step-down plans needed for the Refuge are further identified in Chapter 2.

These step-down plans are current and up-to-date:

- Fire Management Plan (includes prescribed fire and wildfire management direction; annual burn plans are also completed), 2002
- Continuity of Operations Plan, 1999
- Safety Program and Operations Plan, 2000
- Hunt Plan, 2001

These step-down plans are being prepared or are in draft form:

- Habitat and Species Inventory and Monitoring Plan (HSIMP)
- Land Protection Plan (LPP)

These step-down plans will need to be completed and are scheduled in Chapter 2:

- Habitat Management Plan (HMP; highest priority)
- Visitor Services Plan
- Law Enforcement Plan
- Invasive Species Management Plan
- Cultural Resources Management Plan

## Compatibility Determinations

Federal law and Service policy provide the direction and planning framework to protect the Refuge System from incompatible or harmful human activities, and to insure that Americans can enjoy Refuge System lands and waters. The Refuge Improvement Act is the key legislation regarding management of public uses and compatibility. The compatibility requirements of the Refuge Improvement Act were adopted in the Service’s Final Compatibility Regulations and Final Compatibility Policy published October 18, 2000 (Federal Register, Vol. 65, No. 202, pp 62458-62496).

The regulations require that an affirmative finding be made of an activity’s “compatibility” before such activity or use is allowed on a national wildlife refuge. A compatible use is one, “. . .that will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge” (Refuge Improvement Act). Six priority,

wildlife-dependent uses that are to be considered at each refuge are defined by the Act and Regulation. These are: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. These priority uses may be authorized on a refuge when they are compatible (as defined above), and not inconsistent with public safety. Not all uses that are determined compatible may be allowed. The Refuge Manager has the discretion to allow or deny any use based on other considerations such as public safety, policy and available funding. However, all uses that are allowed must be determined compatible. Except for consideration of consistency with State laws and regulations as provided for in subsection (m) of the Act, no other determinations or findings are required to be made by the refuge official under this Act or the Refuge Recreation Act for wildlife-dependent recreation to occur (Refuge Improvement Act). Appendix C includes new and/or revised compatibility determinations for Refuge activities. They will be approved with the final CCP.

## Refuge Vision Statement

Very early in our planning process our team developed this vision statement to provide a guiding philosophy and sense of purpose for our planning effort.

*“We envision the future Maine Coastal Islands National Wildlife Refuge epitomizing the mission of the National Wildlife Refuge System; conserving in perpetuity an incredibly rich tapestry of coastal islands, intertidal estuaries, freshwater wetlands, maritime forests and open fields; and, enabling nesting and migrating seabirds, and other wildlife of conservation concern in the Gulf of Maine, to thrive here.”*

*“With the help of our conservation partners, we will apply sound, scientific principles and adaptive management strategies to sustain the long-term health and integrity of coastal Maine habitats; expand community outreach and environmental education and interpretation programs; and, stimulate visitors to embrace stewardship of natural resources.”*

## Refuge Goals

These goals were developed after consideration of our refuge purposes, the Service and Refuge System missions, our vision, and the mandates, plans, and conservation initiatives described above. They are intentionally broad, descriptive statements of purpose. They highlight elements of our vision statement that are emphasized in future refuge management. The biological goals take precedence, in particular Goal 5, but otherwise, the goals are not presented in a particular order.

**Goal 1:** Perpetuate the biological diversity and integrity of upland communities on the Refuge’s mainland properties to sustain high quality habitat for migratory birds.

**Goal 2:** Maintain high quality wetland communities on the Refuge’s mainland properties, primarily to benefit migratory birds of high conservation



priority, while also supporting other native, wetland- dependent species of concern.

**Goal 3:** Perpetuate the biological diversity and integrity of upland communities on the Refuge’s islands to sustain high quality habitat for nesting bald eagles and migratory songbirds and raptors, and to protect rare plant sites.

**Goal 4:** Protect the high quality wetland communities on the Refuge’s islands to benefit nesting and migrating shorebirds and waterfowl.

**Goal 5:** Protect and restore nesting seabird populations on the Refuge’s islands to contribute to regional and international seabird conservation goals.

**Goal 6:** Promote enjoyment and stewardship of coastal Maine wildlife and their habitats by providing priority, wildlife-dependent recreational and educational opportunities.

**Goal 7:** Protect the integrity of coastal Maine wildlife and habitats through an active land acquisition and protection program.

**Goal 8:** Communicate and collaborate with local communities, Federal, State, local, and Tribal representatives, and other organizations throughout coastal Maine to further the mission of the National Wildlife Refuge System.

**The Comprehensive  
Conservation  
Planning Process  
An Early Planning Effort**

In 1993, the Service began to evaluate the need for additional protection of Maine coastal nesting islands. In 1995, the Service’s plans to prepare an EIS to study the protection of significant seabird, wading bird, and eagle nesting islands on Maine’s coast was officially announced through a Federal Register Notice of Intent.

Throughout 1995, four public forums and six public scoping meetings were held in Ellsworth, Machias, Owls Head, Rockport, Brunswick, Freeport, Wells, and Augusta, Maine. The locations, dates, and times for these meetings were announced in local newspapers, as well as through special mailings. Over 250 people attended the public forums, co-sponsored by the Service and 33 additional groups interested in promoting protection of coastal islands. More than 60 people attended the scoping meetings, the purpose of which was to let people know what the Service was doing and share what we have learned about coastal nesting island wildlife and their habitats. Also during 1995, over 1,100 copies of an Issues Workbook were distributed. These workbooks asked people to share what they valued most about the islands, their vision for island protection in the future and the Service’s role in that future, and any other island issues they wanted to raise. One hundred and forty copies of the workbooks were returned to us. We summarized the information and shared the results in a Project Update newsletter in May 1996.



*A view from the John Hollingsworth Memorial Trail, Petit Manan Point Division*  
Myer Bornstein, SEMASS Photos

Also in May 1996, the Service held a two-day facilitated workshop at the Bar Harbor Inn in Bar Harbor, Maine. The 24 participants included island owners, local land trusts, conservation organizations, town officials, sea kayaking companies, tour boat operators, representatives from the aquaculture industry, property rights supporters, and State and Federal agency representatives. The participants discussed the information gathered on seabird, wading bird, and eagle populations and island ownerships, as well as the results of the workbook. Work groups were formed to identify potential management actions and strategies available for protecting, managing, and restoring coastal nesting islands, and to establish a consensus action plan that workshop participants could support.

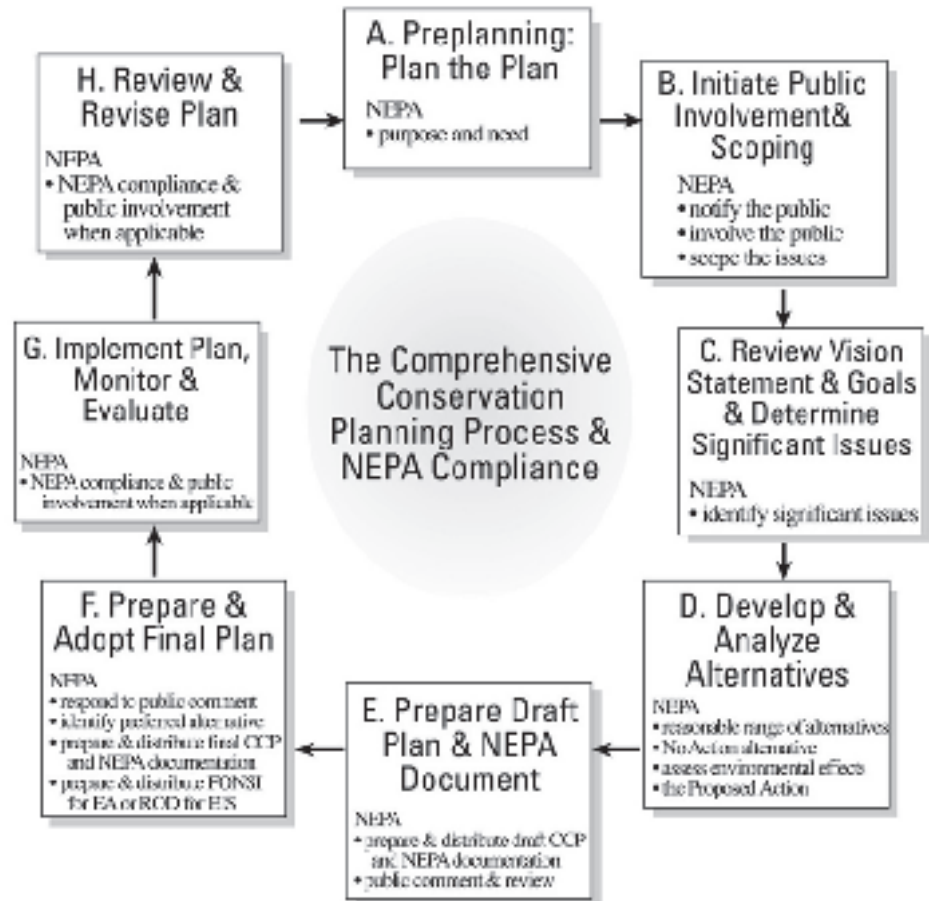
During 1997 and 1998 further planning on this project was delayed pending passage of the Refuge Improvement Act and new Service planning policy. During this time, we determined that the focus of our planning should be expanded to include not only Service acquisition of Maine coastal nesting islands, but all other aspects of refuge management as well. This expanded effort would better comply with the intent of the new Service planning policy.

## **Our Recent Planning Effort**

The planning process was restarted in the summer of 1999, and a new planning team was formed to produce a draft CCP/EIS. Our core planning team consists of the Refuge staff, Regional Office planning, visitor services, and cultural resources staff, and one staff from the Maine Department of Inland Fisheries and Wildlife (MDIFW). We regularly consult with the Regional Refuge Biological Program staff, Migratory Bird program staff, Gulf of Maine Program Ecological Services staff, and program specialists with MDIFW.

Service planning policy establishes an eight-step process (Figure 1-1) which we followed in developing this final EIS. Individual steps are described in detail in the planning policy and CCP training materials. As part of “Step A: Preplanning,” we developed a preliminary Refuge vision statement and Refuge-wide goals and identified issues and management concerns. We reviewed the 1995 list of issues and concerns for the project, expanded them to include issues on existing refuge lands, and prepared to gather additional comments from the public. The revised list of issues and concerns is presented below.

Figure 1-1 Steps in the comprehensive conservation planning process and their relationship to National Environmental Policy Act compliance



During this step, we also initiated a wilderness review of existing Refuge lands. This review is the process we use to determine if we should recommend Refuge System lands and waters to Congress for wilderness designation. The wilderness review process consists of three phases: (1) inventory, (2) study, (3) recommendation. Our Refuge Planning Policy requires us to conduct a wilderness review concurrent with the CCP process and incorporate the summary of the review into the CCP (602 FW 3.4 C. 1(c)). The process we followed for this CCP is described in Appendix D.

Next, we completed “Step B: Initiate Public Involvement and Scoping,” which provided an opportunity for the public to critique, or add to, the vision, goals, and issues for the Refuge. We held public meetings and open houses in Augusta, Milbridge, and Rockport in 2000. A newsletter shared the comments from the open houses with the people on our mailing list.

Following the public meetings, the planning team met a few times, and individual members drafted and refined elements of our management alternatives. Our next newsletter, published at the end of 2001, shared our draft alternatives with the public. At publication, we presented five management alternatives, but after further analysis, we determined that one of

the alternatives was not significantly different than the others. All the significant components of this alternative were included in at least one of the other four alternatives. Therefore, we reduced our analysis to four alternatives.

During 2002, we concentrated on completing the analysis for “Chapter 2: Alternatives” and “Chapter 4: Environmental Consequences.”

### The Draft CCP/EIS

We published our Draft CCP/EIS and released it for 68 days of public review and comment from April 30 to July 6, 2004. We notified everyone on our project mailing list of the document’s availability and published a notice in the “Federal Register” on April 30, 2004. The document is also posted on our National Conservation Training Center Library website ([http://library.fws.gov/CCPs/petitmanan\\_index.htm](http://library.fws.gov/CCPs/petitmanan_index.htm)). In addition, we held four formal public hearings on the following dates and locations:

- June 1, 2004, 7-9:00 p.m., Rockland Public Library, Rockland, ME
- June 2, 2004, 7-9:30 p.m., Milbridge Town Hall, Milbridge, ME
- June 8, 2004, 7-9:00 p.m., Pine Tree State Arboretum, Augusta, ME
- June 9, 2004, 7-9:00 p.m., Falmouth Public Library, Falmouth, ME

Eighty-five people attended the public hearings: 28 in Rockland; 35 in Milbridge; 9 in Augusta; and 13 in Falmouth. Thirty gave oral testimony: 12 in Rockland; 7 in Milbridge; 4 in Augusta; and 7 in Falmouth. Some submitted their comments in writing instead of giving oral testimony, while others did both. More comments arrived later by post or electronic mail.

We received a total of 594 public responses in oral testimony at public hearings, in phone calls, or in written or electronic documents. Appendix I is a summary of the comments we received and our response to them. In some cases, our response resulted in a modification to alternative B, our preferred alternative. Our modifications include additions, corrections, or clarifications of our preferred actions in this Final EIS.

In conjunction with publishing this EIS, we are also publishing the Final CCP. The CCP separately portrays our preferred alternative in a stand-alone implementation document. If approved along with the Final EIS, it will be the reference used for determining refuge management direction and priorities and will serve as an outreach tool to inform others of our priorities.

Our Regional Director will issue a Record of Decision (ROD), the final decision document in the planning process approving the final EIS and CCP, after:

- Our Service Director has reviewed and approved our Land Protection Plan; and,

- We have provided the final documents to interested or affected parties for a 30-day waiting period, which will start when we publish a notice in the “Federal Register” that we have prepared a Final EIS and CCP.

Once our Regional Director has signed the ROD, the planning phase of the CCP process is complete, and its implementation phase begins.

## Issues, Concerns, and Opportunities

From the Issues Workbook, public and focus group meetings, comments on the draft CCP/EIS, and planning team discussions, we developed a list of issues, opportunities, or any other item requiring a management decision. We concentrated further on the issues, as these drive the analysis and comparison of alternatives. Issues were sorted into three categories:

1. Significant issues – these issues formed the basis for the development and comparison of different management alternatives. A range of opinions on how to resolve these significant issues and meet objectives generated the different alternatives presented in Chapter 2. These issues are resolved differently among the alternatives. Significant issues are discussed in detail below.
2. Other issues to address - these issues and management concerns are also presented in Chapter 2, but are not considered “significant.” These issues are often resolved in a similar manner in all of the alternatives.
3. Issues and concerns outside the scope of this EIS – these issues do not fall within the scope of the purpose of and need for action as we described for this EIS. They are identified below, but will not be further addressed in this document.

## Significant Issues

The following issues were generated by the planning team or brought to our attention by our State or other partners, or the public, during scoping activities. These issues generated a wide range of opinions including those in support of, to those fully against the particular activity involved. The issues matrix in Chapter 2 shows how we deal with these issues through actions and strategies in the four alternatives. We provide a summary of the different opinions we heard in each discussion of significant issues below.

1. *How will we protect the coastal nesting islands, given the finite number of islands suitable for seabird, wading bird, and eagle nesting?*

There are a limited number of coastal nesting islands providing seabird, wading bird and eagle nesting habitat. Of the more than 4,617 Maine coastal islands, 377 are considered to be nationally significant coastal nesting islands. Only 226 of these nationally significant islands are currently protected by either the Service, MDIFW, or the National Audubon Society, all of whom have either legislative authority or a management mission to maintain and enhance seabird, wading bird, or eagle nesting habitats. Each of these entities has ongoing seabird restoration projects which are very expensive and challenging to undertake.

Many people have expressed concern about the remaining 151 nationally significant coastal nesting islands, which do not have permanent, long-term protection and are subject to development pressures; pressures which continue to increase with the population on Maine's coastal islands. Some noted that the obvious threat is the direct loss of nesting habitat when construction occurs. They commented that residential development near nesting areas can indirectly result in disturbances during construction activities and from the influx of summer residents and their pets. Other concerns include the removal of potential bald eagle nesting trees through logging, and the harvest of other native vegetation or overgrazing by domestic animals which alters vegetation so it is no longer desirable to nesting seabirds.

On the other hand, we heard from some private island owners who feel they manage their islands with a conservation ethic and achieve the desirable habitat objectives. Some expressed the opinion that we "should just let nature take its course" and not intervene. Other people fear Federal ownership will result in a greatly diminished local voice in how the islands are used, and they expect the result will be additional restrictions on traditional activities on or near the islands. These respondents believe the Service will not be responsive to local concerns and that the islands will no longer be subject to local influences. Some expressed the opinion that market forces should dictate the status of land protection. Others recommended that either State agencies or national and local conservation organizations take the lead in land protection, and that the Service act only in a support role. Still others suggested that the Service pursue conservation easements instead of fee simple purchases as a means of protection. In their opinions, this would lessen the impact on local property tax revenues.

The alternatives evaluate different levels of land protection, including the number of islands recommended for Service acquisition.

*2. How will we deal with increased recreational and commercial uses promoted by others on or near coastal nesting islands?*

Tourism is an important component of the State and local economies, providing many seasonal jobs, and affecting many industry sectors. A great deal of revenue is generated from the millions of visitors who come to enjoy coastal Maine in the summer. The coastal nesting islands provide an important niche in the "eco-tourism" industry, at least partly because of the wildlife viewing opportunities they provide. Commercially provided seabird viewing activities are experiencing rapid growth. The total dollar volume of sales in this activity is approximately \$1,000,000 per year, with at least 20,000 participants. Many people also regularly enjoy seabird viewing without paying a commercial venture; they motor or paddle out to islands in their own canoes or kayaks. The total dollar value attributed to this activity in coastal Maine is approximately \$525,000 per year, with at least 10,500 annual visits (Colgan, 2002).



*Seabird-watching cruise*  
USFWS photo

We heard concerns about the growth of this eco-tourism industry, specifically the increased number or frequency of tour boats visiting coastal nesting islands, resulting in an increased potential for disturbing nesting seabirds, wading birds, and eagles. Yet other respondents expressed an interest in seeing this wildlife observation opportunity continue, commercially provided or otherwise. Some mentioned an increased outreach and education campaign might ensure visitors become aware of the disturbances created and seek ways to minimize it. Others recommended that the islands be off-limits and that we enforce a wide no-access zone around the islands during the nesting season to preclude boat activity.

The alternatives consider various levels of outreach to user groups such as canoeists, kayakers, and commercial touring operations.

*3. How will our management activities affect public access to coastal nesting islands?*

Under the Colonial Ordinance of 1641-1647 as clarified by Title 12 M.R.S.A. 571 et seq., people have a right to use the intertidal zone around islands for “fishing, fowling, and navigation.” The intertidal zone is the area between mean low and mean high water. Use of the island above mean high water, however, is controlled by the property owner(s). Most people recognize that Service acquisition of nesting islands will result in a seasonal closure to protect the nesting seabirds, wading birds, or bald eagles. Opinions vary on this restriction.



*A view of the shore of Cross Island*  
USFWS photo

Some people want increased opportunities for public access to coastal islands and would not support any additional restrictions. They believe that allowing people to experience the islands first-hand will contribute to their understanding and appreciation of these national resources. Many commented that access should especially be allowed for historic and traditional activities, such as berry picking, waterfowl hunting, camping, and annual family picnics.

Others are concerned that increased public access will only lead to increased disturbance to nesting birds, and sensitive plant and cultural areas. Some expressed concern with the potential for increased vandalism and trespass on private property when access on adjacent

Federal lands is allowed. A few suggested that the islands be off-limits year round to ensure full protection of the special resources found there. Others believe access should be allowed, but tightly controlled.

The alternatives compare different levels of public access, including variations on the seasonal closure period and the types of uses allowed.

4. *How will we manage habitats to protect threatened or endangered species, or other species of management concern?*

Several Federal-listed species, including the threatened bald eagle and the endangered roseate tern, are found on some of Maine's coastal islands. Several of these islands are part of the Refuge. A number of State-listed species, including several plants, are also present on these islands. Active management, to avoid habitat loss or degradation and sustain or increase populations, is one of the best ways to ensure the long-term survival of these species of concern. Several Refuge islands have active seabird habitat restoration programs in place.

The Service is responsible for protecting Federal-listed endangered and threatened species and keeping additional species off of the Federal list. In addition to these, there are other species of management concern warranting protection, including anadromous fish, certain marine mammals, State-listed and other rare or declining species as identified in Appendix B.



*Arctic tern in flight*  
USFWS photo

Many people expressed their interest in protecting these species and, where possible, increasing populations through management. Their reasons ranged from a fear of losing a species entirely to an interest in maintaining overall biological diversity on coastal islands. Some are particularly interested in increasing well-distributed populations throughout the Gulf of Maine to protect against catastrophic losses. Others expressed the view that many unique natural communities and species of plants and animals, both terrestrial and marine, are found on coastal nesting islands. Protecting this diversity is the key to a healthy island environment. The emphasis on coastal nesting islands for seabirds, wading birds, and eagles will have direct and indirect benefits for many other species.

A few people are concerned that refuge management is focusing too much on protecting nesting habitat at the expense of the other habitat needs for a given species. They argue that it is equally important to protect the feeding, roosting, and migratory areas used by the birds. Feeding areas located on mudflats or open water may be subject to disturbance or overharvesting of resources upon which the birds depend. Habitat in feeding areas may be



disturbed or altered by dredging and dragging, deposition of sediments or dredged materials, or other activities. Others point out the need to learn more about what the birds feed on and where they feed.

Some people expressed fear that the presence of endangered or threatened species will severely restrict their ability to continue using and enjoying the islands. They do not support increased Federal acquisition of islands. Other respondents want us to “let nature takes its own course” without any intervention in managing these populations.

Several people wanted a clearer understanding of our management goals and objectives before they formed an opinion. They asked how we will decide on population goals for species of management concern, and how this translates into habitat management on coastal islands.

The alternatives compare different objectives and strategies for managing the species of management concern identified in Appendix B.

5. *How will we control the impacts of predators on species of management concern?*

We identified the need to control predators at seabird nesting sites as an important management concern. Herring and great black-backed gulls are highly effective at preying on the eggs and young of several nesting seabird species of concern. In addition, these two gulls often out-compete less common species, such as terns and laughing gulls, for nesting space on islands. In our current management, we generally remove nesting herring

and black-backed gulls before we restore colonies of the less common seabirds. Mammals like rats, raccoons, mink, cats, and birds like owls and night-herons can also create serious predation problems on islands. Some people recognize the importance of controlling predators to help maintain and restore diversity on nesting islands. Others are concerned about lethal predator control techniques, including trapping and the use of avicides, and adamantly oppose their use on the Refuge. Some people support predator control only if there is a threat to human life.

The alternatives compare and contrast different levels and techniques of predator control.



*Great back-backed gull preys on tern*  
Photo courtesy of the Cornell Laboratory of Ornithology

6. *How will we manage sheep grazing on refuge lands?*

We identified the amount and timing of sheep grazing on Refuge islands as a management concern. Sheep currently graze on Nash and Metinic islands, where they have grazed for over 100 years. Grazing also occurs on

other islands proposed for Service acquisition in the Land Protection Plan (Appendix A). Grazing is considered a traditional and historic island activity by many people. Others, however, feel that grazing is inconsistent with the “wildlife first” mission of the Refuge System and oppose this activity on refuge lands.

Our observations on Nash and Metinic islands, and on other grazed private islands, indicate that when sheep graze too long in one area, or their numbers exceed foraging capacity, their presence can have a serious impact on nesting seabirds and their habitat. Overgrazing destroys the grasses and shrubs needed by nesting terns and eiders and forces nesting birds to use lower-quality habitat elsewhere on the island. In addition, sheep can directly disturb the birds by trampling their nests and eggs, or by forcing adult birds to flush from the nest, making their eggs or young more susceptible to predation by gulls.



*Grazing sheep dot the Metinic Island landscape*  
USFWS photo

On the other hand, our staff and sheep owners feel that grazing can be used as an effective vegetation management tool when the number of animals, time of year, and length of grazing season are properly managed. In general, the vegetation on tern nesting islands must be managed to promote shorter grasses and other herbaceous vegetation, and not allow shrub or other woody growth, such as raspberry. It is challenging to get equipment to these islands, and prescribed fire is not always a viable option. As such, sheep grazing is considered by many to be a practical solution if managed properly to meet specific objectives.

The alternatives evaluate different levels of sheep grazing in support of seabird habitat management.

#### *7. How will we manage non-native, invasive species on refuge lands?*

Most people recognize that non-native, invasive plants and animals can displace native species, degrade wetlands and other natural communities, and reduce natural diversity and wildlife habitat values. Non-native plants outcompete native species by dominating light, water, and nutrient resources. We are concerned that, once established, invasive plants are expensive and labor-intensive to eliminate; they are able to establish easily, reproduce prolifically, and disperse readily, making eradication difficult. Preventing new invasions is extremely important for maintaining biological diversity and native plant populations.

Fortunately, the Refuge has very few non-native plant or animal species on its mainland divisions. In these areas, monitoring is all that has been warranted to date. On Refuge islands, however, little information is available.

The alternatives consider different levels of effort to determine the presence of invasive plant species and establish management strategies to deal with them.

8. *How can we effectively monitor and inventory wildlife populations and habitat on refuge lands?*

We are challenged each year by the staffing, funding, and logistical requirements of an effective resource monitoring and inventory program. We must make difficult choices regarding priorities because of limited available resources, which can vary widely between years. Unfortunately, our budget does not include a dedicated source of permanent funding for carrying out important habitat and population inventory and monitoring activities. We rely on competitive sources of funding – Challenge Grants, Cooperative Agreements, the National Fish and Wildlife Foundation, habitat funds, etc., to supplement Service funding. The uncertain availability of funding from year to year has always hampered our long-term planning.

Everyone we spoke with encouraged the continued partnership with the Gulf of Maine Coastal Program, where resource information is shared among many groups. The Coastal Program compiles and analyzes scientific resource data collected by the Service, State, and private conservation organizations. Through their analysis, they identify significant fish and wildlife habitats in need of protection, monitor population trends for certain species in the Gulf of Maine, identify existing information gaps for species of concern, and, consequently, determine future research needs. Many people feel this effort fills an important need and must be continued as an ongoing and long-term project. Others pointed out that other partnerships, for example with universities and colleges, conservation organizations, private landowners, or aquaculture industry representatives may be available to support implementation of Service inventory and monitoring priorities and encouraged us to explore these possibilities.

The alternatives consider different levels of inventory and monitoring effort and pursuit of partnerships to accomplish priority activities.

9. *How will we build partnerships to protect coastal wildlife habitats and support priority wildlife-dependent uses?*

We have established many valuable partnerships working to protect wildlife and habitats along the Maine coast. Partners are integral to virtually every program on the Refuge. Our partners assist us in activities including environmental education and interpretive programs, habitat evaluations, species inventories, nest site monitoring, and seabird restoration. In Chapter 3 we describe these partners and their missions in greater detail.

Due to the cyclical nature of funding for government agencies and the consistent membership support in conservation organizations, partnerships among public agencies and private organizations are vital to accomplishing

Refuge goals. Many people believe the only way to protect Maine's islands is for all parties – private island owners; Federal, State and local agencies; and private industry and organizations – to voluntarily join forces, form partnerships, and pool resources to accomplish the common good. There is a great deal of support for an approach that focuses on voluntarily working together in the spirit of cooperation, combining resources, sharing information, keeping people informed, and simply being good neighbors.



Arctic terns  
USFWS photo

Partnerships can also help us provide high-quality, wildlife-dependent, public use opportunities. Non-consumptive uses such as environmental education are especially amenable to partnerships.

The alternatives compare different levels of effort towards pursuing partnerships.

*10. How will we provide and maintain high-quality programs for the six priority public uses (hunting, fishing, environmental education and interpretation, and wildlife observation and photography)? Also, how will we manage traditional uses?*

Local residents have expressed concern about the possible loss of opportunities to participate in many of the traditional activities they have enjoyed on, or adjacent to, coastal nesting islands. These include picnicking, camping, berry picking, shell fishing, fin fishing, trapping, and waterfowl hunting. They fear that any conservation or protection measures taken on nesting islands will result in additional restrictions on opportunities to pursue these activities. Others point out that these activities, when carried out during the nesting season, can disturb the birds. They believe that use of the islands during the nesting season must be restricted or very tightly controlled.

Many people identified environmental education and interpretation opportunities as their highest priority for public use at the refuge. They expressed concern that there are both local residents and frequent visitors who are unaware of the importance of the nesting islands and the role they play in the coastal ecosystem. It is a concern to some that most people are not familiar with the less visible and more uncommon species that inhabit the islands. In order to instill a sense of wonder regarding the special habitats and populations found on the nesting islands and encourage ethical practices, many people believe that more environmental education opportunities should be provided. In particular, they want us to increase our outreach efforts to local schools and communities.

As a priority, we will continue to promote the wildlife-dependent uses stipulated in the Refuge Improvement Act (e.g., hunting, fishing, wildlife observation and photography, environmental education, and interpretation) to the extent they are determined compatible with refuge purposes. It is only after the Refuge Manager determines that the use is compatible that we will open for any new use, or expand, renew, or extend an existing use.

The alternatives evaluate different levels of providing compatible public use programs, emphasizing the six priority, wildlife-dependent public uses identified in the Refuge Improvement Act. Appendix C includes the compatibility determinations completed for the Service's Preferred Alternative.

*11. How will we manage activities that are not compatible on refuge lands?*

Many people have expressed concern about the vandalism, trespass, intertidal harvesting, and other collecting occurring on Refuge islands. They point out that a Service presence is limited on most islands during the year, and that many of these activities are undetected. A few people mentioned that only a few islands have signs or notices alerting people to allowed activities and seasons of use. Another concern identified is that

people often bring pets ashore when visiting islands, which can cause serious problems to wildlife during the nesting season.

In general, it is very difficult to enforce trespass laws on islands. Also challenging is the fact that the Service does not have jurisdiction in the intertidal areas unless a Federal law is violated or Federal trust resources may be impacted. Generally, the intertidal areas are under the jurisdiction of the State.

The alternatives evaluate different strategies for dealing with activities already occurring on the Refuge that have been determined incompatible with refuge purposes. The strategies include various levels of outreach and law enforcement capability.



*An illegal campsite on Schoppee Island*  
USFWS photo

*12. How will we improve communications, raise the visibility of the Service and Refuge System, and build working relationships with local communities?*

Local residents are becoming more aware of Refuge activities and benefits to their local communities. However, we are striving for even stronger ties to local communities to gain increased understanding and support for the Refuge System and our Refuge programs. Through increased communications, listening and sharing information, we believe we can make great

strides toward conserving the nationally significant resources along coastal Maine.

Some people suggested regular contacts with Tribal representatives, State and local elected officials, and conservation planning efforts at State and local levels. Others would like us to be more involved in Chamber of Commerce and local community events. A Friends Group, Friends of Maine Seabird Islands, has been initiated in the mid-coast area, which shows great promise as an advocacy group for the Refuge.

Other ideas were shared to increase the Service's visibility and Refuge activities. Some people noted that not all Refuge islands have boundary, informational, or regulatory signs to make visitors more aware of the importance of the islands to nesting birds and their vulnerability to disturbance. These respondents believe that more people need to understand that the islands are closed during the nesting season solely for the protection of the birds. Others suggested that informational brochures be developed to educate people and build public support for island protection.

The alternatives compare different levels of community involvement and ways of raising the Service's visibility.

*13. What funding, staffing, and infrastructure will we need to manage a refuge that spans the coast of Maine and includes coastal islands?*

Many who support Refuge management activities appreciate the logistical challenges of managing 42 islands scattered over 200 air-miles of the Maine coast. When carrying out management or law enforcement activities, we must haul boats by trailer from the Refuge offices in Milbridge or the satellite office in Rockport to public launch sites on the mainland. In good weather, it can take as long as 1 to 2 hours to reach those islands



*Transporting people and equipment on the Refuge is often a challenge*  
USFWS photo

farthest out once the boat is launched. Often, in periods of high seas and fog, it is virtually impossible to reach the islands. Setting up and supplying summer base camps on the islands to support research and management activities can be time consuming, costly, and dangerous. Many islands are difficult to land on, even in good weather. A few people noted that more staff located centrally in the mid-coast area might alleviate some of this problem.

Some people expressed their concern with the lack of law enforcement capabilities on Refuge lands. We currently have no law enforcement officers on the staff. Adequately patrolling Refuge mainland areas and widely scattered islands and responding to incidents has become

an impossible task. As public use of the Refuge increases, current law enforcement difficulties will be compounded, especially during the critical nesting season, when the potential for disturbance is greatest.

The alternatives compare different funding and staffing levels needed to support respective objectives and strategies.

*14. Which lands will be studied for their wilderness potential and recommended for inclusion in the National Wilderness Preservation System?*

Service planning policy requires us to review current Refuge lands for their wilderness potential during the CCP planning process. A wilderness review consists of three phases: 1) inventory; 2) study; and, 3) recommendation. A wilderness inventory is conducted first to see if refuge lands meet the minimum criteria established in Section 2(c) of the Wilderness Act. Lands that meet the criteria are called wilderness study areas (WSAs). In the study phase, we evaluate the WSA's values (e.g., ecological, recreational, cultural, economic, and symbolic), resources (e.g., wildlife, water, vegetation, minerals, and soils), and existing and proposed public uses, and analyze whether we can manage the wilderness values and character over the long-term.

Basically, we determine if the WSAs are suitable for wilderness designation. The inventory and study phases are incorporated into the CCP process. In the recommendation phase, we forward the suitable recommendations on to our Director. Our Director must concur with the wilderness study findings and suitable recommendations before they are forwarded or reported through the Secretary of Interior and the President of the United States, to Congress for final approval.

We conducted an inventory and study of existing Refuge lands and determined that 13 islands met the minimum criteria for wilderness. These islands were then grouped into eight WSAs. At this stage, the issue thus becomes whether we can manage for wilderness values and character long-term, without jeopardizing our management to achieve each affected refuge's establishment purposes and the Refuge System mission.

We have heard mixed support for wilderness designation. Some people were simply unsure how this would affect current management of Refuge islands; namely, how such a designation would impact public use and access. Several other people supported wilderness designation for as much refuge land as possible to prevent land uses, such as timber harvesting or grazing, that they believed could potentially degrade natural values. Others felt that wilderness designation would actually harm the character of coastal Maine by attracting additional visitors to the islands. Some of these same people felt that the Service could manage for wilderness character while not officially designating it as such. In addition, we heard from

others who expressed concern that designation could impact commercial or recreational opportunities on adjacent lands.

The alternatives range from proposing none to all eight WSAs for inclusion into the National Wilderness Preservation System. Chapter 4 analyzes the consequences of each alternative's proposal.

**Other Issues to Address**

*1. How will refuge activities affect the local economy and tax base?*

Many people expressed the opinion that refuge lands affect the local economies primarily by increasing the potential for eco-tourism (see issue #2, "Increased recreational and commercial uses on or near coastal nesting islands").

Some people are concerned that refuge lands reduce the local tax base, since the Federal government does not pay property taxes. They believe this places an additional financial burden on town residents who own land and pay taxes on their property. They note that, in addition to Federal lands, those owned by the State and some land trusts are tax-exempt, which has a cumulative impact on the tax base. On the other hand, others noted that Refuge Revenue Sharing payments to towns help offset, and sometimes more than compensate for, these tax losses.

A few people value the open space protection provided by refuges and believe the tangible and intangible benefits to the community are much greater when these islands are protected and kept as open space. They noted that open space benefits local economies by raising property values, lowering infrastructure needs, and maintaining lower costs for community services compared to developed areas.

The alternatives have differing impacts on the local economy as described in Chapter 4: Environmental Consequences.

*2. How will we protect historic resources on refuge lands?*

Some people expressed their interest in protecting the lighthouses and associated structures. A few people represented national organizations dedicated to this preservation effort. Eight refuge islands have lighthouses: Libby, Petit Manan, Egg Rock, Matinicus Rock, Two Bush, Franklin, Pond, and Nash islands. Except for the Nash Island light, these lighthouses have been automated. The U.S. Coast Guard maintains the aids to navigation within the lighthouses.

All the lighthouses except Two Bush are on the National Register of Historic Places. However, the Service is responsible only on Libby Island, Egg Rock, and Matinicus Rock for maintaining the lighthouses to national historic standards. The Service is also responsible for maintaining these standards on the Petit Manan Island lightkeeper's house and outbuildings. The historic lighthouses on Franklin, Pond, and Petit Manan Islands are the responsibility of the Coast Guard.





*Lighthouse on Libby Island*  
USFWS photo

Historically, we have lacked adequate funding to maintain all the lighthouses and historic structures found on these islands. Without adequate funding and the assistance of lighthouse Friends Groups or other agencies and organizations, it will be difficult, if not impossible, for us to meet these legislated responsibilities.

While all alternatives include a requirement to maintain the registered historic lighthouses to standard, the alternatives compare different levels of promoting their use and enjoyment.

3. *How will we promote volunteer opportunities and a Friends Group?*

At public scoping meetings, we heard a lot of interest in volunteer opportunities and initiating a Friends group for the Refuge. We began a formal volunteer program in 2000 and currently have 25 volunteers. Volunteers help with administrative, biological, and public use activities. In the fall of 2002, a Refuge Friends

Group, Friends of Maine Seabird Islands, officially formed in the mid-coast area. Their community outreach efforts have tremendously benefitted the Refuge.

The alternatives evaluate different levels of support for volunteers and establishing other Friends groups in downeast Maine.

4. *How can we provide technical assistance to others interested in managing for wildlife and habitats?*

The need to provide technical assistance to interested island owners, land trusts, and private organizations was identified by many as an important issue. Those who own coastal nesting islands aren't always certain of their significance and what needs to be done to maintain the values that make the islands so special for wildlife. The Service's Gulf of Maine Program helps provide technical assistance and routinely identifies and distributes information about potential sources of funding. Many people feel this fills

an important need and should be continued. Our staff could complement this effort by providing technical assistance more specifically on habitat management techniques.

The alternatives evaluate different levels of providing technical assistance.

## Issues Outside the Scope of this EIS

These issues were brought up by the public or by the planning team during the scoping process. In some instances, the Service does not have any, or only limited, regulatory or jurisdictional authority over the issue. Other issues may be covered under other Service programs, initiatives, or planning projects. Some of the concerns implicit in these issues are addressed in Chapter 4: Environmental Consequences. However, all of these issues are considered outside this document's stated purpose and need for action and, thereby, do not fall within its scope of analysis.

### *1. How will we affect aquaculture operations adjacent to coastal nesting islands?*

Aquaculture is important to the local and State economies in Maine. In Chapter 3, Affected Environment, we provide a summary of the current state of Maine's aquaculture industry.

Many people expressed opinions on the benefits of this industry to local communities and the coastal ecosystem. Some people are concerned that Service ownership of islands will adversely impact present and future aquaculture operations by imposing restrictions. Industry supporters are particularly concerned about increased Service acquisition of islands coupled with the Federal-listing of wild Atlantic salmon as an endangered species in several Maine rivers. In their opinion, Federal acquisition will only continue to reduce the economic viability of an industry impacted by the salmon listing.

Some respondents suggested that aquaculture pens are beneficial as they can provide feeding, roosting, and loafing sites for birds. Fish-eating birds are commonly seen "pirating" fish reared in the pens. Other people, however, are concerned that the noise and activity from aquaculture operations at off-shore facilities may disturb nesting birds on nearby islands. In addition, they feel that disease control, feeding, and waste products at facilities cause pollution.

Some people were not opposed to aquaculture operations per se, but they believe care should be taken to select suitable sites away from known bird nesting islands. Finally, there are some people who do not believe there is any impact on the ecosystem.

The aquaculture issue is complicated and by no means inconsequential; however, we do not believe it warrants a detailed analysis within the context of this EIS. The industry is faced with many challenges, none of

which are the direct result of Refuge programs. These challenges include a combination of health and environmental problems, such as infectious salmon anemia, the Federal-listing of Atlantic salmon as an endangered species, competition from foreign producers, and the lengthy lease process.

A prospective aquaculture operator must undergo both a State and Federal review and permitting process prior to obtaining the necessary leases. The State review is generally initiated first. Both the Maine Department of Marine Resources (DMR) and Department of Environmental Protection (DEP) review and decide on whether to issue State permits. In addition, the Maine DEP has been delegated authority by the Federal Environmental Protection Agency (EPA) to insure operations comply with the Clean Water Act. Unless a Federal-listed species is involved, the Service may not be consulted at this stage.



*Aquaculture pens at Libby Islands, 1994*  
USFWS photo

The Federal permits in Maine are then reviewed and approved by the U.S. Army Corps of Engineers (ACOE). When a permit application is submitted, the ACOE shares the permit application with the Service's Ecological Service's Maine Field Office for a review and recommendation. This review is required under the Fish and Wildlife Coordination Act and the Endangered Species Act. The Service does not have jurisdiction or management authority over coastal waters or the intertidal zone unless, as noted above, it is determined that a Federal-listed species may be impacted.

Typically, the Maine Field Office recommendation is for the aquaculture facility to be located no closer than 1/4 mile from a Refuge island or other Federal-owned island, although this can vary depending on the size of the island and the species which might be impacted. This recommendation by the Maine Field Office is non-binding. If a Federal-listed species, such as a nesting bald eagle, is documented near the prospective site, then the Maine Field Office would initiate a detailed review and recommendation process as required under Section 7 of the Endangered Species Act. The Refuge Program staff are not the authority responsible for this process; however, they will consult with the Field Office upon request.

The January 2004 report by the Governor's Task Force on the Planning and Development of Marine Aquaculture in Maine provides a wealth of information on the history and status of aquaculture in Maine and includes a total of 95 individual recommendations for improving the development of the industry while considering impacts on other uses and the environment ([www.maine.gov/dmr/aquaculture/aqtaskforce/finalreport.htm](http://www.maine.gov/dmr/aquaculture/aqtaskforce/finalreport.htm)). One recommended best management practice is to insure that facilities do not unreasonably interfere within 1,000 feet of "important ecological, recreational, scenic, cultural, or historic" local, State, or Federal lands. Proposed amendments to current State lease decision criteria (Sec. A-6.12 M.R.S.A. §6072, Sub-§7-A) include:

7-A. Decision...

"(D) The lease will not unreasonably interfere with significant wildlife habitat and marine habitat or with the ability of the lease site and surrounding marine and upland areas to support existing ecologically significant flora;" and

(F) The lease does not unreasonably interfere with public use or enjoyment within 1,000 feet of a beach, park, or docking facility owned by the Federal Government, the State Government or a municipal governmental agency or certain conserved lands. For the purposes of this paragraph, "conserved lands" means land in which fee ownership has been acquired by the municipal government, State government or Federal Government in order to protect the important ecological, recreational, scenic, cultural, or historic attributes of that property."

In addition to the Governor's Task Force Report and proposed State rule changes for aquaculture leases, other management implications could arise from the Draft Recovery Plan for Maine Atlantic Salmon, which was issued by the National Oceanic and Atmospheric Administration (NOAA) and the Service on June 18, 2004 for 90 days of public comment. This plan identifies nine actions as necessary for the full recovery of the "Gulf of Maine Distinct Population Segment" including...(3) reduce the risk from commercial aquaculture operations."

The following reasons influenced our decision to not undertake a detailed analysis on impacts to aquaculture operations from implementing this Refuge CCP. First, the purpose of this CCP is to develop strategic management direction for our Refuge Program staff to implement on refuge lands. It does not provide direction for other Service programs, nor are we attempting to modify the current lease review process, or impose jurisdiction where we have no authority, as in State waters.

Second, there is a lot of uncertainty with predicting the locations and extent of future aquaculture facilities. This uncertainty restricts and compromises our ability to conduct a meaningful impacts analyses. In our past experience, we have been more concerned with the proximity of finfish operations to Refuge islands because these facilities and associated

activity have more potential to disturb nesting birds. However, future locations for finfish facilities are the most difficult aquaculture operation to predict (Horne-Olson, pers com). Contributing to this uncertainty is the pending release of the Final Atlantic Salmon Recovery Plan, which will address aquaculture issues, and establish actions necessary to de-list the species from the Federal Endangered Species list.

Third, it is our expectation that the release of the Final Governor's Task Force report and a decision on the proposed rule changes for deciding on aquaculture leases by the State, coupled with the pending Federal recovery plan, will provide the basis for public meetings on improving the governance and implementation of aquaculture in Maine. For example, recommendations on improving the lease process, establishing minimum buffer widths, implementing seasonal restrictions, and use of new technologies should all be discussed through this forum. It is through these public hearing processes that the Service may best be able to affect aquaculture practices to the benefit of natural resources.

Finally, management alternatives in this final EIS include resource monitoring at aquaculture sites in close proximity to Refuge islands with sensitive seabird and bald eagle nesting and feeding areas (Objective 4.3). The monitoring would be done in cooperation with State agencies, our research partners, and industry representatives. The information obtained would provide us with a more informed basis for analyzing future impacts.

Given the reasons noted above, and the purpose of this final EIS, we determined it was not warranted to conduct a detailed impacts analysis on the relationship of proposed Refuge management to the aquaculture industry in Maine.

2. *Will we use eminent domain (condemnation) to take privately owned coastal nesting islands?*

The Service, like all Federal agencies, has been given the power of eminent domain which allows it to condemn and acquire lands for the public good. Some island owners fear that the Service will condemn and take their islands without their consent. They also fear that if this happens they will not be adequately compensated for the real value of their island. Others believe the Service should use all of the tools at its disposal, including eminent domain, to conserve and protect coastal nesting islands.

Service policy is to acquire property only from willing sellers, at market value. None of our alternatives include the use of eminent domain, therefore, we believed it did not warrant further analysis.

3. *Will we take away or regulate private property owners' rights?*

Some people believe the presence and involvement of the Federal government will result in the loss of some of their rights as property owners, ultimately affecting their ability to use their land as they see fit. This would effectively reduce the value of their land by preventing them

from placing it in its “highest and best use.” They believe that, even if the Federal government doesn’t directly regulate or restrict their rights, local or State governments may pass new regulations because of Service interest in the nesting islands. Others feel very strongly that restricting property owners’ rights to sell their land to anyone, including the Federal government, infringes on their individual rights. We have no authority in this planning process to restrict private property rights, or to manage private lands, nor have we ever expressed an interest in doing so unless under a partnership agreement. None of our alternatives consider regulation of private property by the Service and, therefore, it does not warrant additional discussion.

*4. How will we affect lobstering and other commercial fisheries near coastal nesting islands?*

Lobstering and other forms of shell or fin fishing are important components of both local and State economies. The industry provides important jobs in local communities, and many believe it is a mainstay of the traditional culture of coastal Maine. Anything that threatens the viability of the industry is a concern to most people we spoke with. As with aquaculture operations, some people are concerned that Service ownership of islands will adversely impact present and future lobster operations by imposing restrictions. Other people support the industry, but request that the Service work closely with industry representatives to ensure that the fisheries vital to seabirds, wading birds, and bald eagles are not overharvested.

Similar to what we presented in the aquaculture discussion, the Service has no jurisdiction over commercial fisheries, unless it is determined that Federal trust resources may be impacted. At this time, we determined this issue is outside the scope of this document. It did not make sense for us to evaluate new catch limits, new technologies, or other strategies given our limited ability to directly influence an outcome. This topic will not be addressed further in the EIS, except where we identify the need to initiate efforts to determine if there are potential impacts on Federal trust resources (Objectives 4.2 and 4.3).

*5. Will we affect existing local and State land use regulations?*

There are a variety of local and State land use regulations regarding development on islands. Some towns do not have effective regulations or enforcement to conserve natural resources on coastal nesting islands. Many people are concerned that the lack of consistency in the enforcement of existing regulations threatens nesting islands. They fear that variances may be granted that will result in adverse impacts on important island habitats and that current regulatory tools cannot adequately protect nesting

islands. Others complain that these regulations unduly hinder their ability to make effective use of islands they own.

The Service does not have the authority to alter State and local land use regulations, although we can provide input through partnerships and technical assistance. Proposing changes to local and State land use regulations are outside the scope of this document and will not be addressed further.

## Plan Amendment and Revision

Periodic review of the CCP will be required to ensure that objectives are being met and management actions are being implemented. Ongoing monitoring and evaluation will be an important part of this process. Monitoring results or new information may indicate the need to change our strategies.

The Service's planning policy (FWS Manual, Part 602, Chapters 1, 3, and 4) states that CCPs should be reviewed at least annually to decide if they require any revisions (Chapter 3, part 3.4 (8)). Revisions will only be necessary if significant new information becomes available, ecological conditions change, major refuge expansions occur, or we identify the need to do so during a program review.

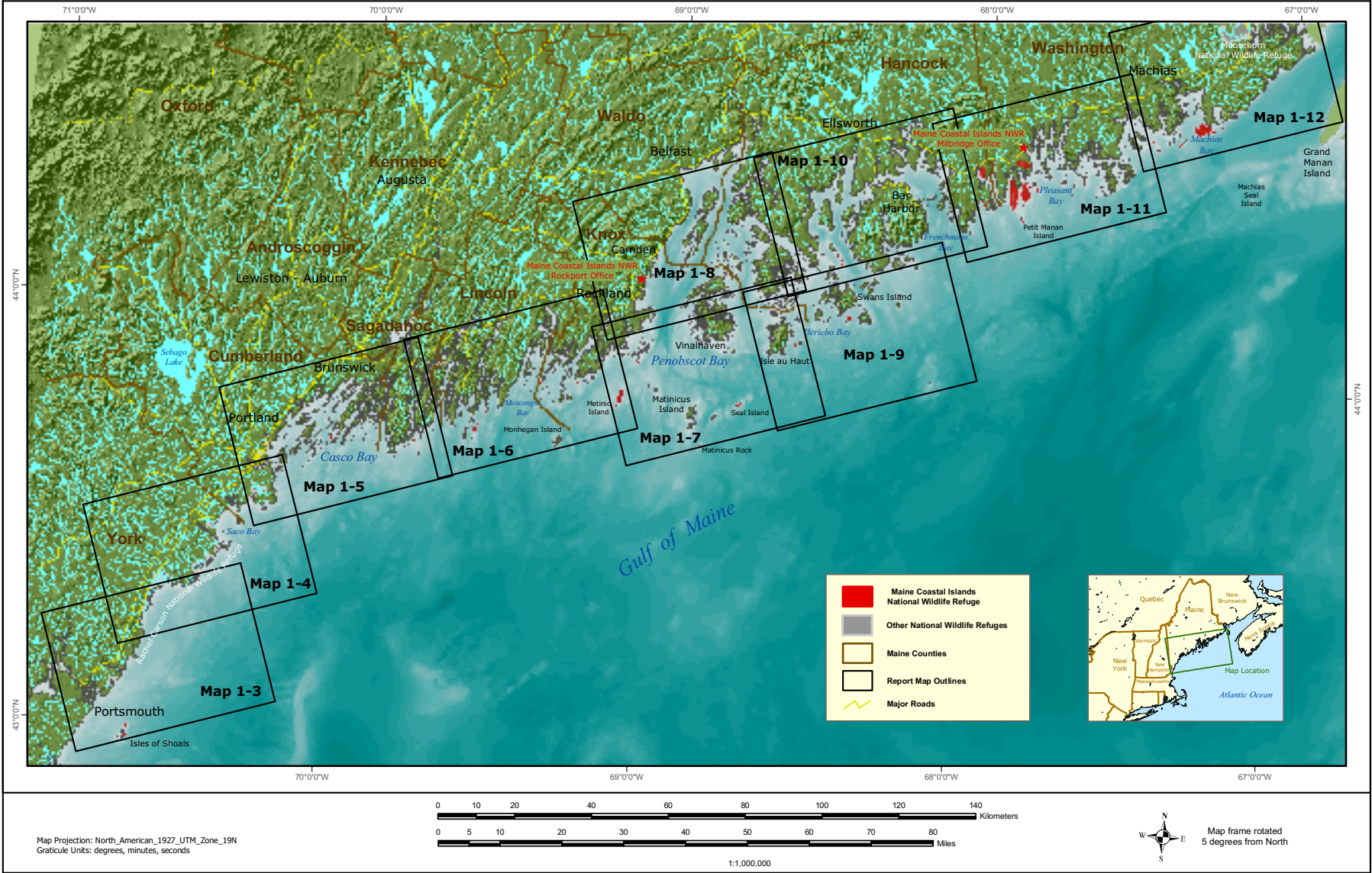
At a minimum, CCPs will be fully revised every 15 years. We will modify the CCP documents and associated management activities as needed, following the procedures outlined in Service policy and NEPA requirements. Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3 C) will only require an Environmental Action Memorandum.



*Birch Point Trail on Petit Manan Point Division*  
USFWS photo



# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT *Maine Coastal Islands National Wildlife Refuge*



Map Projection: North\_American\_1927\_UTM\_Zone\_19N  
Graticule Units: degrees, minutes, seconds

1:1,000,000



Map frame rotated  
5 degrees from North





# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

## Map 1-3 Kittery



### Land Protection Legend

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\* Nationally significant is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCP/EIS.

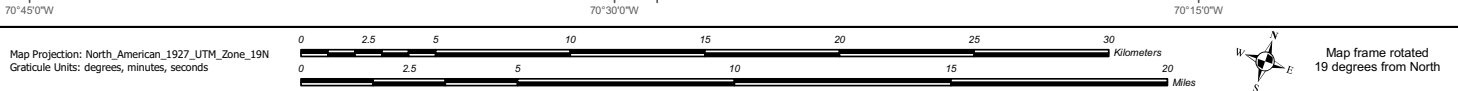
### Base Map Legend

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

### National Land Cover Database

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
National Land Cover Database from the US EPA  
Digital Elevation Model from USGS NED data  
Roads from USGS 1:100,000 road data  
Town lines adapted from Maine Office of GIS data  
All National Wildlife Refuge boundaries from USFWS  
Bathymetry from MassGIS  
Map produced by USFWS R5Carto 2/23/2005





# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE

## COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

### Map 1-4 Saco Bay



**Land Protection Legend**

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\* 'Nationally significant' is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCP/EIS.

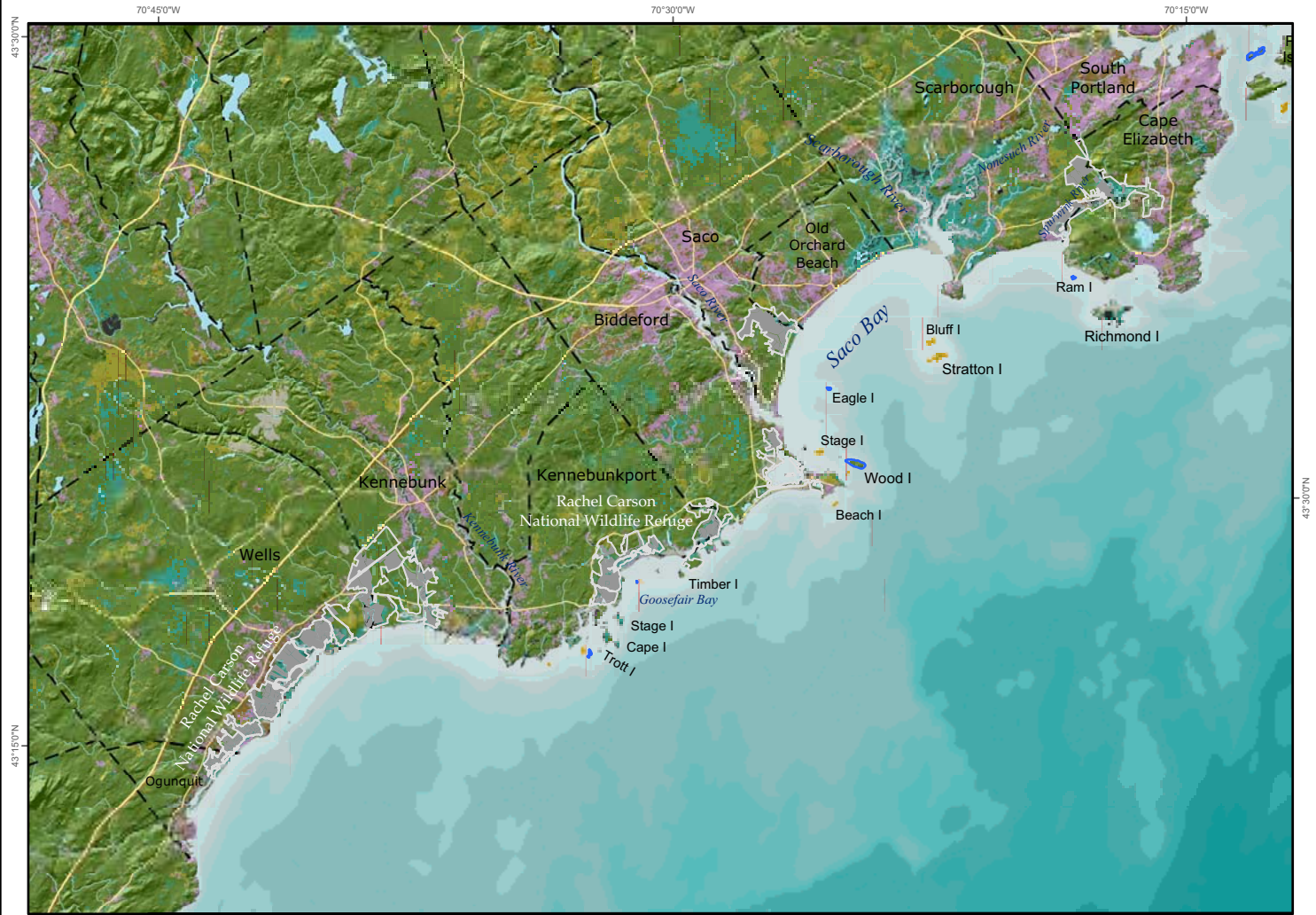
**Base Map Legend**

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

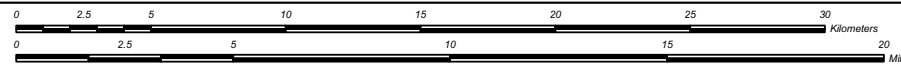
**National Land Cover Database**

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
 National Land Cover Database from the US EPA  
 Digital Elevation Model from USGS NED data  
 Roads from USGS 1:100,000 road data  
 Town lines adapted from Maine Office of GIS data  
 All National Wildlife Refuge boundaries from USFWS  
 Bathymetry from MassGIS  
 Map produced by USFWS R5Carto 1/6/2005



Map Projection: North\_American\_1927\_UTM\_Zone\_19N  
 Graticule Units: degrees, minutes, seconds



Map frame rotated 19 degrees from North



# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE

## COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

### Map 1-5 Casco Bay



#### Land Protection Legend

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\* Nationally significant is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCP/EIS.

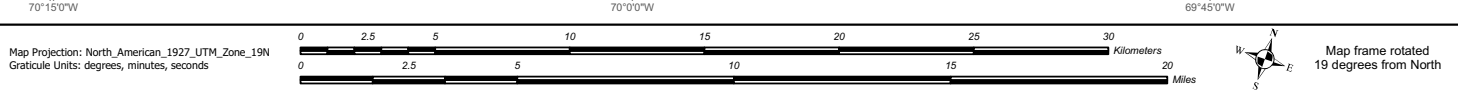
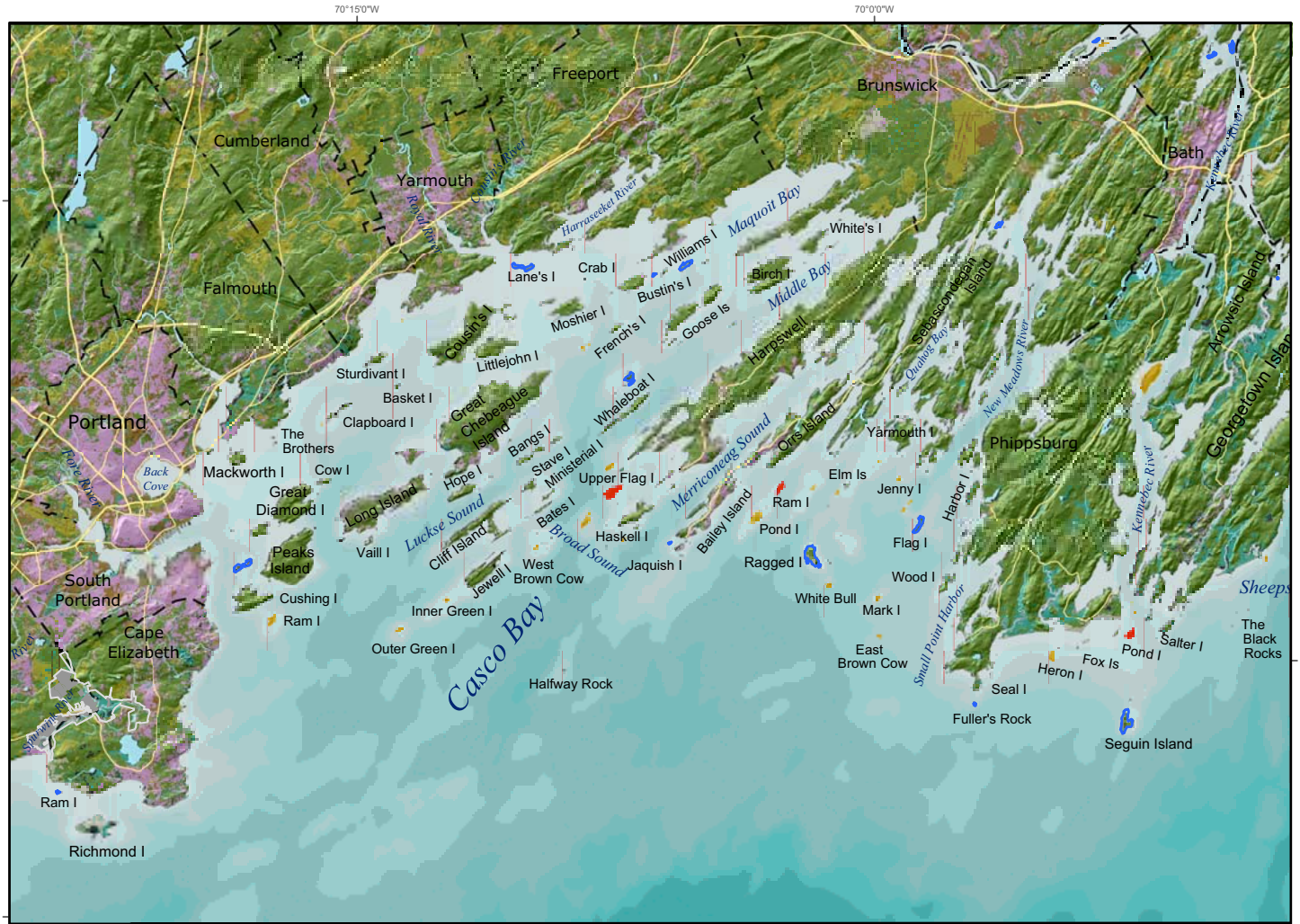
#### Base Map Legend

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

#### National Land Cover Database

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
 National Land Cover Database from the US EPA  
 Digital Elevation Model from USGS NED data  
 Roads from USGS 1:100,000 road data  
 Town lines adapted from Maine Office of GIS data  
 All National Wildlife Refuge boundaries from USFWS  
 Bathymetry from MassGIS  
 Map produced by USFWS R5Carto 1/10/2005





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Map 1-6 Muscongus Bay



- Land Protection Legend**
- Maine Coastal Islands National Wildlife Refuge
  - Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
  - Nationally Significant Islands\* Permanently Protected by Others
  - Nationally Significant Islands\* Not Permanently Protected
  - Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
  - Other National Wildlife Refuges

\* 'Nationally significant' is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCP/EIS.

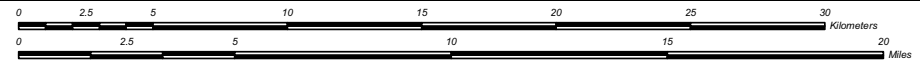
- Base Map Legend**
- Primary Roads
  - Secondary Roads
  - Town Lines
  - Fresh Water

- National Land Cover Database**
- Residential
  - Commercial, Industrial or Transportation
  - Bare Rock or Barren Land
  - Forested
  - Grassland
  - Wetland

Data sources:  
 National Land Cover Database from the US EPA  
 Digital Elevation Model from USGS NED data  
 Roads from USGS 1:100,000 road data  
 Town lines adapted from Maine Office of GIS data  
 All National Wildlife Refuge boundaries from USFWS  
 Bathymetry from MassGIS  
 Map produced by USFWS RSCarto 2/23/2005



Map Projection: North\_American\_1927\_UTM\_Zone\_19N  
 Graticule Units: degrees, minutes, seconds



\* Hart I is a recent acquisition



# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE

## COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

### Map 1-7 Outer Penobscot Bay



**Land Protection Legend**

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\* "Nationally significant" is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCP/EIS.

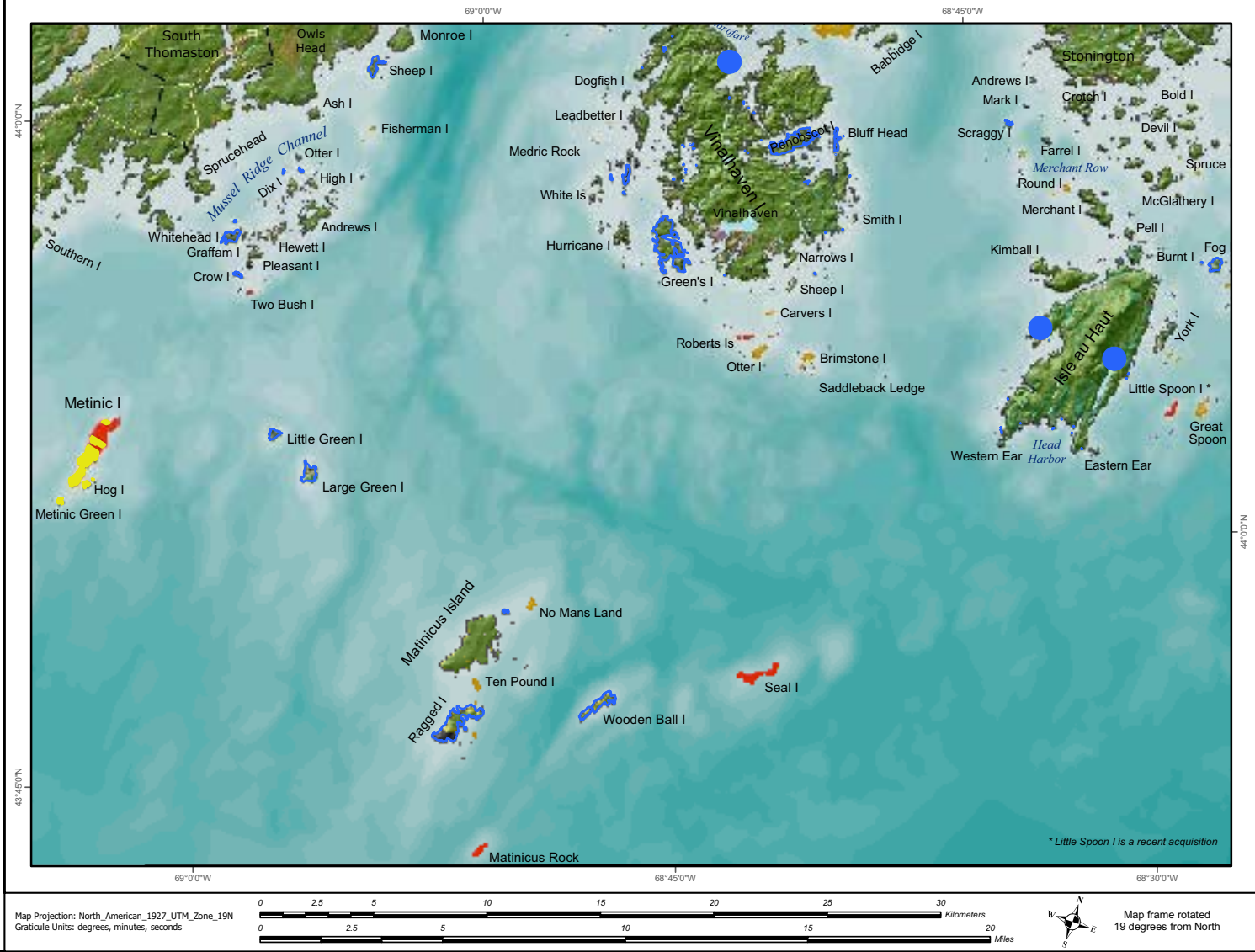
**Base Map Legend**

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

**National Land Cover Database**

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
 National Land Cover Database from the US EPA  
 Digital Elevation Model from USGS NED data  
 Roads from USGS 1:100,000 road data  
 Town lines adapted from Maine Office of GIS data  
 All National Wildlife Refuge boundaries from USFWS  
 Bathymetry from MassGIS  
 Map produced by USFWS R5Carto 2/23/2005





# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE

## COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

### Map 1-8 Inner Penobscot Bay



**Land Protection Legend**

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\* "Nationally significant" is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCP/EIS.

**Base Map Legend**

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

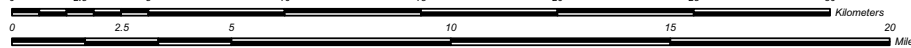
**National Land Cover Database**

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
 National Land Cover Database from the US EPA  
 Digital Elevation Model from USGS NED data  
 Roads from USGS 1:100,000 road data  
 Town lines adapted from Maine Office of GIS data  
 All National Wildlife Refuge boundaries from USFWS  
 Bathymetry from MassGIS  
 Map produced by USFWS R5Carto 1/11/2005



Map Projection: North\_American\_1927\_UTM\_Zone\_19N  
 Graticule Units: degrees, minutes, seconds



Map frame rotated 19 degrees from North



# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE

## COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

### Map 1-9 Jericho Bay



#### Land Protection Legend

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\* "Nationally significant" is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCP/EIS.

#### Base Map Legend

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

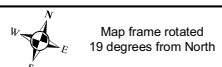
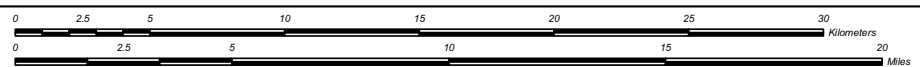
#### National Land Cover Database

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
 National Land Cover Database from the US EPA  
 Digital Elevation Model from USGS NED data  
 Roads from USGS 1:100,000 road data  
 Town lines adapted from Maine Office of GIS data  
 All National Wildlife Refuge boundaries from USFWS  
 Bathymetry from MassGIS  
 Map produced by USFWS R5Carto 2/23/2005



Map Projection: North\_American\_1927\_UTM\_Zone\_19N  
 Graticule Units: degrees, minutes, seconds





# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE

## COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

### Map 1-10 Frenchman Bay



**Land Protection Legend**

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\*Nationally significant is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCPIEIS.

**Base Map Legend**

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

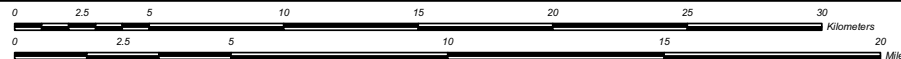
**National Land Cover Database**

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
 National Land Cover Database from the US EPA  
 Digital Elevation Model from USGS NED data  
 Roads from USGS 1:100,000 road data  
 Town lines adapted from Maine Office of GIS data  
 All National Wildlife Refuge boundaries from USFWS  
 Bathymetry from MassGIS  
 Map produced by USFWS RSCarto 2/23/2005



Map Projection: North\_American\_1927 UTM\_Zone\_19N  
 Graticule Units: degrees, minutes, seconds



Map frame rotated 19 degrees from North





# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT



## Map 1-11 Petit Manan

### Land Protection Legend

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\* "Nationally significant" is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCPEIS.

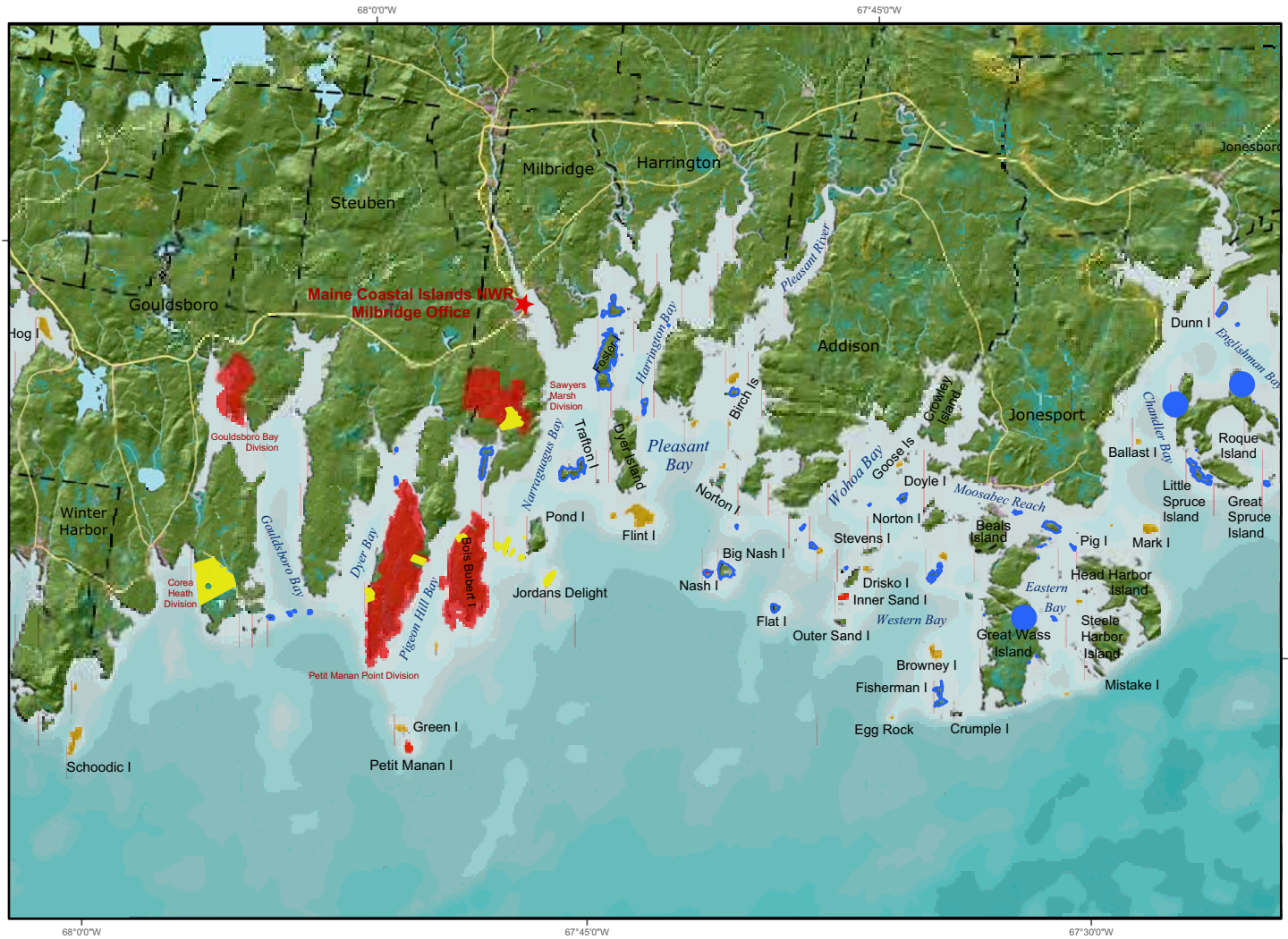
### Base Map Legend

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

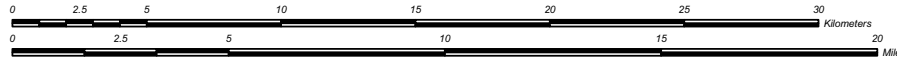
### National Land Cover Database

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
National Land Cover Database from the US EPA  
Digital Elevation Model from USGS NED data  
Roads from USGS 1:100,000 road data  
Town lines adapted from Maine Office of GIS data  
All National Wildlife Refuge boundaries from USFWS  
Bathymetry from MassGIS  
Map produced by USFWS R5Canto 1/11/2005



Map Projection: North\_American\_1927\_UTM\_Zone\_19N  
Graticule Units: degrees, minutes, seconds



Map frame rotated 19 degrees from North



# MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

## Map 1-12 Cobscook Bay



### Land Protection Legend

- Maine Coastal Islands National Wildlife Refuge
- Maine Coastal Islands National Wildlife Refuge Approved for Acquisition
- Nationally Significant Islands\* Permanently Protected by Others
- Nationally Significant Islands\* Not Permanently Protected
- Nationally Significant Bald Eagle Nesting Sites\* Not Permanently Protected
- Other National Wildlife Refuges

\*Nationally significant is defined by criteria developed in partnership with Gulf of Maine Program, Maine Dept. of Inland Fisheries & Wildlife and conservation partners. Specific criteria used to determine national significance identified in Chapter 1 of the CCP/EIS.

### Base Map Legend

- Primary Roads
- Secondary Roads
- Town Lines
- Fresh Water

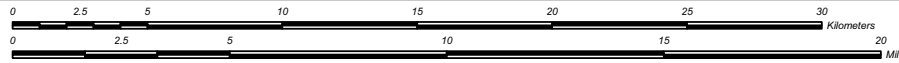
### National Land Cover Database

- Residential
- Commercial, Industrial or Transportation
- Bare Rock or Barren Land
- Forested
- Grassland
- Wetland

Data sources:  
 National Land Cover Database from the US EPA  
 Digital Elevation Model from USGS NED data  
 Roads from USGS 1:100,000 road data  
 Town lines adapted from Maine Office of GIS data  
 All National Wildlife Refuge boundaries from USFWS  
 Bathymetry from MassGIS  
 Map produced by USFWS R5Carto 1/12/2005



Map Projection: North\_American\_1927\_UTM\_Zone\_19N  
 Graticule Units: degrees, minutes, seconds



Map frame rotated 19 degrees from North

## Chapter 2



*Fireweed*  
USFWS photo

# Alternatives, Including the Service's Preferred Alternative

- Introduction
- Formulating Alternatives
- Actions Common to all Alternatives
- Alternatives or Actions Considered but Not Fully Developed
- Descriptions of Individual Alternatives Analyzed in Detail
  - Alternative A: Current Management
  - Alternative B: The Service's Preferred Alternative
  - Alternative C
  - Alternative D
- Comparison of Major Actions by Alternative and Issues

## Introduction

This chapter presents:

- our process for formulating alternatives;
- actions that are common to all alternatives;
- actions or alternatives considered but not fully developed; and,
- descriptions of the four alternatives we analyzed in detail.

At the end of the chapter, you will find a tabular matrix that compares and contrasts specific management actions and strategies by alternative (Table 2-1). We organized this table to show how the actions and strategies address the significant issues identified in Chapter 1.

## Formulating Alternatives

### Relationship of Goals and Objectives to Formulating Alternatives

Goals and objectives define each alternative. As we described in Chapter 1, developing goals for the Refuge was one of the first steps in our planning process. Our goals are intentionally broad, descriptive statements of desired future condition for Refuge lands. By design, they are not quantitative, but are more prescriptive in defining the targets of our management. They also articulate the principal elements of refuge purposes and our vision statement, and provide the foundation for developing specific management objectives. The goals are common to all alternatives.

After developing our goals, we considered a wide range of possible management objectives that would help us meet them. Essentially, objectives are incremental steps we take to achieve a goal and they further define the management targets in measurable terms. They often vary between the alternatives. Objectives provide the basis for determining more detailed strategies, monitoring refuge accomplishments, and evaluating our successes. Service guidance in “Writing Refuge Management Goals and Objectives: A Handbook (November 2003)” recommends that objectives possess 5 properties. They should be: 1) specific; 2) measurable; 3) achievable; 4) results-oriented; and 5) time-fixed. Together these properties constitute the acronym referred to as “SMART” objectives.

The objectives we considered ranged from those that require only a minimum level of funding and staffing, to those that would require a considerable increase in funding, staffing, infrastructure, and partnership development. Some of our objectives directly relate to habitat management, while others strive to meet population targets tied to recovery plans, regional, or Gulf of Maine species and habitat goals. With each objective statement, we provide a background narrative so you can understand its context and why we think it’s important. The objectives selected for the final CCP will be used directly in respective Refuge step-down plans, including the Habitat Management and Visitor Services plans. Our successes will be based on how well we achieve our objectives.

We also developed strategies for each objective. Strategies are specific actions, tools, techniques, considerations, or a combination of these, which may be used to achieve the objectives. Some of the strategies may be revised in the process of developing step-down plans, but most strategies will likely be carried forth directly into subsequent plans.

**Alternatives, including  
the No Action  
Alternative**

After identifying a wide range of possible management objectives and strategies, we began the process of creating alternatives. Simply put, alternatives are packages of complementary management objectives for achieving the Service and Refuge System missions, refuge establishment purposes, and Refuge vision and goals, while also responding to issues and opportunities identified during the planning process.

To this end, we grouped various objectives that seemed to fit together in what we loosely called “themes.” For example, we considered themes like “custodial management” or “habitat restoration emphasis,” or “land protection emphasis.” These themes were then firmed up into four alternatives after further evaluating how respective objectives would interact, their compatibility with the refuge purposes, and the reality of accomplishing each during the next 15 years. We believe the four alternatives, with their respective objectives, represent a reasonable range of proposals for achieving the Refuge’s purposes, vision, and goals, and for addressing the significant issues identified in Chapter 1.

NEPA requires analysis of a “No Action” alternative, which can be defined as continuing with current management. In this final EIS, Alternative A fulfills this definition; it continues our current and approved management activities. We refer to Alternative A throughout this document as our “Current Management Alternative.” It provides the baseline for comparing and contrasting the other three action alternatives. In fact, we suggest reading Chapter 3: Affected Environment first for detailed descriptions of current Refuge resources.

You will notice that objectives in Alternative A do not strictly adhere to the SMART format because we are describing management activities that were already established on the Refuge before the 2003 handbook guidance. We felt it would falsely portray current management to manipulate them into this format. As such, Alternative A objectives are more subjective in nature than Alternatives B, C and D.

Unless otherwise noted, all actions would be implemented by Refuge staff.

### **Actions Common to All Alternatives**

There are some major actions that will be implemented regardless of the alternative selected. These are actions which:

- may be required by law or policy;
- represent NEPA decisions that have recently gone through a public and agency review;
- are administrative actions that do not necessarily require public review but we wanted to highlight them in this document; or,
- are considered so fundamentally important to achieving Refuge purposes and goals, we determined they should occur regardless of the alternative.

### **Refuge Step-down Plans**

All of the alternatives incorporate the completed EAs, management plans, and step-down plans listed below. Some of the alternatives may build on these documents, but do not fundamentally change their original decisions.

- Fire Management Plan and EA, 2002 (includes wildfires and prescribed management fires)
- Safety Program and Operations Plan, 2000
- Continuity of Operations Plan, 1999
- Hunt Plan and EA, 2001

We will complete the following step-down plans, which are necessary components of implementing the selected alternative (future Service policy may require additional plans):

- Habitat Management Plan, within 1 year of CCP approval (see discussion below)
- Habitat and Species Inventory and Monitoring Plan, within 2 years of CCP approval (see discussion below)
- Visitor Services Plan, within 2 years of CCP approval
- Facilities and Sign Plan, within 2 years of CCP approval
- Law Enforcement Plan, within 3 years of CCP approval
- Cultural Resources Management and Protection Plan, within 4 years of CCP approval
- Compatibility Determinations for Wildlife-Dependent Recreational Uses (Appendix C)
- Land Protection Plan (Appendix A)
- Wilderness Stewardship Plan, within 2 years of Wilderness Designation

**Habitat Management Plan**

A Habitat Management Plan (HMP) for the Refuge is the requisite first step to achieving the objectives under Goals 1 through 6, regardless of the alternative. For example, it will establish what specific actions are necessary to enhance, restore, and manage important habitats, and minimize impacts to species assemblages significant to the Refuge. It will also establish the timing for these actions and identify how we will define success. We will write the plan using current resource information, but will update it as needed, based on new information. It is the highest priority step-down plan to accomplish once a final CCP is approved.

**Habitat and Species Inventory and Monitoring Plan**

A Habitat and Species Inventory and Monitoring Plan (HSIMP) for the Refuge will also be a priority to complete. This plan is vital to measuring the success of meeting our objectives, regardless of the alternative. It will outline the methodology we will use to assess whether our original assumptions and proposed management actions are, in fact, supporting our habitat and species objectives. Inventory and monitoring results will provide us with more extensive information on the status of the Refuge's natural resources. It will allow us to make more informed management decisions.

**Land Protection**

Developing a land protection strategy for each alternative was one of the most time-consuming and complicated aspects of this Final EIS. All alternatives include, at a minimum, continued Service acquisition of lands from willing sellers within the currently approved Refuge boundary. At present, we have approval to acquire 467.1 acres consisting of 2 tracts (24.6 acres) on Petit Manan Point Division; 1 tract (95 acres) on the Sawyers Marsh Division; and 21 tracts on 14 islands (347 acres). We believe Service acquisition of these lands are essential to meeting Refuge purposes and goals. These lands are not only important for their Federal trust resource values, but many would also make more effective boundaries for our management and administrative purposes. Table 1 in Appendix A: Land Protection Plan summarizes these lands. While all the alternatives include these 467.1 acres, the alternatives differ in how much additional land is proposed for Service acquisition from willing sellers. All lands acquired would become part of the Petit Manan Refuge.

In addition to Service acquisition, all alternatives would allow us to continue cooperating with our conservation partners to identify and protect areas of high biodiversity value important to Federal trust resources and other rare or declining species or plant communities. It is important that we work together and complement each other's land protection efforts given the limited funding and resources available.

**Invasive and Exotic Plant Management**

Managing to control invasive and exotic plant populations is a priority for the Refuge System. National and regional teams of experts and managers have convened to deal with this issue. Fortunately, on the Refuge and to the best of our knowledge, invasive and exotic plants, while present, are not presently a huge threat to native biodiversity and ecosystem function on the mainland or islands. Nevertheless, we recognize the need to remain vigilant to prevent their expansion, especially to new areas. As a group, these plants tend to be aggressive in establishing themselves and require frequent and thorough treatments to control them. All alternatives would provide for active management to control their presence and spread, although they differ in whether to allow all treatments available to us including, mechanical, chemical, biological, fire, or livestock grazing.

**Machias Seal Island Coordination**

Machias Seal Island has some of the highest numbers and diversity of nesting seabirds of any island in the Gulf of Maine. While we identified in Chapter 1 that sovereignty of this island is an issue between the U.S. and Canadian governments, this has not diminished the strong partnership between the Canadian Wildlife Service, MDIFW, and Refuge staff to protect these nesting seabirds. Annual meetings are held to discuss public use, seabird research, and the results of surveys. This partnership would continue under all alternatives.

**Native American Coordination**

Improving our relationship with the Passamaquoddy and other Wabanaki Tribes is common to all alternatives. Within three years of CCP approval, we will develop a partnership agreement to establish a mutually beneficial working relationship with interested Wabanaki Tribes that includes cooperating in: the identification, inventory, and protection of cultural resources; developing environmental education and interpretative programs using oral and written sources; youth programs; sharing of technical expertise; or any other programs of mutual interest.

**Coast Guard Coordination**

All alternatives include developing a Memorandum of Understanding (MOU) with the U.S. Coast Guard within 2 years of CCP approval. This MOU would be designed to facilitate their maintenance and protection of navigational equipment on Refuge lands, including access to these sites.

**Protecting and Managing Cultural Resources**

We take seriously our responsibility to consider the effects of our actions on archeological and historic resources. Under all of the alternatives, we will comply with Section 106 of the National Historic Preservation Act before disturbing any ground. Compliance may require any or all of the following: review of State Historic Preservation Office records, consultation with Native American Tribal Historic Preservation offices, a literature survey, or field survey. All alternatives also include completing a Cultural Resources Management and Protection Plan within 4 years of CCP approval.



In addition, we will continue our program to maintain historic lighthouses and/or associated structures to at least minimum national historic preservation standards. The Service is responsible for maintaining historic structures on Petit Manan Island (light keepers dwelling and outbuildings), Matinicus Rock (lighthouse, light keepers dwelling, and outbuildings) and the fog signal buildings and lighthouses on Libby Island and Egg Rock. While all alternatives would include maintenance to minimum historic preservation standards, the alternatives differ in how we would pursue further enhancements, and promote public use and enjoyment of these resources.

As noted above under land protection, all alternatives include additional land acquisition. However, regardless of the alternative, we are not purposefully seeking to acquire any more lighthouses or associated historic structures with these purchases, except as necessary to protect Federal trust resources.

**Maintaining Water Impoundments on Petit Manan Point Division**

There are three connected freshwater impoundments on Petit Manan Point Division covering approximately 112 acres. In all alternatives, the water control structures would be maintained to provide stopover and foraging habitat for fall migrating waterfowl, wading birds, and shorebirds. The impoundments require minimal maintenance and are particularly valuable for fall migrating waterfowl, including black duck, because they provide freshwater and forage in close proximity to the coastline. They consistently hold thousands of fall migrating ducks which move through continuously until the water is frozen. While all alternatives would maintain the water control structures, the alternatives vary in the amount of active management these wetlands would receive.

**Refuge Revenue Sharing Payments**

Annual refuge revenue sharing payments to the 20 Maine coastal towns in which Refuge lands are located will continue under each alternative. Future increases in payments will be commensurate with increases in the appraised values of Refuge lands, new acquisitions of land, and the level of Congressional appropriations.

**Partnerships**

All alternatives support partnerships to the fullest extent possible. These are vital to successfully managing all aspects of the Refuge, from land protection to habitat and species management, to public use activities. We listed many of our valuable partners in Chapter 1, but we will also pursue new ones of mutual interest and benefit to Refuge goals and objectives.

**Friends Group Support**

All alternatives would continue to support the Friends of Maine Seabird Islands association which has recently formed in the Rockport area. Their focus is on outreach and advocacy for the Refuge's seabird management and island protection program and the proposed coastal education center. We anticipate this group will provide us with valuable assistance in imple-

menting our final CCP. Similarly, all alternatives would seek opportunities to create a second Refuge Friends Group in downeast Maine.

**Volunteer Opportunities**

All alternatives would continue our successful volunteer program. Thousands of hours of work have been accomplished by volunteers who perform administrative, public use, and biological duties. This program has enhanced our ability to complete many tasks associated with refuge management.

**Existing Facilities Maintenance**

Periodic maintenance and renovation of existing facilities is a critical need, regardless of the alternative finally selected, to ensure safety and accessibility for Refuge staff and visitors. Besides the historic lighthouses, dwellings, and outbuildings noted above under cultural resources, we would continue to maintain the following structures in all alternatives:

- one cabin on Cross Island, and two on Bois Bubert Island;
- a dwelling on Metinic Island;
- boat ramps and boardwalks on Matinicus Rock, Egg Rock, Petit Manan and Libby islands;
- Two Bush Island light (not designated historic);
- the John Hollingsworth Memorial and Birch Point foot trails on Petit Manan Point Division, parking lots; and,
- the Egg Rock seawall

Some of these facilities, namely the trails, should be upgraded to be compliant with the Americans With Disabilities Act (ADA). Appendix E displays the fiscal year (FY) 2003 Maintenance Management System (MMS) database list of backlogged maintenance entries for the Refuge.



*Milbridge, Maine office, current Refuge Headquarters*  
USFWS photo

In addition, there is 1.1 mile of unpaved public road (Route #010) on Petit Manan Point which accesses the two trails. It has recently been maintained so is not currently on the MMS backlog; however, future maintenance will be necessary within the 15 year planning horizon.

Future maintenance needs would vary among the alternatives, since they differ in the amount of new facility construction. Appendix E also lists new construction projects identified in our Refuge Operations Needs Systems (RONS) database.

Funds for refuge public use roads, parking lots, bridges, restrooms, and trails would be sought from the Refuge Roads Program (RRP), a

Federal Lands Highway Program the Service created in TEA-21. These funds can also be used for interpretive enhancements associated with these project, as long as the costs for the interpretive facilities do not exceed 5% of the project budget. RRP funds can be used as the non-Federal match for FHA funds available through State Departments of Transportation. Refuges can also use appropriated Service funds as the non-Federal match for these funds as well. This matching ability can be used to further compatible city, county, and State transportation and transit funds for projects on or near the Refuge.

**Refuge Headquarters and Coastal Education Center**

All alternatives would allow us to pursue the idea of a new Refuge Headquarters and Coastal Education Center in the mid-coast area. We would continue to work with our partners, including National Audubon Society, Maine Audubon Society, the Friends Group, and MDIFW to establish a vision, agree on purpose and conceptual design criteria for the education facility, and explore possible site locations. Our preliminary discussions included ideas that the center could provide such things as interpretive exhibits, trails, and staff- and volunteer-led environmental education and interpretive programs. In Chapter 3, under our discussion on Refuge administration, we present some tentative criteria for selecting a site. We expect to expand on these criteria as discussions with our partners continue. Once a conceptual idea of the center is developed, and we have some prospective sites to evaluate, we will proceed with a separate environmental assessment, including public involvement, before a final decision is made.

**Technical Assistance to Landowners**

All alternatives would allow us to continue to provide technical assistance to landowners interested in enhancing or protecting their lands for wildlife. We heard from many people that this is an important community service provided by the Refuge staff that should continue. Several of our strategies identify specific activities we plan to undertake to facilitate this assistance.

**Permitting Special Uses (including Research and Commercial Activities)**

Under all alternatives, requests for special use permits will be evaluated for appropriateness and compatibility on a case-by-case basis by the Refuge Manager. At a minimum, all commercial activities and all research projects require special use permits. Existing, compatible, and approved special use permits will continue to be allowed in all alternatives. In the future, research projects that will improve and strengthen natural resource management decisions on the Refuge will be encouraged. Research on species of concern and their habitats will continue to be a priority. The Refuge Manager may also consider research not directly related to refuge objectives, but which contributes to the broader enhancement, protection, or management of native species and biological diversity within the region and beyond.

We will promote partnerships with local universities and colleges, USGS and other Federal and State research agencies. The Refuge Manager will determine on a case-by-case basis whether they can directly support a project through funding in-kind services (e.g. housing or use of other facilities), field assistance, or through sharing data and records.

All researchers on refuges, current and future, will be required to submit a detailed research proposal following Service policy in the FWS Refuge Manual, Part 4, Chapter 6. Special use permits must also identify a schedule for progress reports (at least annual), criteria for determining when a project should cease, and publication or other final reporting requirements. Multi-year projects should be established under a cooperative agreement. The Regional Division of Natural Resources, other Service divisions, and State agencies will be asked to review and comment on research proposals. Research results will be shared within the Service, with MDIFW, and elsewhere as appropriate.

Some projects, such as depredation and banding studies, require additional Service permits. These projects will not be approved until all the Service permits and Endangered Species Act consultation requirements are met. Also, to maintain the natural landscape of Refuge lands, any proposals for permanent or semi-permanent structures will not be allowed, except under extenuating circumstances such as seasonal camps for future management projects.

**Refuge Complex Name Change**

Through our outreach efforts, we have determined the need to change the name we use to refer to the 5-refuge complex. We will change it to “Maine Coastal Islands National Wildlife Refuge” to better reflect the current mission and geographic scope of our management. We will use this name in outreach and administration, only to refer to the five refuges collectively. It does not change the name or status of the individual refuge units.

**Additional NEPA Analysis**

The National Environmental Policy Act requires a site-specific analysis of impacts for all major Federal actions. These impacts are to be disclosed in either an EA or Environmental Impact Statement (EIS).

Many of the actions and associated impacts proposed in the four alternatives are described in enough detail to comply with NEPA, and would not require additional environmental analysis. Although this is not an all-inclusive list, the following examples fall into this category: seabird management on islands, habitat diversity management on the mainland, expanding priority wildlife-dependent public use programs; acquiring land; controlling invasive plants, and managing predators.

A few of the proposed actions may not be described in enough detail to comply with the site-specific analysis requirements of NEPA. One example of a project that will require a separate NEPA compliant document

is the construction of a new Refuge Headquarters and Coastal Education Center.

**Adaptive Management**

Common to all alternatives is a strategy of adaptive management to keep the CCP relevant and current through scientific research and management. We acknowledge that our information on species and ecosystems is incomplete, provisional, and subject to change as our knowledge base improves.



*Wood duck pair*  
USFWS photo

The need for adaptive management is all the more compelling today.

“The earth’s ecosystems are being modified in new ways and at faster rates than at any other time in their nearly 4 billion year history. These new and rapid changes present significant challenges to our ability to predict the inherently uncertain responses and behaviors of ecosystems.” (Christensen, et al. 1996)

Objectives and strategies must be adaptable in responding to new information and spatial and temporal changes. We will continually evaluate management actions, both formally and informally, through monitoring or research to recon-

sider whether their original assumptions and predictions are still valid. In this way, management becomes an active process of learning what really works. It is important that the public understand and appreciate the adaptive nature of natural resource management.

The Refuge Manager is responsible for changing management actions if they do not produce the desired conditions. Significant changes may warrant additional NEPA analysis; minor changes will not, but will be documented in annual monitoring, project evaluation reports, or the Annual Refuge Narrative.

**Alternatives or Actions Considered But Not Fully Developed**

**No Service Land Acquisition**

We considered an alternative that has no additional Service land acquisition including forgoing acquisition of those tracts within our currently approved Refuge boundary. However, we quickly came to the conclusion that this alternative would compromise our ability to achieve our Refuge goals and individual refuge purposes. As we noted above under the land protection discussion, it is important that, at a minimum, we acquire the private lands within our currently approved boundary. These lands are important for their Federal trust resource values and would provide us with more effective management boundaries. Further, their potential development would adversely impact resources on adjacent refuge lands. Finally, we recognized that no individual, agency, organization, or elected official has recommended this alternative to us. As such, we felt it was not warranted to develop this alternative in detail.

**Description of Individual Alternatives Analyzed in Detail**

The four alternatives analyzed in detail are each presented below. We provide an overview description of each one, and then present their respective goals, objectives, and strategies. Maps depicting our proposed public use programs and infrastructure are presented after each alternative's discussion.

Following these descriptions, Table 2-1 provides a side-by-side comparison of how the alternatives address the significant issues identified in Chapter 1. It is designed to provide a quick overview of the principal Federal actions we propose to undertake, and those actions that distinguish the alternatives.

Table 2-2 indicates which of the 151 nationally significant islands are included in the Refuge expansion proposals for Alternatives A, B and C. Alternative D does not include an expansion proposal. Table 2-3 summarizes the land acquisition proposals by alternative.

The environmental consequences of implementing the actions proposed in the alternatives are described in detail in Chapter 4.

**Alternative A: Current Management**

**Introduction**

This alternative portrays current, planned and approved management activities and serves as a baseline against which all other alternatives are compared. Projects planned, funded, and/or underway are described in this alternative. The biological program priorities would continue to be the six seabird management projects on Refuge islands. These projects include vegetation management to maintain high quality nesting habitat and hiring seasonal crews to staff the management sites throughout the nesting season. On the mainland, we would continue the 70 acres of open field management, maintain the 3 freshwater impoundments, and continue the Monitoring Avian Productivity and Survivorship (MAPS) station monitoring. In addition, we would continue to conduct baseline biological inventories on both the mainland and islands as funding and staffing allows.

We would continue our annual hunt program, begun in 2002, which allows waterfowl hunting on 22 islands, deer hunting on Bois Bubert Island, and small game, big game, and waterfowl hunting on the Sawyers Marsh and Gouldsboro Bay divisions. No fishing opportunities exist on the Refuge, so no program has been developed. Other existing priority public use programs would continue, primarily the wildlife observation, nature photography, and environmental interpretation on Petit Manan Point Division's two trails: Birch Point and John Hollingsworth Memorial trails. Our expectation is that we would see approximately a 10% increase in annual visitation based on recent local trends; however, increasing visitation on the Refuge is not an objective of this alternative.

We would continue to pursue Service acquisition from willing sellers of the 467.1 private acres within our approved boundary. We would also pursue a new expansion proposal of 30 islands (881 acres; see Table 2-2) and 153 acres of mainland in two tracts. The islands all support Federal trust resources such as nesting seabird sites and important migratory bird habitats. The larger, 150 acre mainland tract is a very important coastal shorebird concentration area during migration and would be acquired under a no-cost transfer from the U.S. Navy. This expansion proposal is based on what we could reasonably expect to acquire if the recent annual land acquisition funding continued over the next 15 years and willing sellers are available. Maps 2-1 to 2-4 (pages 2-39 to 2-42) depict our existing and planned use infrastructure on the four mainland divisions.

No new infrastructure would be developed for any of our programs, but we would continue to maintain the facilities we identify in Chapter 3. Alternative A would maintain the current staffing level; that is, six permanent employees (see Appendix F).

Although we conducted a wilderness inventory (Appendix D) and concluded that 13 islands met the minimum qualifications for wilderness, under this alternative we would not propose that any be recommended for inclusion in the National Wilderness Preservation System. Designation would require additional staff time and resources to plan and manage these islands to maintain their wilderness character, which we would not be prepared for under this alternative.



*Banding birds at the MAPS Station on Petit Manan Point Division*  
USFWS photo

The current status of Refuge resources, programs, staffing and infrastructure is described in more detail in Chapter 3: Affected Environment.

As we mentioned above in the section on formulating alternatives, the objectives in Alternative A do not adhere to the SMART format because our current programs were not designed within this planning framework. As such, you will notice that Alternative A objectives are fewer and more subjective in nature than Alternatives B, C, and D. However, we list Alternative A objectives in approximately the same subject-area sequence as Alternatives B, C, and D.

**Goal 1: Perpetuate the Biological Diversity and Integrity of Upland Cover Types on the Refuge's Mainland to Sustain High Quality Habitat for Migratory Birds**

**Objective 1.1 (Blueberry Barrens - Old Field)**

Maintain the 70 acres of open field on Petit Manan Point to provide habitat diversity for nesting and migrating land birds.

*Background:* Five years of data from the Monitoring Avian Productivity and Survivorship (MAPS) station on Petit Manan Point have indicated an incredible diversity of land bird species nest here. MAPS is a continent-wide program, with over 500 stations, designed to determine Neotropical land bird survival and productivity rates. The overall goal is to establish the factors most affecting population fluctuations. The MAPS station on Petit Manan Point is in the top 5% nationally, excepting Alaska, with regards to species richness and productivity. We have attributed this success, in part, to the diversity of cover types in the area, which in turn, offer a wide variety of nesting and foraging habitat, and protective cover. We assume other factors attracting birds to Petit Manan Point are its proximity to the shoreline, a major bird travel corridor, and the availability of freshwater. Our observations also indicate that this cover type on the Petit Manan Point is heavily utilized during fall land bird migrations, probably for the same reasons it is important nesting habitat.

As such, our management strategy has been to burn, mow, or otherwise mechanically treat, vegetation on a 3-5 year rotation, when funding, staffing, and prescribed burn conditions allow. More details on our current management are provided in Chapter 3: Affected Environment.

*Strategies:*

- continue MAPS and Regional land bird surveys according to their respective protocols to determine nesting land bird response to habitat management. Conduct respective surveys as often as needed to establish trend information. Incorporate data into GIS database.
- continue annual woodcock surveys on Petit Manan Point.
- continue to mechanically treat and/or prescribe burn open fields; prescribed burn generally on a three-to-five-year rotation in the 11 burn units according to annual burn plan. Up to 55 acres may be prescribed burned in any given year.

**Objective 1.2 (Rare Plants)**

Monitor the rare plant communities on Petit Manan Point to ensure they are not being adversely impacted by human or wildlife activities.

*Background:* On Petit Manan Point, botanical surveys to date have identified five rare plants: swarthy sedge (*Carex adusta*), salt-marsh sedge (*Carex recta*), Nova Scotia false-foxglove (*Agalinis neoscotica*), Pickering's reed bent-grass (*Calamagrostis pickeringii*), and moonwort (*Botrychium lunaria*; see Appendix B for TNC and Maine Natural Area ranking of each species). All five species of plants are considered imper-



iled in Maine because of their rarity or vulnerability to further decline. The Nova Scotia false-foxglove is also thought to be imperiled globally. To date these populations have been located and mapped.

There is a pending land transfer of the 400 acre Corea Heath from the U.S. Navy to the Service. This tract is unique ecologically and botanically and was designated an “Ecological Preserve” by the Navy. Once this tract is acquired by the Service, our intent is to map and monitor the rare plant community similar to Petit Manan Point.

Strategies:

- continue to locate rare plants when staff or volunteer resources allow; maintain locations in GIS database.
- visit the rare plants sites at least once every three years to document impacts from humans, invasive plants, and wildlife, namely deer.
- treat invasive plants threatening rare plant populations using hand, mechanical, chemical, or prescribed fire as warranted.

**Goal 2: Maintain High Quality Wetland Habitat of the Refuge’s Mainland Coast, Primarily to Benefit Migratory Birds of High Conservation Priority, while also Supporting Other Native, Wetland-Dependent Species of Concern**

**Objective 2.1 (Maritime Saltmarsh and Estuary) on the Refuge’s Mainland Coast**

Monitor saltmarsh and estuary areas to ensure they are not being lost or degraded by human-caused activities such as trampling, adjacent construction or developments, and pollution.

*Background:* Saltmarsh and estuaries are perhaps the most productive areas on the Refuge. They support more species than any other cover type, when you consider the number of vertebrate and invertebrate species that forage, nest, spawn, migrate through, or use them as nurseries. Numerous Federal trust resources, such as land birds, waterfowl, and shorebirds, rely on this habitat type for either nesting or migration. They also filter nutrients, waste, and sediment from upland runoff.

These areas provide immensely valuable functions in the coastal ecosystem.

Fortunately, the salt marsh habitats on refuge lands are relatively undisturbed. While historic salt haying occurred, all dams associated with this activity have been breached and do not impede natural tidal fluctuations. As such, our management of these areas has been more custodial, limited to monitoring human activities and wildlife use.

*Strategies:*

- continue to monitor these areas for degradation; observe for signs of trampling, adjacent construction or developments, and pollution.



*Saltmarsh on Gouldsboro Bay Division*  
USFWS photo

- continue to conduct land bird and marshbird surveys according to Regional protocol.
- continue to cooperate with MDIFW, Acadia NP, and private researchers to conduct winter shorebird surveys to document trends and better understand how these birds may be using these areas.

### **Objective 2.2 (Freshwater Impoundments)**

Maintain the three existing freshwater impoundments on Petit Manan Point (i.e. Meadow Brook, Mague Flowage, and Cranberry) to continue to provide 112 acres of freshwater habitat for migrating waterfowl, shorebirds and waterbirds.

*Background:* The upper two earthen dike impoundments (Mague and Meadow Brook) were created in 1990 and the lower Cranberry impoundment was created in 1993 to trap and hold groundwater flow. While the amount of water can be much less during dry summers, up to 112 acres occurs in the fall as ponded freshwater. This freshwater, combined with the wild rice forage in Cranberry Flowage and the proximity to the shoreline, make these ponds exceptional fall migratory bird resting and foraging habitat. Of particular note is the thousands of black ducks that migrate through these impoundments. Black ducks are a Federal trust species of concern throughout their range. While not as numerous, shorebirds and waterbirds of conservation concern also benefit. In the past we have monitored the amount and distribution of wild rice and estimated waterfowl numbers during peak season, but have not been able to accomplish this with current staffing levels.

*Strategies:*

- continue to maintain the earthen dikes and culverts each season.
- continue annual water bird surveys according to Regional protocol.

### **Objective 2.3 (Vernal Pool Wetlands)**

Protect vernal pool wetlands to insure no net loss or degradation of this important ecological community.

*Background:* Vernal pools are temporary wetlands that provide crucial habitat to several vertebrate and many invertebrate species. They are especially valuable to these species because they have no predatory fish. Typically small and quite shallow, they can be found in many areas where small depressions collect spring runoff or snowmelt or intercept seasonally high groundwater tables. Because they are small and often isolated from other wetlands they are often overlooked when development is planned. As such, the decline of this habitat has been very dramatic, as has been the decline of certain species dependent on them.



*Pickerel frog*  
USFWS photo

For example, several of the amphibians of concern to the Refuge depend on vernal pool habitat during all or part of their life cycle. Unfortunately, this habitat type is not fully mapped on Refuge lands nor have known sites been intensively surveyed to document the presence of amphibians during the breeding season. Successive surveys will be necessary to locate vernal pools and evaluate the effects of our management actions on amphibian species diversity and abundance.

We are also interested in amphibian populations because they serve as excellent indicators of environmental health (Heyer et. al. 1994). Their

physiological traits (e.g. permeable skin) and ecological traits (e.g. complex, two-phase life cycle), make them sensitive to changes in water quality and quantity; certain types of habitat alteration; nutrient, chemical, and thermal pollution; and acidification of wetlands and forest habitats (Hine 1982; Klemens 1993).

*Strategies:*

- continue to locate and map vernal pool habitats in the GIS database; participate in the Regional vernal pool study if protocol criteria can be met.
- continue to conduct annual anuran call count surveys according to Regional protocol.

**Goal 3: Perpetuate the Biological Diversity and Integrity of Upland Cover Types on the Refuge's Coastal Islands to Sustain High Quality Habitat for Nesting Bald Eagles and Migratory Songbirds and Raptors, and to Protect Rare Plant Sites**

**Objective 3.1 (Bald Eagle Nesting)**

Protect from human impacts the four active and four historic bald eagle nesting sites.

*Background:* Bald eagles are listed as threatened by both the Federal government and the State of Maine. When they were initially listed, the threats to the species included environmental contaminants, shooting, habitat loss, and human disturbance at nest sites. Extensive public education efforts and Federal and State legislation have significantly reduced many of these threats; however, habitat loss and human disturbance continue to be issues. Over the past 20 years, the bald eagle population in Maine has responded to this protection, and the State now supports over 295 pairs of eagles. However, MDIFW has identified permanent protection of at least 150 eagle nesting sites as a requirement for de-listing the species.

Bald eagles are actively nesting on the Refuge on Mink, Bois Bubert, Outer Heron, and Little Marshall islands and have historically nested on Sally, Cross, Double Head Shot, and Schoppee islands. One additional pair of eagles nests within the Gouldsboro Bay Division.

Within Maine, mature red spruce/balsam fir-dominated stands close to foraging habitats are considered preferred nesting habitat. Eagles have also successfully nested in large hardwood trees that are dominant in the tree canopy. During the nesting season eagles are sensitive to disturbance and will typically nest in areas with minimal human activity. If disturbed, adult bald eagles may flush from their nest leaving eggs and young chicks exposed to inclement weather (heat or cold) or susceptible to predation.

*Strategies:*

- continue to implement seasonal public access restrictions annually on the four active and four historic bald eagle nesting sites: historic eagle nesting islands are closed from Feb. 15 to May 15; active eagle nesting islands (or portions thereof) are closed from Feb. 15 to August 31.
- continue to support MDIFW's annual efforts to monitor occupancy and productivity at all bald eagle nest sites in the State; compare reproductive rates of eagles nesting within the Refuge to statewide averages; if possible, determine causes of decreased productivity and evaluate whether management actions are warranted.
- continue to acquire mainland and island habitat with active or suitable bald eagle nesting habitat within approved Refuge boundaries. Any additional bald eagle nest sites acquired in the future by the Service would receive the same level of protection as current Refuge lands.



*Bald eagle and nest*  
MDIFW photo

### Objective 3.2 (Migratory Land Birds)

Monitor land bird use of coastal islands, documenting species, habitat preferences, seasonality, and relative numbers to develop a base of knowledge for making informed management decisions.

*Background:* Recent information indicates that coastal islands play a key role in providing Neotropical migratory songbirds and raptors with the optimal variety of foraging items which are necessary to complete their migration (R. Suomala pers. comm.). Studies have revealed that migrating songbirds are severely dehydrated and they seek forage such as berries to obtain lifesaving water. Interestingly, many birds that are normally omnivorous will forage exclusively on berries during migration (Parrish 1999).

Seabird researchers working on coastal islands have documented significant numbers and species of migrants using the islands during spring migration. Unfortunately, Refuge specific information is not available for the fall bird migration. However, based on a limited study we contracted,

preliminary results indicated that a considerable number of raptors utilize offshore islands as foraging areas during their fall migrations (Drury and Goodhue 1998). Additional surveys are planned which will hopefully provide us with more information.

*Strategies:*

- continue to have seasonal researchers on seabird management islands document nesting and migrating land birds in conjunction with their seabird work.

### **Objective 3.3 (Baseline Biological Inventories)**

Conduct baseline biological inventories on islands within the Refuge to build a knowledge base for more informed decision-making.

*Background:* Beginning in 1999, we initiated a protocol to conduct baseline vegetation and wildlife inventories on at least two Refuge islands per year. Our efforts will continue until all Refuge islands have been inventoried, and then the survey process will start again. The protocol is designed to insure that we specifically identify and map those species and plant communities of management concern (Appendix B), as well as other native species to provide us with information to develop strategies to protect and manage native biological diversity and integrity.

*Strategies:*

- continue baseline biological inventories on at least 2 islands/year; maintain a GIS database with survey information.
- continue to allow research that contributes to our baseline biological inventory database. Spider, small mammal, beetle, dragonfly and damselfly surveys are examples.

### **Objective 3.4 (Rare Plants)**

Protect or enhance existing populations of rare plants to ensure they remain viable and contribute to the natural botanical diversity of the island.

*Background:* Included in the inventory in Objective 3.3 is the identification of rare plant sites. Several sites are already known to us. Our best example is Halifax Island where the following rare and fragile communities have been documented: maritime slope bog, dwarf shrub bog, moss lawn bog plateau, bog lawn, bog pond, and acidic fen (Famous and Spencer-Famous 1999). We are protecting these sites by closing 3/4 of Halifax Island to public access to avoid trampling. On a few other islands, we are monitoring invasive plants to ensure they do not threaten rare plants or native biodiversity, and only when necessary, will control their spread through hand, mechanical, chemical, or prescribed fire treatments.



Portions of Halifax Island are closed to public access to protect rare plants  
USFWS photo

*Strategies:*

- continue to maintain year round access closure on 3/4 of Halifax Island.
- continue to conduct baseline biological inventories as identified in objective 3.3 on at least 2 islands/year; including identifying and mapping in GIS rare plants sites.
- continue to treat invasive plants only when they threaten rare plant populations using hand, mechanical, chemical, or prescribed fire treatments as warranted.

**Goal 4: Protect the High Quality Wetland Habitats on the Refuge’s Coastal Islands to Benefit Nesting and Migratory Shorebirds and Waterfowl**

**Objective 4.1 (Coastal Saltmarsh - Cross Island)**

Monitor the saltmarsh on Cross Island to ensure it is not being lost or degraded by human-caused activities such as trampling, adjacent development, or pollution.

*Background:* As noted in Objective 2.1, coastal salt marsh areas provide immensely valuable functions in the coastal ecosystem supporting an incredible diversity of vertebrate and invertebrate life.

*Strategies:*

- continue to monitor these areas for degradation; monitor for signs of trampling, adjacent construction or developments, and pollution.

**Objective 4.2 (Intertidal Harvesting)**

Monitor intertidal harvesting activities to insure they do not impact nesting birds.

*Background:* The intertidal area adjacent to many coastal islands is rich in aquatic resources that are harvested for both commercial and recreation uses. Some of these resources include blue mussels, blood worms, and periwinkles. Our concern is the loss of this forage base for waterfowl, shorebirds, and aquatic life, and that the harvest activity often occurs during the sensitive seabird nesting season. We have frequently observed that harvesters land their boat on the island accompanied by dogs who roam freely on the island. We have observed seabirds, who are nesting just inland above high tide line, flush from their nest repeatedly with the presence of harvesters who often stay in an area for hours.

*Strategies:*

- continue to monitor and document intertidal harvesting activities in conjunction with seabird management projects; note numbers, timing and what they are harvesting.
- continue to enforce public access closures during the seabird nesting season.

**Objective 4.3 (Fall and Winter Shorebird Use)**

Monitor fall migration and winter shorebird use to determine whether there are concentration areas that should be protected and/or managed.

*Background:* It is well documented that coastal islands provide important resting and stopover habitat for fall migrating shorebirds. Shorebirds migrate some of the longest distances of any bird group. During migration, they seek out certain wetlands where they can feed intensively on adult and larval invertebrates to replace depleted energy reserves and to provide fuel for the ensuing long-distance flights. The mudflats, rocky and sandy intertidal areas are ideal foraging habitat for many migrating shorebirds, as well as winter residents. Coastal islands are also ideal since they are generally free from mainland predators and human disturbance. Of particular interest to us is the potential use of Refuge islands by migrating piping plover, a Federal-listed threatened species. A few occurrences of this species have been noted during migration.

*Strategies:*

- continue to monitor fall shorebird migrations as volunteer assistance or research opportunities become available; map and incorporate data into GIS database.
- continue to cooperate with MDIFW, Acadia NP, and private researchers to conduct winter shorebird surveys along the coast.

**Goal 5: Protect and Manage Nesting Seabird Populations on Refuge Coastal Islands to Contribute to Regional and International Seabird Conservation Goals**

**Seabird Nesting Islands with Active Management****Objective 5.1 (Common and Arctic Tern)**

Contribute to the Gulf of Maine Seabird Working Group goal of restoring well-distributed populations of common and Arctic tern to coastal islands.

*Background:* In cooperation with other Gulf of Maine Seabird Working Group (GOMSWG) partners, we are contributing to the significant progress of restoring these terns to their historic population levels by managing for their colonies on Refuge islands. An additional objective we are working towards is to improve the geographic distribution of these nesting colonies in the Gulf of Maine.

Arctic terns are currently State-listed as threatened; common tern are State-listed as species of special management concern. Over the last 19 years of management and restoration work, the common tern population has increased from about 2,500 to 5,936 pairs. Arctic terns have increased from 1,720 pairs to 2,975 pairs. This represents a population growth in Maine of 72% for Arctic tern, and 137% for common tern. An additional 3,551 pairs of common and Arctic terns nest on Machias Seal Island. At present, approximately 90% of the entire Gulf of Maine population of common and Arctic terns are nesting on the ten managed seabird islands in Maine; six of these are on the Refuge. In fact, most of the Arctic terns in Maine only nest on three Refuge islands: Petit Manan, Matinicus Rock, and Seal islands. In 2001, only five pairs of Arctic terns in the lower 48 states nested outside of Maine (NAS 2001). Therefore, the recovery of the Arctic tern population along the eastern United States is dependent on the status of the Maine population. Their limited distribution and the fact they frequently experience lower productivity levels (NAS 2001), make them a particular concern to us.

The potential is great that a single catastrophic event (e.g. oil spill, disease, predator) could significantly reduce these tern populations in the Gulf of Maine since they are few in number and concentrated on so few islands.

As such, GOMSWG members are working hard to cooperatively increase the geographic distribution of managed colonies to minimize this threat.



*Arctic tern in flight*  
USFWS photo

Our work with common and Arctic tern on Refuge islands is focused on predator management, vegetation management, and restricting public access to insure we continue to enhance suitable nesting habitat. We maintain seasonal staff on these islands throughout the nesting season. Staff monitor nesting pairs, their productivity, predator activities, public use in the intertidal zone, and tour boat activities. Please refer to Chapter 3 for a more detailed discussion of our predator management and vegetation treatments.

In addition to our seabird projects on six Refuge islands, we would contribute to this objective with our proposal to acquire and manage an additional 30 islands with active seabird nesting (See Goal 7). We would also continue to cooperate with NAS in ongoing management efforts on four other seabird islands under other ownerships.

*Strategies:*

- continue cooperation with NAS, MDIF&W, Canadian Wildlife Service and other seabird partners; annually census islands for nesting common and Arctic terns; conduct productivity studies to estimate reproductive success



- identify factors responsible for reduced productivity levels below the target of 1.0 chick/pair and initiate steps to minimize these factors.
- continue to actively manage predator populations on seabird islands on an annual basis, using lethal and non-lethal methods to control gulls, owls, and small mammals. If trapping is necessary, utilize Refuge staff or a contracted local trapper to set and monitor traps throughout the season.
- in cooperation with NAS, continue to annually monitor effectiveness of trapping program and evaluate new and different techniques.
- continue to annually document and evaluate how often and how close tour boats come to nesting islands and the response by seabirds.
- continue to annually meet with tour boat companies prior to the season to discuss “best management procedures” while operating near seabird nesting islands.
- continue to participate in cooperative efforts (University of New Brunswick, NAS, and USFWS) to study the Arctic tern metapopulation within the Gulf of Maine.
- continue to annually close seabird nesting islands to public visitation between April 1 and August 31.
- continue working with Federal Aeronautics Administration (FAA) to have Refuge islands identified on FAA flight charts so that pilots are alerted to the 2,000 ft.-minimum recommended altitude over a national wildlife refuge.
- continue to work with partners to monitor aquaculture facilities near nationally significant nesting islands to determine if aquaculture operations are disturbing nesting birds.
- continue to acquire seabird nesting islands within the approved Refuge acquisition boundary

### **Objective 5.2 (Roseate Tern)**

Contribute to the recovery of roseate tern by increasing the number and productivity of nesting pairs through the protection and management of nesting sites.

*Background:* The roseate tern is Federal- and State-listed as endangered. The Roseate Tern Recovery Plan (USFWS 1998) goal is to expand the Northeastern U.S. population to over 30 colonies, with six sites supporting at least 200 nesting pairs with high productivity (1.0 fledged chick/pair). The roseate tern saw a population growth rate of 276% over the past 15 years, faring better than the common and Arctic tern populations noted above. While their growth rate is impressive, 95% of the 285 pairs of roseate terns in Maine nest on just two islands (Eastern Egg Rock and Stratton).

Our management efforts on Refuge islands include the use of artificial nest boxes, predator management, and restricted public access to ensure we continue to provide habitat which is suitable for nesting roseate terns.

Continued monitoring efforts by the island research crews will enhance our knowledge of roseate terns by providing site specific reproductive data, diet composition, and habitat use for each island. Should limiting factors be identified, measures would be taken to alleviate or minimize the situation. The research crew would continue to be responsible for daily predator control as necessary. Managing predators is critical to the contin-

ued survival of the colonies. In an effort to minimize human disturbance during the nesting season, we would continue to close seabird nesting islands to public visitation between April 1 - August 31. We would continue to strive for increased numbers of nesting pairs and a productivity rate of 1.0 chick/pair.

In addition to our management projects on six Refuge islands, we would contribute to this objective with our proposal to acquire and manage an additional 30 islands with active seabird nesting (See Goal 7). Three of these islands are historic roseate tern nesting sites, and others would provide potential future nesting sites.



Roseate tern  
USFWS photo

#### *Strategies:*

- continue cooperation with National Audubon Society to annually census islands for nesting roseate terns; conduct productivity studies to estimate reproductive success; identify factors responsible for reduced productivity levels below the target of 1.0 chicks/pair. Initiate steps to minimize these factors.
- continue to place Federal bands and field readable bands on roseate tern chicks, and read bands on adult terns in cooperation with the USGS roseate tern metapopulation study.
- continue to evaluate roseate tern use of artificial nest boxes on Petit Manan Island.
- continue to map all roseate tern nests using a GPS and incorporate into a GIS database.
- continue to actively manage predator populations on an annual basis, including lethal and non-lethal methods to control gulls, owls, and small mammals. If trapping is necessary, utilize Refuge staff or a contracted local trapper to set and monitor traps throughout the season.

- in cooperation with National Audubon Society, continue to annually monitor effectiveness of trapping program and evaluate new and different techniques.
- continue to annually close seabird nesting islands to public visitation between April 1 and August 31.
- continue to annually document and evaluate how often and how close tour boats come to nesting islands and the response by seabirds.
- continue to annually meet with tour boat companies prior to the season to discuss Best Management Practices.
- continue to acquire historic and potential roseate tern nesting islands within the approved acquisition boundary

### **Objective 5.3 (Alcids)**

Contribute to the Gulf of Maine Seabird Working Group and MDIFW Species Assessment goals of restoring self-sustaining, well-distributed populations of alcids, with particular emphasis on Atlantic puffin and razorbill.

*Background:* Atlantic puffin and razorbills are currently State-listed as threatened. Puffins nest on four Refuge islands; two of which (Seal Island and Matinicus Rock) contain 85% of their population in Maine. Razorbills also nest on three islands within the Refuge: Old Man, Seal, and Matinicus Rock, which includes over 90% of their population in Maine. Due to the limited size and distribution of breeding populations in Maine of both species, we are working to increase the number of active colonies on Refuge islands. MDIFW recently completed a Species Assessment for Atlantic puffin and razorbills in which they identified population and productivity goals (MDIFW 2000). In addition, MDIFW identified the need to increase the number of Maine islands occupied by nesting puffin from four to six, and increase the number of Maine islands supporting nesting razorbill from five to seven islands. Using the 2000 season as a population baseline, our goal will be to increase by 50% the number of breeding pairs of Atlantic puffin and razorbills. In addition, we are focusing management efforts on maintaining a minimum productivity level of 0.5 fledged chicks/nesting pair.

We are optimistic that razorbills, which have routinely been visiting Petit Manan Island during the breeding season, will initiate nesting there. We also hope that Seal Island will be fully occupied in the future. Currently, one pair of razorbills is nesting on Seal Island, but as many as 30 have been observed there (Breton 2001).

We are also interested in enhancing populations of black guillemots, another alcid species using Maine islands. We will continue to monitor their presence and use of Refuge islands in conjunction with our seabird work.

In addition to our management projects on six Refuge islands, we will contribute to this objective with our proposal to acquire and manage an additional 30 islands with active seabird nesting (See Goal 7). We would also continue to work with NAS in seabird management efforts on four other islands under other ownerships.

*Strategies:*

- continue to conduct daily censuses of black guillemots, Atlantic puffins and razorbills on or adjacent to Petit Manan, Seal, and Matinicus Rock islands each year during the nesting season.
- continue to monitor productivity at 25 active puffin burrows on Seal and Matinicus Rock islands each year during the nesting season.
- continue to monitor all puffin burrows on Petit Manan Island each year during the nesting season.



*Atlantic puffin*  
USFWS photo

- continue to observe and record food deliveries to individual burrows to help determine reproductive success each year during the nesting season.
- continue to band adults and chicks where possible each year during the nesting season.
- continue to cooperate in the graduate study of Atlantic puffin survival and recruitment (Breton et al.) with NAS and University of New Brunswick by banding as many adult and juvenile puffins and reading as many bands as possible on birds returning to the islands.
- continue to annually close seabird nesting islands to public visitation between April 1 and August 31
- on Petit Manan Island, continue to map all active puffin and, if appropriate, razorbill burrows using GPS and incorporate into a GIS database.
- on Petit Manan Island, evaluate puffin and razorbill use of artificial burrows. On an annual basis, evaluate need to continue providing burrows and whether to expand efforts to new locations on island.
- continue to annually document and evaluate how often and how close tour boats come to nesting islands and the response by seabirds.

- continue to annually meet with tour boat companies prior to the season to discuss Best Management Practices when operating adjacent to seabird nesting islands.
- continue to acquire seabird nesting islands within the approved Refuge acquisition boundary.
- evaluate all current and future land acquisitions within the approved Refuge boundary for their suitability as management sites. Develop management plans for selected islands including: predator control needs, staffing and equipment needs, logistical concerns, use of social attraction equipment, and habitat alteration considerations.

#### **Objective 5.4 (Herring and Black-backed Gulls)**

Control herring and great black-backed gull nesting and loafing on the six managed seabird islands to minimize inter-specific competition and predation on common, Arctic and roseate terns, and puffins, razorbills, and common eiders.

*Background:* Although we recognize gulls are native to coastal ecosystems, human activity has enabled their populations to expand way beyond historic levels, causing an imbalance between gull populations and the populations of most other colonial and beach nesting birds. Expanding gull populations and habitat loss along the coast of Maine were partly responsible for wide-scale population declines in many seabird populations during the last century. Gull numbers in Maine went from approximately 10,000 in 1900 to nearly 120,000 in 2002. The prevalence of open landfills along the coast allowed herring and great black-backed gulls to produce a greater number of chicks. These gull chicks experienced a greater survival rate due to the abundance of food during the winter months. Both species are effective predators of other seabird eggs and young, and their presence can lead to complete nesting failure or island abandonment by many seabirds. Gulls also initiate nesting earlier in the season than terns, forcing the terns to nest in marginal habitat. As a result, terns and other seabirds may be more vulnerable to increased predation, inclement weather, and tides. Gull management efforts on our seabird management islands have proven to be successful. As a result, over 90% of the common, Arctic, and roseate terns, and all puffins and laughing gulls nesting within Maine nest on islands where gull populations are actively managed. Our gull management methods are described in more detail in Chapter 3, but consist of harassment, nest and egg destruction, shooting, and/or limited use of avicides.

*Strategies:*

- continue to conduct daily censuses of nesting and loafing gulls on all six managed islands.
- continue to dissuade nesting and loafing gulls by maintaining a human presence throughout the nesting season on all six managed islands;

remove all gulls determined to be preying on the terns or alcids using lethal and non-lethal techniques as warranted. Continue to monitor gull colony at Green Island to determine whether these birds are contributing to predation on Petit Manan Island.

### Objective 5.5 (Laughing Gulls)

Reduce the population growth trend of increasing laughing gull numbers on seabird management islands, but maintain their overall population distribution.

*Background:* Currently, laughing gulls nest on three islands within Maine, two of which are Refuge islands: Petit Manan Island and Matinicus Rock. The third island currently supporting nesting laughing gulls is the MDIFW- owned Eastern Egg Rock. These colonies represent the northern extreme of the laughing gull breeding range in the U.S., and they are State-listed as a species of special concern.



*Census activity*  
USFWS photo

In recent years on Petit Manan Island, laughing gulls have experienced considerable population growth (175% in 10 years) and colony expansion. We documented 794 laughing gull nests on Petit Manan Island during the 2000 nesting season, and 961 nests during the 2001 season. GOMSWG members are concerned that these gulls act as competitors with the terns for limited nesting space, directly prey on the terns and their eggs, and steal food from the terns (kleptoparasitism).

In an effort to limit the number of laughing gulls nesting on Petit Manan Island in 2002, we created a “gull free” area on the island. This was accomplished by removing all laughing gull nests on the northern and eastern sides of the island. Our effort was not directed at eliminating laughing gulls as a breeding component of Petit Manan Island, but simply to manage their population growth and productivity. Our study conducted on the tern colony in 2002 indicated that Arctic terns responded with a significantly higher level of productivity, as compared to recent years. National Audubon also carried out a similar control efforts on Eastern Egg Rock.

#### *Strategies:*

- continue to cooperate with National Audubon Society and annually monitor Matinicus Rock and Petit Manan for nesting laughing gulls; map their distribution using GPS; determine their numbers and density; and document laughing gull kleptoparasitism and predation rates on terns. Incorporate all data into a GIS database.

- continue to determine the effectiveness of experimental habitat alteration on laughing gull nesting distribution and density on Petit Manan Island.
- continue to annually evaluate other techniques to manage distribution and reduce populations on the 3 managed islands when they are determined to be harming the productivity objectives for other seabirds of concern.
- continue to annually close seabird nesting islands to public visitation between April 1 and August 31.

### **Objective 5.6 (Common Murre)**

Contribute to the recovery of common murre in the Gulf of Maine by establishing and sustaining a breeding colony on Matinicus Rock.

*Background:* Although common murrens are known to breed throughout eastern Canada, no nesting attempts have been documented within Maine during the past century. However, records from the mid- 1800's indicate that common murrens did breed on at least one island in outer Penobscot Bay (Scott Hall NAS pers. com.). Like many other seabird species, the murre was nearly decimated by over-harvesting throughout much of the 20<sup>th</sup> century (Gaston and Jones 1998). We will continue working with NAS to utilize social attraction equipment (sound system and decoys) to re-establish a murre nesting colony in the Gulf of Maine. Unfortunately, efforts to encourage birds to establish nesting colonies outside their current breeding areas has proven to be more difficult than establishing a new colony within an already occupied region.

*Strategies:*

- continue to utilize “social attraction” methods in cooperation with National Audubon Society to attract common murrens to Matinicus Rock; a sound system broadcasting murre calls and murre decoys are set up each nesting season in early May.
- continue to annually close seabird nesting islands to public visitation between April 1 and August 31.
- continue to utilize seasonal staff to monitor common murre use of Refuge islands throughout the nesting season.

### **Seabird Nesting Islands with No Active Management**

#### **Objective 5.7 (Seabirds)**

On the 25 Refuge islands not actively managed for nesting seabirds, continue to monitor species composition, nesting densities, and where feasible, eliminate threats.

*Background:* Recent increases in both recreational and developmental use patterns of coastal islands have limited the number of islands that are suitable for nesting seabirds. Increasingly fewer opportunities exist for

expanding seabird populations in the Gulf of Maine. Of the 3,000 islands along Maine’s coast, seabirds currently utilize approximately 10% (MDIFW, B.Allen pers.com.).

In addition to the six managed seabird management islands currently within the Refuge, 25 additional Refuge islands provide nesting habitat for common terns, razorbills, black guillemots, common eiders, great cormorants, double-crested cormorants, Leach’s storm-petrels, and herring and

black-backed gulls. Our staff visit these islands less frequently due to limitations in staffing. However, statewide surveys have routinely been done by boat and aerial observation. A survey protocol, initiated in 2001, will require that we visit each seabird nesting island, at a minimum, once every five years during the nesting season.

As previously noted, population and distribution goals for many of these species have been established by the Regional Tern Management Plan (USFWS 2000), the Roseate Tern Recovery Plan, and MDIFW Species Assessments for common eiders (MDIFW 1999), Atlantic puffins and razorbills (MDIFW 1999), and Leach’s storm-petrels (MDIFW 1999).



Common eider hen  
USFWS photo

*Strategies:*

- continue to annually close seabird nesting islands to public visitation between April 1 and August 31.
- continue to survey at least five Refuge islands with nesting seabirds each year using Refuge staff, contractors, or partners to determine whether active management is warranted to maintain suitable nesting habitat; utilize proven habitat management techniques consistent with other Refuge management projects.
- continue to coordinate all efforts with GOMSWG members annually.

**Goal 6: Provide Enjoyment and Promote Stewardship of Coastal Maine and their Habitats by Providing Priority, Wildlife-Dependent Recreational and Educational Opportunities**

**Objective 6.1 (Environmental Education)**

Continue to provide opportunities for partner-led environmental education programs on Refuge lands

*Background:* Annually, we cooperate with the NAS and Damariscotta River Association in their classroom environmental education programs. We also have a partnership with the Chewonki Foundation and Hurricane Island Outward Bound School, who have established environmental education programs using Refuge lands. We continue to issue a special use permit to the Humboldt Research Station (formerly Eagle Hill Institute) for an “outdoor laboratory” on Refuge lands.



*Strategies:*

- continue to partner with Chewonki Foundation, Damariscotta River Association, National Audubon Society, and Hurricane Island Outward Bound to conduct curriculum-based educational programs in classrooms and on Refuge lands.
- continue to issue a special use permit to Humboldt Research Station for their outdoor classroom.

**Objective 6.2 (Environmental Interpretation)**

Maintain the environmental interpretive opportunities on Petit Manan Point and provide interpretive materials to commercial tour boat operators.

*Background:* Our current environmental interpretation program involves conducting two to three interpretive programs annually as staffing permits, maintaining an interpretive kiosk and panels on the Petit Manan Point Division, maintaining two interpretive trails, and sharing Refuge brochures and nesting status information to commercial seabird tour boat operators.

*Strategies:*

- continue to annually maintain the infrastructure on the Petit Manan Point Division, including access road, interpretive signs, and the Birch Point and John Hollingsworth trails.
- continue to conduct interpretive programs upon request when staffing permits.
- continue to provide periodic updates to commercial seabird tour boat operators during the nesting season.

**Objective 6.3 (Hunting)**

Continue to provide a diversity of hunting opportunities on Refuge lands.

*Background:* Hunting is one of the six priority public uses identified in the 1997 Refuge Improvement Act. We opened up portions of the Refuge to hunting during the 2001-2002 hunting season. Migratory game bird and waterfowl, and small and big game seasons were opened on the Sawyers Marsh and Gouldsboro Bay divisions. We also opened Bois Bubert Island to white-tail deer hunting. In addition, 22 Refuge islands were opened to migratory waterfowl hunting. Our plans would include opening all future islands acquired to migratory waterfowl hunting, unless we determine there are safety or overriding resource concerns that would make hunting incompatible.

*Strategies:*

- continue to implement the hunt program offering the variety of seasons noted above.
- continue policy that hunter access is by foot traffic only; no bicycles, horses, or ATVs will be allowed. The only exceptions are boat access to islands.
- allow dogs off leash only to facilitate the hunt effort and only under control of the hunter at all times; this would include flushing, pointing, and retrieving dogs.

**Objective 6.4 (Wildlife Observation and Photography)**

Maintain the current wildlife observation and photography opportunities provided on the Refuge mainland divisions (Maps 2-1 to 2-4).

*Background:* We currently maintain two foot trails on the mainland: the John Hollingsworth Memorial Trail (1.5 miles roundtrip) and the Birch Point Trail (4.0 miles roundtrip). Both trails are on the Petit Manan Point Division and are open year round. The Hollingsworth Memorial Trail has parking for approximately eight cars; the Birch Point Trail has parking for approximately 10 cars. There are many times during the summer when the parking lots are full. We are currently monitoring trail and road usage on Petit Manan Point using volunteers, interns, and counting machines.

During 2001, approximately 19,000 people visited the area. The only fully

accessible facility on the Refuge is an informational kiosk on the main access road to Petit Manan Point.

Our current program also allows commercial photographers access to Refuge lands, which are otherwise closed to public access, under individual special use permits, and only when there is a direct benefit to the Service. In addition, we allow camping on two islands: Halifax and Bois Bubert, in cooperation with MITA, because of the unique wildlife observation and photography opportunities this affords.



*A bench on John Hollingsworth Memorial Trail, Petit Manan Point Division  
USFWS photo*

*Strategies:*

- continue policy that all trails will remain open to foot traffic only, including snowshoeing and cross country skiing; no bicycles, horses, or ATVs will be allowed. The only vehicle access is along the 1.1 mile refuge entrance road on Petit Manan Point, at the end of Pigeon Hill Rd.
- continue to allow commercial photographers access to Refuge lands under a special use permit only when the Service can benefit.
- continue to allow camping on Halifax and Bois Bubert islands in designated sites as part of the Maine Island Trail.

**Objective 6.5 (Public Access to Refuge Islands)**

Allow public access to islands to the extent it will not adversely impact Federal trust resources.

*Background:* Some sensitive areas require us to restrict public access to minimize disturbance, especially during the nesting season. Seabird nesting islands are closed to public use from April 1 to August 31 each year. Active bald eagle nesting islands are closed to public use from February 15 to August 31 each year. Historic bald eagle nesting islands are closed to public use from February 15 to at least May 15 each year. If an historic eagle site becomes active, the island is closed until August 31.

Most of Halifax Island is closed to protect botanical resources. Seal Island is closed to all public use due to unexploded ordinance. Cross, Scotch, Bois Bubert, and the remainder of Halifax Island are open to public use year round. In addition, camping is allowed in designated areas on Bois Bubert and Halifax islands as part of the Maine Island Trail.

We utilize interns working on the islands to assist in informing potential visitors that the nesting islands are closed during the nesting season. Outside of the nesting season, interns will greet boaters upon landing and educate them about the management and restoration work and the sensitivity of seabirds to disturbance.

*Strategies:*

- continue to maintain seasonal access restrictions noted above.
- continue to maintain the seasonal “closure” signs that exist on several islands.
- as new islands are acquired, we will implement the seasonal access restrictions as warranted.

**Goal 7: Protect the Integrity of Coastal Maine Wildlife and Habitats through an Active Land Acquisition and Protection Program**

**Objective 7.1 (Service Land Acquisition)**

Continue Service acquisition of significant Maine coastal habitats from willing sellers within our approved boundary (467.1 acres) and seek new acquisition authority for an additional 30 islands (881 acres) and 153 acres of mainland (see Table 2-2 and Table 2-3).

*Background:* As we stated in the land protection discussion under “Actions Common to All Alternatives”, all alternatives include, at a minimum, continued Service acquisition of lands from willing sellers within the currently approved Refuge boundary. At present, we have approval to acquire 467.1 acres total consisting of 2 tracts (25 acres) on Petit Manan Point Division; 1 tract (94.6 acres) on the Sawyers Marsh Division; and 25 tracts on 14 islands (347.5 acres). We believe acquisition of these lands is essential to meeting Refuge purposes and goals. These lands are not only important for their Federal trust resource values, but many would also make more effective boundaries for our management and administrative purposes. In addition to these acres, we also propose an expansion of mainland and islands as discussed below.

In Chapter 1, we describe how we have worked with the Service’s GOMP and our other conservation partners to develop a “nationally significant islands” list for coastal Maine. Three hundred and seventy-seven (377) islands are currently on the list; 126 of these are already protected long-term (GOMP, December 10, 2001). The remaining 151 islands are still in need of permanent protection. The ultimate goal among all our partners is to achieve permanent protection for the remaining 151 islands, and to manage these islands as needed to ensure the long term nesting success of species of management concern.

Since no single partner, including the Service, has the resources to achieve the 151 island goal single-handedly, this goal necessitates a strong partnership. The Service can contribute to this goal through fee simple acquisition or purchasing conservation easements, especially for those islands that need active management for Federal trust species. What typically happens is that the partners become aware of an individual island available for sale from a willing seller. The partners, including the Service, determine which of them through ownership, could best serve the long term protection of the respective island. The island’s specific resources of concern (e.g. seabirds, bald eagles, wading birds, or the endangered roseate tern), level of management or restoration required, or its proximity to other partner owned islands, current owner preferences, timing, and



*Great blue heron*  
Photo by Craig Snapp

availability of financial and administrative resources are all considered when determining which partner is best suited.

In this alternative, we have assumed a Service island acquisition rate of 2 islands/year for 15 years (30 islands total) using FY02 land acquisition funding (\$1mm/year) as a basis. For purposes of analysis, we have identified 30 specific islands for acquisition from the list of 151 nationally significant islands not currently protected long-term (see Table 2-2). It is important to recognize that we have no way of predicting at this time when, or even if, these islands would become available from willing sellers. Also, it is possible that new information may result in an island being taken off or added to the list, which would cause us to reevaluate our list of 30. These islands were selected primarily because they have higher numbers and productivity of nesting seabirds, or because roseate terns, a Federal-listed endangered species, historically nested on them.

In addition to the islands, we are proposing an expansion of 153.3 mainland acres to be acquired by the Service. The Sprague Neck tract, 150 acres, is a significant shorebird and black duck concentration area during migration. We would acquire this tract as a no-cost transfer from the U.S. Navy. The remaining three acres is a private tract surrounded by refuge lands in our Gouldsboro Bay Division. In addition to its value for wetlands, it is also important to acquire this small tract to make a more efficient administrative boundary.

*Strategies:*

- continue to acquire private lands from willing sellers within currently approved acquisition boundary; tracts on 14 islands (347.5 acres) and 120 acres of mainland are approved. All lands acquired would become part of the Petit Manan Refuge.
- continue to participate in annual coordination with the Gulf of Maine island protection partners including: GOMP, MDIFW, TNC, MCHT, local land trusts, and private landowners.
- continue to work annually with GOMP to insure nationally significant island list is updated.
- continue to post new Refuge units with boundary signs as soon as they are acquired to establish that these lands are managed by the Service.
- in 2004, seek approval and begin to implement a Land Protection Plan for the Refuge, if approved, authorizing acquisition of 30 islands and two mainland tracts when willing sellers become available (see Table 2-2).

### **Objective 7.2 (Cooperative Protection and Management of Nesting Islands)**

Continue to assist State agencies, conservation organizations, and local land trusts in their efforts to protect and manage islands with high natural resource value.

*Background:* As we described in Objective 7.1 above, no single conservation partner, including the Service, has the resources to single-handedly achieve the 151 nationally significant nesting island protection goal. This goal necessitates a strong partnership among the many entities involved in land protection along Maine's coast. It is important that we continue to work together and complement each others' efforts.

*Strategies:*

- continue to work with land trusts and participate in GOMSWG to share resource information and identify island protection needs.
- continue to work with MITA in an informal Island Stewardship Program to monitor visitor use and resource impacts on five Refuge islands; meet with them two to three times/year.

### **Objective 7.3 (Cooperative Protection and Management of Important Mainland Habitats)**

Continue to assist State agencies, conservation organizations, and local land trusts in their efforts to protect and manage mainland habitats with high natural resource value.

*Background:* Similar to our discussion on islands, there is no single conservation partner, including the Service, who has the resources to protect all the significant habitats along the mainland coast. Unprotected salt marsh and estuaries of appreciable size, so important to migrating land birds, waterfowl, water birds, and shorebirds, constitutes thousands of acres along the coast. Therefore, we must work with our conservation partners to help them identify, protect, and manage these important habitat areas. With the exception of 153.3 acres noted in Objective 7.1 above, we are not proposing a significant mainland expansion in this alternative. The interagency Maine Wetlands Coalition is working to identify priority wetlands needing protection, management, or restoration. We will await the outcome of their report, which we expect within 3 years, before we consider a significant mainland expansion. Meanwhile, we may evaluate specific areas for Service acquisition on a case-by-case basis, assuming they are important to Federal trust resources, if asked to by the coalition. We would first ensure that we could comply with Service policies on acquisition and refuge boundary expansion. This would be followed by the appropriate NEPA analysis and documentation for each area.

*Strategies:*

- continue to coordinate, as needed, with the interagency Maine Wetlands Coalition who are working to identify priority coastal mainland wetlands in need of protection, management, or restoration.

**Objective 7.4 (Archeological and Historic Resources)**

Continue to comply with National Historic Preservation Act requirements to protect archeological and cultural resources.

*Background:* Service actions likely to affect archaeological and historic sites are routinely reviewed and assessed under the provisions of Sec. 106



*Libby Island lighthouse and boardwalk  
USFWS photo*

of the National Historic Preservation Act. To date, projects requiring such review on the Refuge have been confined to structural rehabilitation of historic lighthouse structures. Funding to pursue lighthouse maintenance to national historic preservation standards has been inconsistent and inadequate. It is expensive to maintain lighthouses due to the logistics of getting equipment off shore, the seasonality of the work, and the expertise required to maintain these structures to specific historic standards. Chapter 3 describes in greater detail the work that has been accomplished to date and the costs.

Refuge lands have never had a systematic archaeological survey.

*Strategies:*

- continue to pursue funding to maintain historic lighthouse structures to historic preservation standards; establish annual maintenance plans as funding becomes available.
- continue to survey for archeological or historic resources prior to any ground disturbing activities.

**Goal 8: Communicate and Collaborate with Local Communities, Federal, State, Local, and Tribal Representatives, and other Organizations throughout Coastal Maine to Further the Mission of the National Wildlife Refuge System**

**Objective 8.1 (Research Partnerships)**

Continue to work with researchers who are actively engaged in collecting information that will benefit the Service on a local, regional, or national level.

*Background:* Fortunately for us, the Refuge is sought after as a place to conduct research on undeveloped coastal environments. We have obtained a tremendous amount of information through research partnerships. This has particularly benefited us as we often do not have the staff or funding to accomplish this work on our own. Some of the current research partnerships include: an Arctic tern and Atlantic puffin metapopulation studies with the

University of New Brunswick, Canada; a common eider survival and recruitment study with MDIFW and U.S. Geological Survey (USGS); and a purple sandpiper study with MDIFW and Acadia National Park.

*Strategies:*

- continue partnership with Humboldt Research Station under a special use permit to provide outdoor laboratory opportunities on Refuge lands; seek an expansion of their activities to include inventory and monitoring of resources once HSIMP is completed.
- continue research partnerships with MDIFW and other state agencies, NPS, NAS, USGS, and universities, and initiate new ones, that are directly beneficial to the Service on a local, regional, or national level.

**Objective 8.2 (Community Outreach)**

Continue to support the outreach efforts by the Friends of Maine Seabird Islands and continue other staff-led outreach activities that target large audiences.

*Background:* Our current outreach program includes regular submissions of news releases and a biweekly column relating Refuge news and issues to local newspapers. We also provide at least four presentations annually to local civic organizations and staff a Refuge booth at approximately four fairs, sporting shows, or other community events.

*Strategies:*

- continue to meet regularly with the Friends of Maine Seabird Islands group and support their efforts to advocate for the Refuge in local communities. Continue to provide them office space and other administrative support.
- continue with news releases, the biweekly column, and presentations as staffing and resources allow.

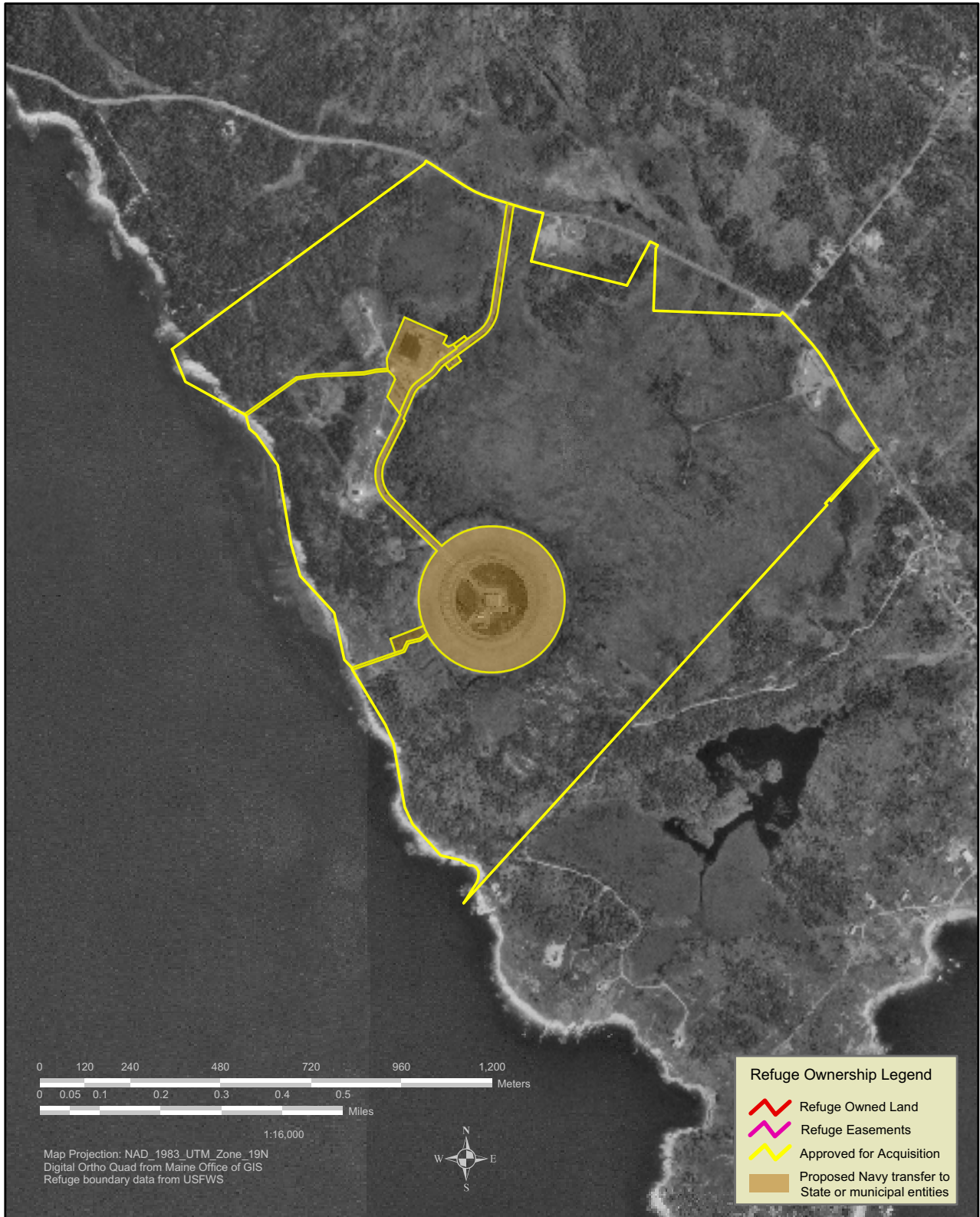


*Northern saw-whet owl*  
USFWS photo



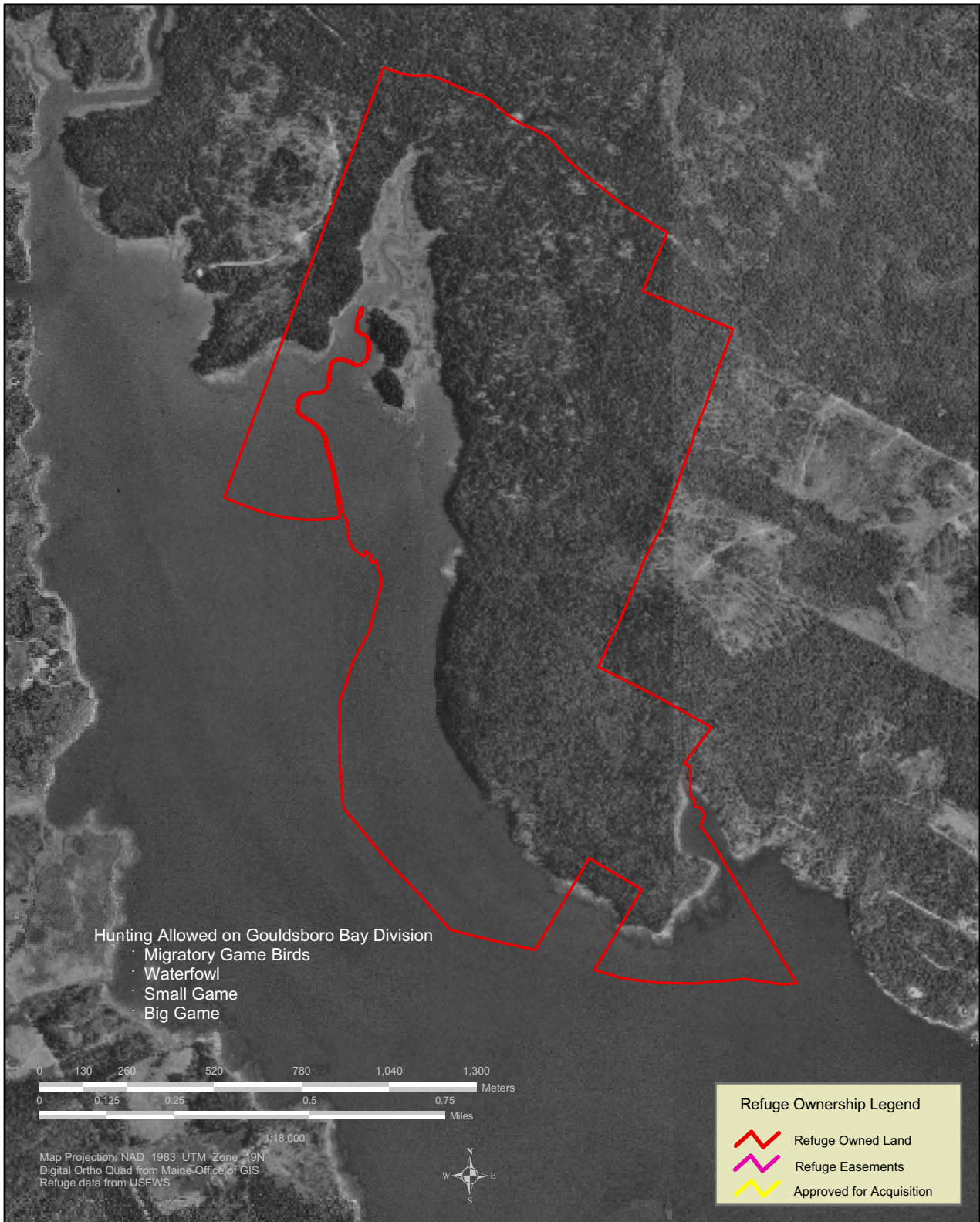


**MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE**  
**COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT**  
**Corea Heath Division Public Use**  
Alternative A





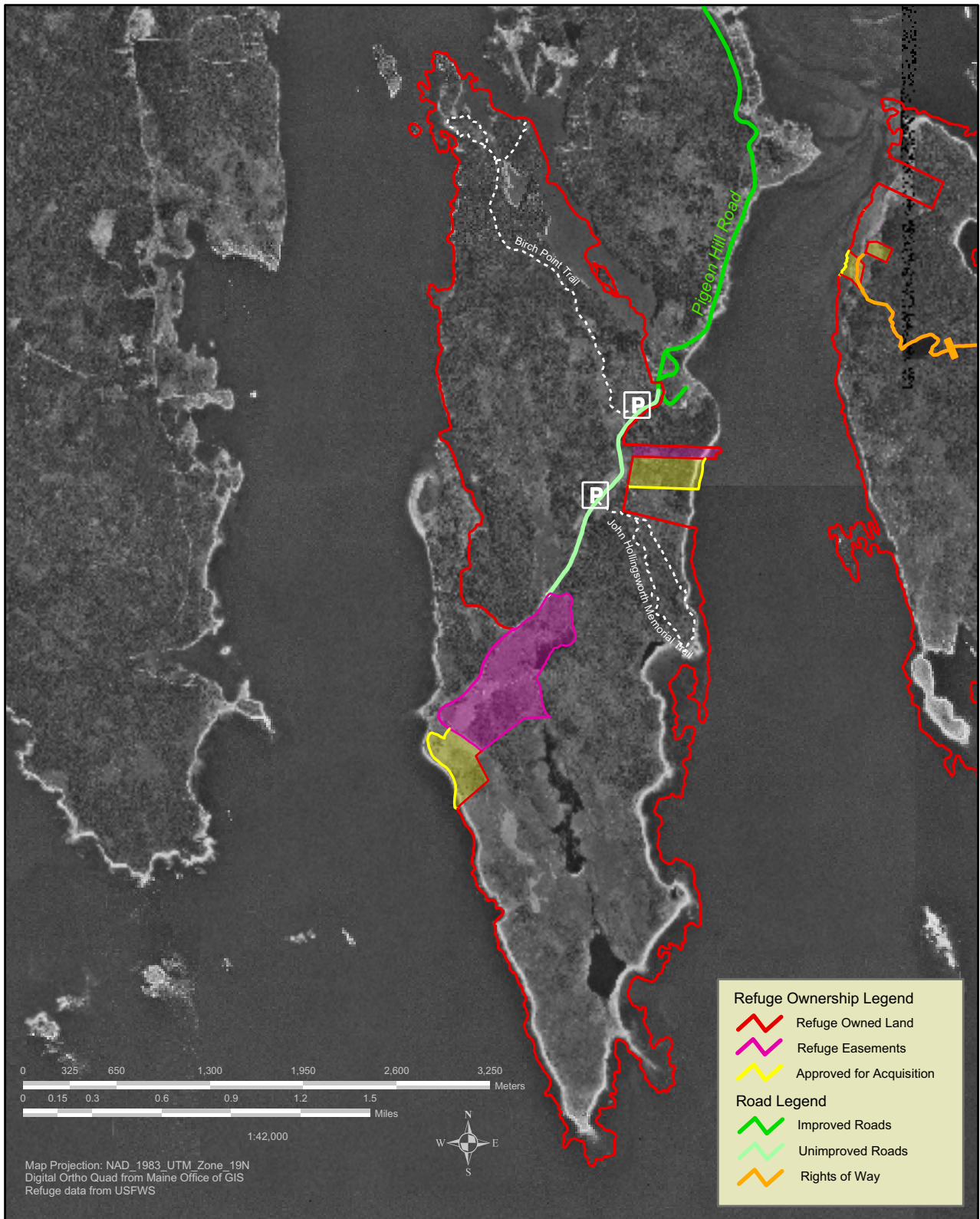
MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT  
**Gouldsboro Bay Division Public Use**  
Alternative A - Existing or Planned





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Petit Manan Point Division Public Use  
Alternative A - Existing and Planned

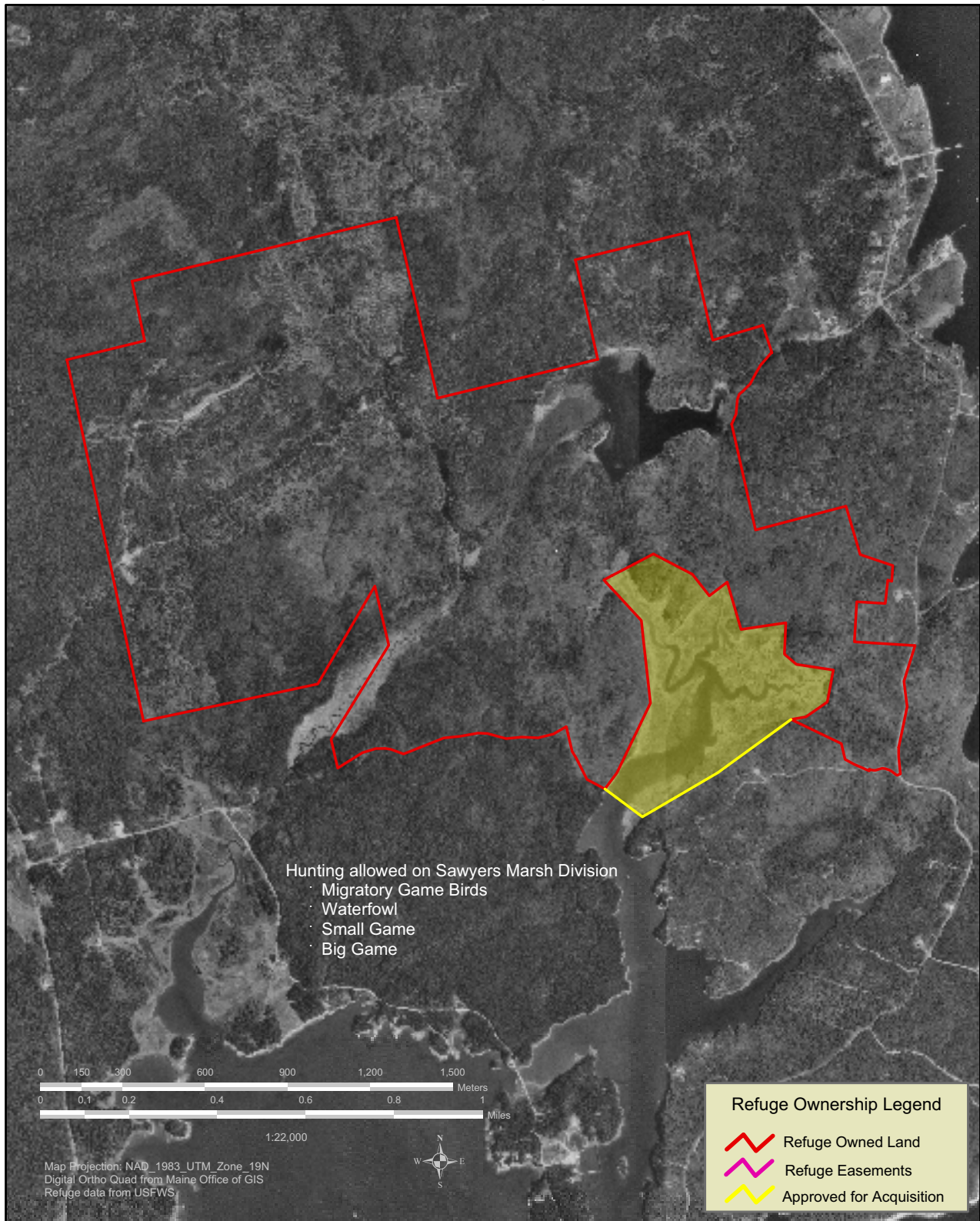




MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Sawyers Marsh Division Public Use

Alternative A - Existing or Planned



## Alternative B: The Service's Preferred Alternative

### Introduction

Alternative B is the alternative we are recommending to our Regional Director for implementation. It includes an array of management actions from Alternatives A, C, and D which, in our professional judgment, will work best towards achieving the refuges' purposes, the vision and goals for the Refuge, and Gulf of Maine, State, and regional conservation plans. In our opinion, it is the alternative that would most effectively address the significant issues. We believe it is reasonable, feasible, and practicable.

In all program areas, Alternative B would enhance the quality and sustainability of current resource programs, develop long-range and strategic step-down plans, promote partnerships, and restore habitats for species of management concern. The protection, management, and restoration of seabirds would remain our top priority (Goal 5). We will increase our responsibility in promoting nesting seabird conservation in the Gulf of Maine by establishing six new seabird restoration projects over the next 15 years. In addition, our other priority biological programs will become more focused to benefit species of concern, namely migratory land birds, waterfowl and shorebirds. We will continue the vegetation management programs on Petit Manan Point and the islands, using a combination of treatments such as mechanical, prescribed fire, herbicides, and sheep grazing, as necessary. In addition, we will strengthen our biological inventory and monitoring program to allow us to better evaluate our programs and make more informed decisions.

We will increase our land acquisition and cooperative land protection program, including the 467 acres within our currently approved boundary, and an expansion of 87 nationally significant coastal nesting islands (2,306

acres), and 2 mainland tracts (153.3 acres) important to migratory waterfowl and shorebirds (See Land Protection Plan, Appendix A). All 87 islands we propose for Service acquisition have active nesting by Federal- and State-listed species and/or other species of concern, including: roseate tern, bald eagle, Atlantic puffin, common tern, Arctic tern, and razorbills. In addition to Service acquisition, we will work with MDIFW, other GOMSWG members, and land conservation partners to support their efforts to protect additional active and potential nesting sites. It is through this cooperation that we could best achieve the goal of protecting well-distributed bald



*Meadow Brook flowage on Petit Manan Point Division*  
USFWS photo

eagle, seabird, wading bird, and waterfowl nesting islands throughout the Gulf of Maine.

We will increase opportunities for priority wildlife-dependent public uses, especially in environmental education and interpretation. We will provide environmental education teacher and student workshops using the Refuge mainland divisions as a field classroom. We will provide interpretive panels at strategic locations along coastal Route 1, and place Service interpreters on board commercial tour boats. We will develop an interpretive trail and parking area at both the Gouldsboro Bay and Sawyers Marsh divisions, and a trail and observation platform at the Corea Heath Division. Our hunt program will be expanded to include white-tailed deer hunting during specific seasons on the Petit Manan Point Division. We would expect an increase in visitation of approximately 15-20% over current levels with implementation of these programs. This increased use would occur primarily on the mainland divisions. Maps 2-5 to 2-8 (pages 2-110 to 2-113) depict our existing and proposed infrastructure on the four mainland divisions.

We will enhance local community outreach and partnerships, continue to encourage our Friends Group, and improve our relationships with our neighbors and elected officials. We believe these efforts will strengthen support for resource management by the Service and our management priorities in the local communities we serve.

Finally, this alternative includes our recommendation to our Director that we pursue Federal wilderness designation on 13 Refuge islands, which we have grouped into 8 wilderness study areas. Our management of these islands will not change appreciably over how we manage them currently. We have no management activities planned that will be affected by this designation. We believe these islands could be an important addition to the National Wilderness Preservation System.

**Goal 1: Perpetuate the Biological Diversity and Integrity of Upland Cover Types on the Refuge's Mainland to Sustain High Quality Habitat for Migratory Birds**

**Objective 1.1 (Blueberry Barrens - Old Field)**

On the Petit Manan Point Division, maintain 70 acres of blueberry barren and old field to provide nesting and migratory habitat for landbirds of high conservation priority in PIF Area 28, such as bobolink, American woodcock, and whimbrel.

*Background:* The Partners in Flight (PIF) Landbird Conservation Plan for Physiographic Area 28 (Eastern Spruce-Hardwood Forest; June 2000) has identified the need to maintain blueberry barrens and active agricultural land to provide breeding habitat for the species noted above which are all documented on Petit Manan Point. This plan also acknowledges that this cover type contributes to the overall avian richness of Area 28; an area

which is dominated by spruce-fir forest. In this PIF area, there is particular concern with bobolink which have been declining significantly (~3%/year). American woodcock, which depend on old fields and clearings for courtship displays in the spring, are also declining at a rate of 2-3% per year. Compared to other PIF physiographic areas, Area 28 supports the highest relative abundance of breeding American woodcock. The decline of species dependent on open fields is closely correlated with the recent trends of increased residential and commercial development and the declining interests in agriculture; each resulting in a reduction of grasslands, open fields, and pastures within Maine.

We have a Monitoring Avian Productivity and Survivorship (MAPS) station in this cover type on Petit Manan Point which has been in place five years. The emphasis in the MAPS program is to focus on demographic parameters such as Neotropical landbird survival and productivity rates, in an effort to identify factors that may be causing population fluctuations. The MAPS program methodology provides annual indices of adult population size and post-fledging productivity using data on the numbers and proportions of young and adult birds captured; and, annual estimates of adult survivorship, adult population size, proportion of resident individuals in the adult population, and recruitment into the adult population from mark-recapture data on adult birds (DeSante et. al. 2001). This information would supplement the significant effort spent across the United States in conducting Breeding Bird Surveys to determine population size and trends. Our results from this station indicate this station is incredibly rich in species diversity and is also highly productive.

In addition to providing breeding habitat, these open fields provide important foraging habitat for migratory birds during spring and fall migration. Most migratory birds rely on seeds, fruits, and insects to sustain them through migration (Blake and Hoppes 1986).

While difficult to quantify, the foraging habitat provided during migration is considered a vital component of the overall habitat quality. Opportunities to improve the fields for seed, fruit and insect production are important in managing this cover type. In addition, we need to remain vigilant with regards to invasive and exotic plants. While not presently a concern, we must continue to be watchful of their presence and work actively to prevent their establishment.

Finally, this cover type supports our efforts to achieve Objective 6.5; that is, the open fields provide high quality, accessible wildlife viewing opportunities.



*Hooded warbler*  
USFWS photo

*Strategies:*

- continue annual woodcock surveys on Petit Manan Point.
- continue MAPS and Regional landbird surveys according to their respective protocols to determine nesting and migratory landbird response to habitat management. Conduct respective surveys as often as needed to monitor population trends confidently. Incorporate data into GIS database.
- as identified in Fire Plan EA and annual burn plan, continue to burn field units on a three-to-five-year rotation using the 11 burn unit configuration. Combine prescribed fire with mowing or other mechanical treatments, herbicides, and/or biological treatments to maintain desirable structure and control invasive plants.

*Within 5 years of CCP implementation:*

- review and revise existing cover-type map for Petit Manan Point Division and incorporate into a GIS database.
- in the HMP, include strategies to manage this cover type to provide the best mix and configuration of age classes and structural diversity to benefit nesting and migratory birds across the landscape. Consider the most appropriate management of age classes given the surrounding land ownership and management and what refuge lands can uniquely sustain over time. Utilize vegetative treatments such as mechanical, biological, chemical, and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants. Refine objectives as needed with new information gained from revised cover type mapping.



*Prescribed burning*  
USFWS photo

- Up to 110 acres could be prescribed burned in any given year across the refuge to achieve this and other habitat objectives. Consult with Regional Fire Management Officer when developing prescribed fire management prescriptions.
- participate in the Atlantic Northern Forest Bird Conservation Region Planning efforts, the PIF Working Group, and other regional landscape-scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.
- in HSIMP, include monitoring for exotic and invasive vegetation on an annual basis.
- hire a Wildlife Biologist (GS 9) to help collect and manage field data.



**Objective 1.2 (Northern Hardwood-Mixed Forest)**

Maintain 1,090 total acres of northern hardwood-mixed forest habitat (453 acres on the Petit Manan Point Division; 123 acres on Gouldsboro Bay Division; 455 acres on the Sawyers Marsh Division; and 59 acres on Corea Heath Division), to provide nesting habitat for landbirds of high conservation priority within PIF Area 28 such as black-throated blue and Canada warblers.

*Background:* The northern hardwood-mixed forest is usually dominated by sugar maple, beech, birch, and white pine. Similar to the open field habitat in Objective 1.1, this cover type provides valuable habitat for nesting land birds, including the Federal-listed bald eagle, as well as foraging and resting habitat for migrating land birds. According to the PIF Plan for Area 28, the importance of this habitat type is considerable because of the number of associated bird species with high proportions of their total population in the planning unit. Of particular note is the fact that nearly 25% of the world's black-throated blue warblers are estimated to breed in Area 28. A majority of high priority species in this habitat, including the black-throated blue and Canada warblers, are dependent on a relatively dense forest understory for foraging and nesting. To benefit migrating birds, the PIF Plan recommends maintaining a balance of forest age structures, including mid-successional and late-successional forest, and providing structural diversity (shrubs and treefall) within the forest.

We have had a MAPS station for five years in this cover type at Petit Manan Point Division and for three years at Gouldsboro Bay Division. Our results indicate that this habitat type is consistently utilized by the species of concern noted in the objective statement. We are not recommending any vegetation management at this time to enhance this habitat for a certain species. We believe several more years of MAPS monitoring is desirable to establish trend and preferences at these sites.

*Strategies:*

- continue to participate in the Atlantic Northern Forest Bird Conservation Region planning efforts; incorporate specific strategies into HMP as warranted
- continue annual MAPS survey on the Petit Manan Point Division and Gouldsboro Bay Division, and annual Regional landbird surveys on Petit Manan Point, Sawyers Marsh and Gouldsboro Divisions according to respective protocols to determine nesting landbird response. Evaluate data on an annual basis. Conduct respective surveys as often as needed to establish trend information. Incorporate data into GIS database. By 2006 season, determine whether to expand MAPS survey to Sawyers Marsh Division.

- continue to cooperate with MDIFW in annual monitoring for bald eagle occupancy and productivity at the bald eagle nest located in the Gouldsboro Bay Division.
- continue to update, as needed, the cover type map for Petit Manan Point, Sawyers Marsh and Gouldsboro Bay divisions. Incorporate updates into a GIS database.

*Within 5 years of CCP implementation:*

- in HMP, include strategies to manage these forest stands to minimize fragmentation and provide the best mix of forest age class and structural diversity to benefit nesting and migratory birds across the landscape. Consider the most appropriate management of age classes given the surrounding land ownership and management and what refuge lands can uniquely sustain over time. Utilize vegetative treatments such as mechanical, biological, chemical, and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants. Refine objectives as needed with new information and the new and revised cover type mapping.
- participate in the Atlantic Northern Forest Bird Conservation Region Planning efforts, the PIF Working Group, and other regional landscape-scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.
- in HSIMP, include monitoring for exotic and invasive vegetation on an annual basis.
- hire a Wildlife Biologist (GS 9; same position as Objective 1.1)

### **Objective 1.3 (Mature Red Spruce-Balsam Fir Forest)**

Maintain 1,690 total acres of mature conifer forest habitat (905 acres on the Petit Manan Point Division; 253 acres on Gouldsboro Bay Division; and 403 acres on Sawyers Marsh Division), to provide nesting habitat for landbirds of high conservation priority within PIF Area 28 such as bay-breasted warbler, Cape May warbler, and spruce grouse.

*Background:* This mature conifer forest habitat is usually dominated by red spruce and balsam fir. The PIF Plan for Area 28 identified the need for conservation lands to maintain a large percentage of land area in mature (> 50 years old) red spruce and balsam fir to offset those private lands under intensive forest management. Although conifers dominate a large percentage of Maine's forests, the forest industry has favored shorter harvest rotations which has created younger, even-aged forested stands that are more monotypic and have less structural and age-class diversity compared to older stands. These younger, even-aged forests typically have a lower supply of downed and standing dead wood, more uniform vertical structure and

canopy gaps, and a highly altered plant and animal composition (Elliott 1999). Each of these characteristics reduces the quality of nesting, foraging, and migratory habitat for landbirds of high conservation priority within PIF 28.

*Strategies:*

- continue to participate in the Atlantic Northern Forest Bird Conservation Region planning efforts; incorporate specific strategies into HMP as warranted
- continue annual MAPS survey on the Petit Manan Point Division, and annual Regional landbird surveys on Petit Manan Point, Sawyers Marsh and Gouldsboro Bay divisions according to respective protocols to determine nesting landbird response. Conduct respective surveys as often as needed to establish trend information. Incorporate data into GIS database. By 2006 determine whether to expand MAPS effort to Sawyers Marsh Division.
- continue to cooperate with MDIFW in annual monitoring for bald eagle occupancy and productivity immediately upon discovering an eagle nest in this habitat type (none are known on Refuge mainland properties at this time).

*Within 5 years of CCP implementation:*

- revise cover type map for the Petit Manan Point, Sawyers Marsh and Gouldsboro Bay divisions. Incorporate information into a GIS database.
- in HMP, include strategies to manage these forest stands to minimize fragmentation and provide the best mix of forest age class and structural diversity to benefit nesting and migratory birds across the landscape. Consider the most appropriate management of age classes given the surrounding land ownership and management and what refuge lands can uniquely sustain over time. Utilize vegetative treatments such as mechanical, biological, chemical, and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants.

Refine objectives as needed with new information and the new and revised cover type mapping.

- participate in the Atlantic Northern Forest Bird Conservation Region Planning efforts, the PIF Working Group, and other regional landscape-scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.

- in HSIMP, include monitoring for exotic and invasive vegetation on an annual basis.



Cedar waxwing - MAPS survey  
USFWS photo

- hire a Wildlife Biologist (GS 9; same position as Objective 1.1)

#### **Objective 1.4 (Early Successional Forest-Edge)**

On the Petit Manan Point Division, annually manage the 226 acres in early successional forest/edge habitat dominated by speckled alder (*Alnus rugosa*), mountain ash (*Prunus americana*), sweet gale (*Myrica gale*) and other shrubs, approximately 2-10' tall, to provide nesting and feeding habitat for landbirds of high conservation priority within PIF Area 28 such as chestnut-sided warbler, American woodcock, and olive-sided flycatcher.

*Background:* Within PIF Area 28, this habitat was historically created from natural disturbances such as fire, flooding, beaver activity, or severe storms or occurs as a relatively short-lived vegetation stage after agricultural abandonment or logging (Rosenberg and Hodgman 2000). In general, current land management practices strive to avoid these disturbances and, as a result, this habitat type and many landbirds associated with it are in decline throughout PIF Area 28.

Particular attention has focused on the 2-3% per year decline of American woodcock which has occurred since 1968. While woodcock utilize a variety of habitats depending on the season and activity, they utilize early successional forest/edge habitat for foraging, daytime cover, and nesting. Chestnut-sided warbler and olive-sided flycatcher are two other landbird species of high conservation priority which utilize this habitat for nesting.

In addition to nesting, this habitat provides important foraging areas for migratory birds during spring and fall migration. As noted above, most migratory birds rely on seeds, fruits, and insects to sustain them through migration. Opportunities to manage early successional /edge habitat to increase seed, fruit and insect production will be an important consideration. Active management will be necessary to maintain this habitat type; otherwise, over time, much of the upland areas will grow into a spruce-fir forest. However, wetland areas will likely remain as shrub habitat. In addition, we need to remain vigilant with regards to invasive and exotic plants. While not presently a concern, we must continue to be watchful of their presence and work actively to prevent their establishment.

#### *Strategies:*

- continue annual MAPS survey and annual Regional landbird surveys on the Petit Manan Point Division according to respective Regional protocols to determine nesting landbird response. Conduct respective surveys as often as needed to establish trend information. Incorporate data into GIS database.

*Within 5 years of CCP implementation:*

- revise cover type map for the Petit Manan Point Division and incorporate information into GIS database.
- in HMP, include strategies for managing early successional forest/edge habitats to provide the best mix of structural diversity to benefit nesting and migratory birds. Consider the most appropriate management of age classes given the surrounding land ownership and management and what refuge lands can uniquely sustain over time. Utilize vegetative treatments such as mechanical, biological, chemical and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants. Refine objectives as needed with new information and the revised cover type mapping.
- Up to 110 acres could be prescribed burned in any given year on refuge lands to achieve this and other objectives. Consult with Regional Fire Management Officer when developing prescribed fire management prescriptions.
- participate in the Atlantic Northern Forest Bird Conservation Region Planning efforts, the PIF Working Group, and other regional landscape-scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.
- in HSIMP, include monitoring for exotic and invasive vegetation on an annual basis.
- hire a Wildlife Biologist (GS 9; same position as Objective 1.1)

**Objective 1.5 (Rare Plant Sites)**

On the Sawyers Marsh, Gouldsboro Bay, Petit Manan Point, and Corea Heath divisions, manage rare plant sites to insure their population viability is sustained over time and they continue to contribute to the natural botanical diversity of the area.

*Background:* Botanical surveys to date have identified five rare plants: swarthy sedge (*Carex adusta*), salt-marsh sedge (*Carex recta*), Nova Scotia false-foxglove (*Agalinis neoscotica*), Pickering's reed bent-grass (*Calamagrostis pickeringii*; State threatened), and moonwort (*Botrychium lunaria*) on the Petit Manan Point Division (see Appendix B for TNC and Maine Natural Area ranking of each species). All five species of plants are considered imperiled in Maine because of their rarity or vulnerability to further decline. One species, Nova Scotia false-foxglove, is also thought to be imperiled globally. Very little is known about their life history requirements and what protection measures are most effective to insure their continued viability. Additional surveys are needed on the Petit Manan Point Division to verify each population's extent and distribution.

We also need to establish what external threats could impact these plants populations. Moreover, we must remain vigilant with regards to invasive and exotic plants. While not presently a concern, we must continue to be watchful of their presence and work actively to prevent their establishment or spread.

Also on Petit Manan Point is an 11-acre Jack pine (*Pinus banksiana*) woodland; a rare plant community in the state. This stand provides a unique and important contribution to the ecological diversity of the area as it is one of only eight sites in the state (Elliott, 1999). Jack pine regenerates best through fire, which consumes the organic matter and exposes a more suitable seedbed of mineral soil (Maine NAP, 1983).

Rare plant surveys have not been initiated on Sawyers Marsh or Gouldsboro Bay Divisions; however, our proposal is to conduct further surveys beginning in 2005. With identification of rare plant populations at these two locations, our concerns would be similar to those addressed for Petit Manan Point.

Several studies have been conducted on the Corea Heath Division and have determined it is an exemplary coastal plateau bog ecosystem. The entire area is considered unique botanically, and is State-designated as a Maine Critical Area. It is recognized as one of the largest and most southerly coastal raised peatlands in North America. The adjacent jack pine stand is also a Maine Critical Area.

The core 240-acre bog (or peatland) complex on Corea Heath division is actually comprised of several smaller peatland communities, including open and forested bogs, and open and forested fens. Fortunately, the U.S. Navy preserved and protected Corea Heath for more than 50 years, by limiting infrastructure developments and not allowing public access. According to information we obtained from the State of Maine Natural Areas Program database, the State-listed threatened plant, Pickerings reed bent-grass occurs here. Two other rare species are suspected in the area: screwstem (*Bartonia paniculata*), as State threatened species, and Wiegand sedge (*Carex wiegandii*), a State species of special concern.

*Strategies:*

*Within 5 years of CCP implementation:*

- compile what is known about rare plant life history requirements for the species that have been identified on the Refuge through consultation with botanical experts and literature reviews.
- initiate rare plant surveys on Sawyers Marsh and Gouldsboro Bay Divisions.
- identify location and extent of known populations with GPS, quantify numbers, and identify potential threats, incorporate information into a GIS database; re-establish locations of known plants on Corea Heath Division.

- in HMP, include strategies to manage the health and productivity of these plant populations. Encourage research studies of the viability and persistence of these rare plant populations, emphasizing patterns of reproductive success and limitations imposed by rare plant habitats. Consider use of deer exclosures to help assess effect of feeding on rare plant sites. Consider restricting public access in sensitive areas. Implement survey efforts to locate additional rare plant communities. Utilize vegetative treatments such as mechanical, biological, chemical, and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants before they become established. Refine objectives as needed with new information and the revised cover type mapping.
- Up to 110 acres could be prescribed burned in any given year to achieve this and other objectives. Consult with Regional Fire Management Officer when developing prescribed fire management prescriptions.
- in HSIMP, include monitoring strategies for exotic and invasive vegetation on an annual basis. Establish survey protocol to locate additional rare plant populations. Develop a deer monitoring strategy if warranted.

**Goal 2: Maintain High Quality Wetland Habitat on the Refuge's Mainland Coast, Primarily to Benefit Migratory Birds of High Conservation Priority, while also Supporting other Native, Wetland-Dependent Species of Concern**

**Objective 2.1 (Maritime Saltmarsh and Estuary)**

On the Gouldsboro Bay and Petit Manan Point Divisions, maintain the 28 and 8 acres, respectively, of coastal saltmarsh to insure the quality and natural function of the marsh is sustained and providing breeding and/or wintering habitat for species of conservation concern such as Nelson's sharp-tailed sparrow, American black duck, and northern harrier.

*Background:* Historically, over 90% of saltmarshes in the northeast were parallel-grid ditched by 1938 for mosquito control (Bourn and Cottom 1950). Within PIF Area 28, the most extensive saltwater marshes occur in Canada and these were largely altered through diking for waterfowl production and draining for agriculture. In Maine, salt hay farming was a threat and currently, residential and industrial development are other significant impacts affecting these fragile systems. The PIF Area 28 plan has identified two species of concern on which to focus conservation efforts: Nelson's sharp-tailed sparrow and American black duck. Other Regional species of concern include northern harrier and migrating shorebirds.

The PIF Area 28 plan ranks Nelson's sharp-tailed sparrow as the highest overall conservation priority, primarily due to its very restricted range and small total populations. Nearly the entire range of the Nelson's sharp-tailed sparrow occurs in PIF Area 28. Unfortunately, its status and habitat requirements are poorly known. It is assumed to breed almost entirely in coastal and estuarine marshes in this area.

The American black duck is a globally vulnerable Watch List species with a large proportion of its range within PIF Area 28. It is considered one of the highest priority species of concern according to the Atlantic Coast and Eastern Habitat Joint Ventures and among the state and provincial agencies where it occurs. Coastal saltmarshes provide breeding habitat for this species, and coastal marshes, estuaries, and sheltered coves are especially important to wintering black ducks (PIF Plan Area 28 plan) for foraging and shelter. Numerous other species of wading birds, waterfowl, and shorebirds also utilize the saltmarshes as feeding areas during the breeding and migration seasons.

Fortunately, the salt marsh habitats on refuge lands are relatively undisturbed. While historic salt haying occurred, all dams associated with this activity have been breached and do not impede natural tidal fluctuations. As such, our management of these areas has been more custodial, limited to monitoring human activities and wildlife use.

*Strategies:*

- continue to seek acquisition of the 95 acre Sawyer's Marsh tract from willing sellers, which is the remaining inholding in this division.

*Within 5 years of CCP implementation:*

- in HMP, include strategies to maintain high quality marsh habitat over time. Identify and evaluate threats to the saltmarsh. Utilize vegetative treatments such as mechanical, biological, chemical and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants. Refine objectives as needed with new information and the revised cover type mapping.
- conduct saltmarsh sparrow surveys according to Regional protocol.
- utilize the Global Programme of Action Coalition protocol (USGS) to monitor and evaluate saltmarsh quality and natural function.
- participate in the Atlantic Northern Forest Bird Conservation Region Planning efforts, the PIF Working Group, and other regional landscape-scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.
- in HSIMP, include monitoring strategies for exotic and invasive species on an annual basis.
- initiate surveys to document use of the Refuge saltmarshes as feeding areas for species of concern during the breeding and migration seasons.



## Objective 2.2 (Freshwater Impoundments)

On the Petit Manan Point Division, annually manage the three freshwater wetland impoundments (i.e., Meadow Brook, Mague, and Cranberry) comprising 112 acres, with at least 20 acres of wild rice, to provide high quality feeding and resting habitat during fall migration (September to December) for waterfowl such as American black duck, mallard, northern pintail, and green-winged teal.

*Background:* Freshwater wetlands throughout Maine have declined from historic levels following hydropower development or conversion to support agricultural, commercial, industrial, and residential development. Currently, the freshwater wetlands on the Petit Manan Point Division provide stopover habitat for thousands of waterfowl who continuously move through during their fall migration (September to December). In particular, Cranberry Flowage currently receives considerable use during the fall due to the extensive stands of wild rice.

Since there is no public access to Mague and Cranberry impoundments, and no hunting is allowed here, very little disturbance occurs near these freshwater impoundments. As a result, migratory waterfowl are provided with a high quality food source in a relatively undisturbed environment.

As noted in Objective 2.1, the American black duck is a species of high conservation priority that utilizes these wetlands not only during migration, but will use them in conjunction with nesting in the adjacent uplands.

In addition to waterfowl, these freshwater wetlands provide migratory habitat for shorebirds, and nesting and foraging habitat for other species of conservation concern, such as belted kingfisher, northern harrier, northern goshawk, peregrine falcon, and waterbirds such as American and least bittern (USFWS 1995). Unfortunately we do not have extensive information on these species and their use of the impoundments. In particular, the secretive nature of bittern and other marsh and wading birds, and the inaccessibility of their preferred habitat, make it difficult to monitor their

population levels. We recognize that the standardized Breeding Bird Surveys are not adequate for species which occur in inaccessible marshes.

Baseline survey information will be utilized in the development or revision of our HMP and in evaluating property for potential land acquisition. Efforts that will further the conservation of these species will be considered a priority during management of Refuge impoundments.

Finally, we need to remain vigilant with regards to invasive and exotic plants. While not presently a concern, we must continue to be watchful of their presence and work actively to prevent their establishment.



*Ducks flying off Cranberry Marsh, a freshwater impoundment on Petit Manan Point Division*  
USFWS photo

*Strategies:*

- continue to maintain the earthen dikes and culverts, and use beaver deceivers to insure the three impoundments on the Petit Manan Point Division sustain water levels each year for fall migratory waterfowl, water birds, and shorebirds. Manage furbearers as warranted when needed to protect infrastructure.

*Within 5 years of CCP implementation:*

- map and monitor the distribution of wild rice and other important native wetland vegetation according to Regional protocol; explore all possibilities to expand the distribution of wild rice into Mague Flowage.
- evaluate seasonal use of wetlands by waterfowl, raptors, marsh and wading birds, and shorebirds to potentially develop additional habitat objectives for these species in the HMP.
- include in HMP, strategies to maintain high quality freshwater wetlands habitat over time. Identify and evaluate threats to the wetlands. Utilize vegetative treatments such as mechanical, biological, chemical and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants. Refine objectives as needed with new information and the revised cover type mapping.

*Peregrine falcon*

Photo courtesy of the Cornell Laboratory of Ornithology

- participate in the Atlantic Northern Forest Bird Conservation Region Planning efforts, the PIF Working Group, and other regional landscape-scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.
- include in HSIMP monitoring for exotic and invasive vegetation on an annual basis.
- participate in USFWS Region 5 anuran call count surveys in wetlands considered suitable for amphibians; document species occurrence and abundance and incorporate into GIS database.

**Objective 2.3 (Vernal pool wetlands)**

Protect all vernal pool habitat on the Refuge to insure no net loss or degradation of this important ecological community and to maintain breeding habitat for amphibian species of conservation concern, such as wood frogs and spotted salamanders.

*Background:* In addition to the concerns with freshwater wetland-dependent species noted above, amphibians are also a significant concern. Not only are their populations in decline throughout the Northeast, but because of their physiological traits (e.g. permeable skin) and ecological traits (e.g. complex, two-phase life cycle), they serve as potentially excellent indicators of environmental health (Heyer et. al. 1994). They are sensitive to changes in water quality and quantity; certain types of habitat alteration; nutrient, chemical, and thermal pollution; and acidification of wetlands and forest habitats (Hine 1982 and Klemens 1993). Monitoring changes in their presence and abundance will help us determine if there are unhealthy environmental conditions.

Many of the amphibians of concern to the Refuge rely on vernal pool habitat during all or part of their life cycle. Unfortunately, this habitat type is not fully mapped on the Refuge nor have known sites been intensively surveyed to document the presence of amphibians during the breeding season. Successive surveys will be necessary to evaluate the effects of Refuge management actions on amphibian species diversity and abundance.

*Strategies:*

*Within 5 years of CCP implementation:*

- complete surveys of vernal pools on the mainland and determine the presence of amphibians during the breeding season. Specifically, participate in Regional anuran call count surveys in select vernal pools to document species occurrence, seasonal use, and abundance. Incorporate survey results into GIS database. Surveys will also monitor amphibian use of Refuge impoundments.
- determine the need for more intensive, species-specific monitoring after evaluating the results of anuran call count surveys.

**Goal 3: Perpetuate the Biological Diversity and Integrity of Upland Cover Types on the Refuge's Coastal Islands to Sustain High Quality Habitat for Nesting Bald Eagles and Migratory Songbirds and Raptors, and to Protect Rare Plant Sites**

**Objective 3.1 (Bald Eagle Nesting Sites)**

Protect the four active and four historic bald eagle nesting sites and maintain suitable habitat on another 15 islands with stands of mature red spruce/balsam fir forests to maintain or increase the number of occupied bald eagle nesting territories within the Refuge.

*Background:* Bald eagles are Federal-listed as threatened by both the Federal government and the State of Maine. Initial threats to the species included environmental contaminants, shooting, habitat loss, and human disturbance at nest sites. Extensive public education efforts and Federal and state legislation have significantly reduced many of these threats (McCullough 1993). The bald eagle population in Maine has responded to this protection, and the state now supports over 275 pairs of eagles. However, MDIFW has identified permanent protection of eagle nesting areas as the top priority for the future recovery of this species in Maine. Bald

eagles are actively nesting on Mink, Bois Bubert, Outer Heron, and Little Marshall islands and have historically nested on Sally, Cross, Double Head Shot, and Schoppee islands. One additional pair of eagles nests within the Gouldsboro Bay Division.

Within Maine, mature red spruce/balsam fir-dominated stands close to foraging habitats are considered preferred nesting habitat. Eagles have also nested in large hardwood or white pine trees that are dominant in the tree canopy. During the nesting season eagles are often sensitive to disturbance and will typically nest in areas with minimal human activity (Stalmaster 1987). If disturbed, adult bald eagles may flush from their nest leaving eggs and young chicks exposed to inclement weather (heat or cold) or susceptible to predation.

*Strategies:*

- continue to implement seasonal public access restrictions annually on the four active and four historic bald eagle nesting sites: historic eagle nesting islands are closed from Feb. 15 to May 15; active eagle nesting islands (or portions thereof) are closed from Feb. 15 to August 31.
- continue to evaluate annually the reproductive performance of eagles nesting within the Refuge and compare to statewide average; if possible, determine causes of decreased productivity and evaluate whether management actions are warranted.
- continue to evaluate annually all future land acquisition for potential to provide nesting habitat for bald eagles. Any additional bald eagle nest sites acquired in the future by the Service would receive the same level of protection as current Refuge islands.
- continue to support MDIFW's annual efforts to monitor occupancy and productivity at all bald eagle nest sites.

**Objective 3.2 (Mature Red Spruce-Balsam Fir)**

Maintain mature red spruce/balsam fir stands on Refuge islands, in particular, the 734 acres on Bois Bubert Island and 1,248 acres on Cross Island to provide nesting habitat for landbirds of high conservation priority within PIF Area 28 such as bay-breasted warbler, Cape May warbler, and spruce grouse.

*Background:* See Objective 1.3

*Strategies:*

*Within 5 years of CCP implementation:*

- in HMP, include strategies to manage these forest stands to minimize fragmentation and provide the best mix of forest age class and structural diversity to benefit priority nesting birds across the landscape. Consider the most appropriate management of age classes given the surrounding



Cape May Warbler  
USFWS photo

land ownership and management and what refuge lands can uniquely sustain over time. Utilize vegetative treatments such as mechanical, biological, chemical and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants. Refine objectives as needed with new information and the revised cover type mapping.

- use landbird survey data collected on the mainland divisions, and Breeding Bird Survey data collected on Cross Island, to evaluate relationship of PIF priority species to stand characteristics such as stand age and stand structure.
- update the cover type maps for Cross and Bois Bubert islands in digital form for use in habitat planning.
- participate in the Atlantic Northern Forest Bird Conservation Region Planning efforts, the PIF Working Group, and other regional landscape-scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.
- in HSIMP, include monitoring for exotic and invasive vegetation on an annual basis.
- hire a Wildlife Biologist (GS 9; same position as Objective 1.1)

### Objective 3.3 (Early Successional Forest/Edge)

Manage early successional forest/edge habitat dominated by species such as alder (*Alnus spp*) and cherry (*Prunus spp*) approximately 2-10' tall on Refuge islands, including the 320 acres on Bois Bubert Island, to provide nesting habitat for landbirds of high conservation priority within PIF Area 28 such as chestnut-sided warbler, American woodcock, and olive-sided flycatcher.

*Background:* See Objective 1.4.

*Strategies:*

*Within 5 years of CCP implementation:*

- in HMP, include strategies for managing early succession forest/edge field habitats to provide the best mix of structural diversity to benefit nesting and migratory birds. Consider the most appropriate management of age classes given the surrounding land ownership and management and what refuge lands can uniquely sustain over time. Utilize vegetative treatments such as mechanical, vegetation and to control invasive and exotic plants. Refine objectives as needed with new information and the revised cover type mapping.
- participate in the Atlantic Northern Forest Bird Conservation Region Planning efforts, the PIF Working Group, and other regional landscape-

scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.

- in HSIMP, consider the effects of deer browsing and incorporate a deer monitoring strategy if warranted. Include monitoring for exotic and invasive vegetation on an annual basis.
- hire a Wildlife Biologist (GS 9; same position as Objective 1.1)

### **Objective 3.4 (Migratory Landbirds)**

Within 3 years of CCP approval, begin to evaluate at least three Refuge islands per year during spring (May and June) and fall (August to October) to determine their value to migratory landbirds of concern (e.g. black-throated blue, Canada, bay-breasted, and Cape May warblers, and raptors) to serve as a basis for future management decisions.

*Background:* Recent information indicates that coastal islands may play a key role in providing Neotropical migratory land birds with the optimal variety of prey items which are necessary to complete their migration (R. Suomala pers. comm.). Seabird researchers working on coastal islands have documented significant numbers and species of Neotropical migrants, including raptors using the islands during spring migration. Refuge specific information is not available for the fall. However, limited studies contracted by the Refuge indicate that a considerable number of raptors utilize offshore islands as foraging areas during their fall migrations (Drury and Goodhue 1998). Survey efforts will be coordinated with those identified in objective 4.4.

*Strategies:*

*Within 5 years of CCP implementation:*

- evaluate opportunities to cooperate in ongoing University of New Hampshire study to determine foraging habitat preferences of migratory songbirds.
- implement Regional land bird inventory protocol to monitor spring (May and June) and fall (August to October) migratory bird use of Refuge islands.
- conduct spring and fall migratory Neotropical landbirds and raptor monitoring on at least three Refuge islands as necessary to determine their use of coastal habitats; utilize seabird management crews to survey between May-early August. Hire additional seasonal staff to conduct migratory raptor surveys during August-October.

*Within 5 -10 years of CCP implementation:*

- complete cover type mapping for island habitats; update HMP as needed.
- evaluate monitoring data to determine habitat characteristics preferred by these species and whether active management is warranted; revise or update objectives in HMP as needed.

### **Objective 3.5 (Baseline Biological Inventories)**

Within 2 years of CCP approval, begin to complete botanical and wildlife evaluations on at least six Refuge islands per year to identify species of concern and to provide a baseline for making future management decisions.

*Background:* Few complete biological inventories have been conducted on offshore Maine islands, but we suspect there are many rare or unique species inhabiting them. Plants and animals living in the Gulf of Maine are uniquely adapted to cold water currents, the prevalence of fog in summer, and strong cold winds that typically occur off the Maine coast (Conkling 1999). Along the outer islands, this results in harsh environmental conditions similar to those in more Arctic or boreal regions. These conditions, which frequently are too harsh for some plants found on the mainland, give rise to a group of boreal species of plants that typically exist much farther north (Mittelhauser and Morrison 2000).

To date, botanical and wildlife inventories of Refuge islands have been completed for Libby, Johns, Eastern Brothers, Halifax, Petit Manan, and Upper Flag islands. A preliminary inventory of the Cross Island wetlands has also been completed. Bois Bubert has a cover type map completed. Future inventories will include a description of plant and resident wildlife species composition and relative abundance, GPS locations of sensitive plant and wildlife species habitats, locations of invasive or exotic species, and known or potential threats to the island's biological diversity.

Invasive plants are not presently a huge threat, but we will need to be vigilant so they do not become one. For example, we are controlling the population of invasive dodder (*Cuscuta spp.*) on Petit Manan Island where it has been found across the island. In some years the vine flourishes, forming a thick tangled mat, which may limit mobility of young tern chicks. We have mechanically removed the plant after the nesting season, and prior to seed production. Purple loosestrife (*Lythrum salicaria*) is also known to occur on Smuttynose Island. Our long-term goal of this program will be to identify invasive plant locations through these surveys, so we can immediately begin control where needed.



*Buttercup*  
USFWS photo

*Strategies:*

*Within 5 years of CCP implementation:*

- establish protocol to conduct baseline vegetation and wildlife inventories on at least six Refuge islands per year. Efforts will continue until all Refuge islands have been inventoried. Consider use of contractors or initiate cooperative efforts with universities to conduct surveys. All survey information would be stored in a GIS database.
- conduct literature search to determine historical surveys conducted on, or adjacent to, Refuge islands.
- update HMP as needed using information obtained from inventories and develop strategies to insure resources of concern are protected.
- in HSIMP, include monitoring for exotic and invasive vegetation on an annual basis. Utilize vegetative treatments such as mechanical, chemical, biological, and prescribed fire to control exotic and invasive plants.
- complete digital cover type mapping for all forested Refuge islands.

### Objective 3.6 (Rare Plant Communities)

Manage known rare plant populations on Refuge islands and mainland to insure these populations remain viable and contribute to the natural botanical diversity of the area.

*Background:* Botanical surveys to date have identified numerous rare plant populations on islands within the Refuge. These include Cross Island: livid sedge (*Carex livida*) and Coast blite goosefoot (*Chenopodium rubrum*); Eastern Brothers: northern yarrow (*Achillea millefolium*); Libby Island: saltmarsh sedge (*Carex recta*), bird's eye primrose (*Primula laurentiana*), and northern yarrow; Bois Bubert: Bird's eye primrose and Nova Scotia false-foxglove (*Agalinis neoscotia*); Halifax Island: northern yarrow; John's Island: sea-beach sedge (*Carex silicea*); Upper Flag Pitseed goose-foot (*Chenopodium berlandieri* var. *macrocalycium*). In addition, two rare plant communities have been identified on Refuge islands: maritime slope



bog and jack pine woodland. These areas provide a unique and important contribution to the ecological diversity of the area. In particular, the 28-acre jack pine woodland on Bois Bubert Island is only one of eight in the state (Elliott, 1999). Jack pine regenerates best through fire, which consumes the organic matter and exposes a more suitable seedbed of mineral soil (Maine NAP, 1983).

See Appendix B for The Nature Conservancy and Maine Natural Areas ranking of each species.

*Strategies:*

*Within 5 years of CCP implementation:*

- conduct literature search and consult experts regarding life history requirements.
- review baseline biological inventory information collected each year (See Objective 3.6) for occurrences of rare plants.
- annually coordinate all survey and management efforts with Maine Natural Areas Program (NAP).
- in HMP, include strategies to manage the health and productivity of these island rare plant populations and communities. Encourage research studies on the viability and persistence of these rare plant populations, emphasizing patterns of reproductive success and limitations imposed by rare plant habitats. Consider use of exclosures if sheep could be impacting rare plants. Also, consider restricting public access in sensitive areas. Utilize vegetative treatments such as mechanical, biological, chemical and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants. Refine objectives as needed with new information and the revised cover type mapping.
- Up to 110 acres could be prescribed burned in any given year to achieve this and other habitat objectives. Consult with Regional Fire Management Officer when developing prescribed fire management prescriptions.
- in HSIMP, incorporate a deer monitoring strategy if warranted. Include monitoring for exotic and invasive vegetation on an annual basis. Determine survey protocol to locate additional rare plant communities.
- visit all known rare plant sites; locate with GPS; map abundance, density and distributions; identify threats, including non-native and invasive species; establish a GIS database for inventory information; and incorporate new information into the HMP.

**Goal 4: Protect the High Quality Wetland Habitats on the Refuge's Coastal Islands to Benefit Nesting and Migrating Shorebirds and Waterfowl**

**Objective 4.1 (Coastal Saltmarsh - Cross Island)**

Protect the 15 acres of coastal saltmarsh on Cross Island to sustain its high quality and natural function and to provide breeding habitat for species of conservation concern such as Nelson's sharp-tailed sparrow, American black duck (breeding and wintering), and northern harrier (wintering and foraging).

*Background:* See Objective 2.1

*Strategies:*

*Within 5 years of CCP implementation:*

- in HMP, include strategies to maintain high quality saltmarsh habitat over time. Identify and evaluate threats to the saltmarsh. Utilize vegetative treatments such as mechanical, biological, chemical and prescribed fire, where appropriate, to manage desirable vegetation and to control invasive and exotic plants. Refine objectives as needed with new information and the revised cover type mapping.
- conduct sharp-tailed sparrow surveys according to Regional protocol.
- utilize the Global Programme Action Coalition (USGS) protocol to monitor and evaluate saltmarsh quality and natural function; beginning in 2006, monitor the area every five years.
- participate on the PIF Working Group and other regional landscape-scale efforts to review and evaluate the Refuge's contribution to the habitat and population objectives identified in regional, state, PIF, and species-specific plans. Update HMP as needed.
- in HSIMP, include monitoring for exotic and invasive vegetation on an annual basis.

**Objective 4.2 (Intertidal Harvesting)**

Within 1 year of CCP approval, initiate efforts to determine the effects on Federal trust resources from intertidal resource harvesting (e.g. blue mussels, blood worms, and periwinkles) on or adjacent to Refuge islands. In particular, evaluate reductions in foraging habitat for common eider and migrating shorebirds such as black-bellied plover, red knot, sanderling and least sandpiper, and disturbance to island nesting species (i.e. terns, common eider, Atlantic puffin, bald eagles) during the nesting season.

*Background:* The intertidal areas surrounding Refuge islands are open to commercial harvesting of invertebrates under the Colonial Ordinance of 1641-1647. Similar harvesting activities also occur adjacent to Refuge mainland properties. At this point in time, we have no means or methods to document the level of harvest, or even document the number of harvester visits to an island. However, the significance of amphipods and periwinkles (*Littorina spp.*) to eider ducklings has been well-documented



*Common eider hen*  
USFWS photo

(Mawhinney 1999). In addition, many harvesters visit the seabird islands during critical nesting periods, frequently causing the nesting birds to flush from their nests. In some instances, harvesters have landed on nesting islands and allowed their dogs to roam the island while they harvest the intertidal area.

Intertidal habitat surrounding coastal islands are also important foraging areas for tens of thousands of migrating shorebirds each season. It is unknown whether present or future harvest levels of invertebrates may adversely affect the availability of these critical forage items to the shore-

birds. Any reduction in food base may reduce the birds' fitness as they migrate south for the winter. The United States Shorebird Conservation Plan (Brown, Hickey, and Harrington 2000) identifies the need to determine population-limiting factors as the most critical need in the conservation of shorebirds.

In the past, rockweed harvesting has been a resource concern for many of the same reasons identified above for invertebrate harvesting. However, in 2001 the Federal regulation prohibiting taking plants on Federal lands, including rockweed, was provided to all licensed rockweed harvesters. This activity is now a law enforcement issue and will be monitored closely by our staff.

*Strategies:*

*Within 5 years of CCP implementation:*

- coordinate with Maine Dept. of Marine Resources, Moosehorn and Rachel Carson refuges, U.S. Geological Services (USGS), and the University of Maine to establish and initiate monitoring protocols to measure impacts from human disturbance and loss of forage to nesting and migratory species of conservation concern.
- hire a Marine Ecologist (GS 11).
- coordinate with commercial harvesters to identify harvest areas and level of take.
- as cooperative research opportunities arise, conduct food habitat studies for trust species of concern affected by intertidal harvesting.

**Objective 4.3 (Aquaculture Facilities)**

Within 1 year of CCP approval, initiate efforts to determine the effects of present and proposed commercial aquaculture facilities in the waters adjacent to Refuge islands supporting nesting seabirds, wading birds, bald eagles, and waterfowl.

*Background:* Within Maine, several aquaculture facilities have been developed in the waters adjacent to islands supporting nesting bald eagles. Information gathered to date indicates that with sufficient screening and adequate distance between nest sites and fish pens, eagles and aquaculture can co-exist (USFWS 1997). On several occasions, however, regulators have permitted aquaculture development close to bald eagle nesting islands and some of these have since experienced reduced productivity rates or site abandonment (Todd, pers. com. 2004).



*Aquaculture pens near Cross Island*  
USFWS photo

We are unsure if there is a direct cause and effect on species of concern since no wildlife studies have been conducted in Maine prior to site development to establish a baseline. A study by Norm Famous evaluated wildlife response to aquaculture facilities, but the study was initiated after the site was developed and there was no pre-development data collected (Famous 1991). Therefore, it is difficult to assess true impacts, if any, of the facilities' development and operation on nesting birds and other wildlife. The general concerns raised by the conservation agencies include: disturbance to birds nesting on adjacent islands, loss

of foraging habitat for nesting and wintering birds, entanglement, and attraction of predators (e.g. gulls and herons).

Research on this issue in British Columbia concluded that increasing numbers of aquaculture facilities in an area important to breeding seabirds can have deleterious effects on these populations in the long term (Booth and Rueggeberg 1989). They found this to be particularly true if sites are developed in proximity to species that have a limited number of large colonies, make intensive use of the surrounding area for foraging, and for which there are few alternate breeding areas available (e.g. terns and alcids). More information is needed to determine if there is a direct impact on nesting seabirds near Refuge lands.

#### *Strategies:*

##### *Within 5 years of CCP implementation:*

- coordinate annually with conservation partners including: Maine Dept. of Marine Resources, Army Corps of Engineers, MDIFW, NPS, Gulf of Maine Council, Natural Resource Council of Maine, Conservation Law Foundation, and USFWS-Ecological Services Maine Field Office to share information and concerns.
- develop and implement monitoring program with MDIFW, USGS, Maine Dept of Marine Resources, Army Corps of Engineers, University of ME Cooperative Education Unit, USGS, and aquaculture industry to measure whether or not the facilities have a negative impact on nesting

birds of conservation concern. For example, determine whether birds are flushed from nests more frequently, birds are entangled in nets, or predators are attracted to the area. Also, establish baseline data to collect prior to new aquaculture developments near Refuge islands so a pre- and post-evaluation can be done.

- hire a Marine Ecologist (GS 11; same position as Objective 4.2).

*Within 5-10 years of CCP implementation:*

- work with aquaculture industry to minimize potential adverse effects of future aquaculture projects, including site location, cage design, stocking levels and fish age, netting characteristics, and project initiation intervals.

#### **Objective 4.4 (Fall Shorebird Migration)**

Within 5 years of CCP approval, evaluate at least three Refuge islands per year during fall migration (July to October) to determine the value of these islands to migratory shorebirds of concern such as red knot, black-bellied plover, piping plover, and whimbrel.

*Background:* The 1995 International Shorebird Survey Report identified several shorebird species which occur during fall migration on the Refuge and are in decline in our Northeast Region. These species include: black-bellied plover, whimbrel, semipalmated plover, red knot, sanderling, least sandpiper, purple sandpiper, and short-billed dowitcher. In addition, we suspect the Federal-listed threatened piping plover utilizes refuge lands since it nests north of the Refuge. Initial efforts to monitor shorebird use of coastal islands has indicated that these habitats may provide significant feeding and roosting habitats for large numbers of birds passing through during fall migration.

*Strategies:*

*Within 5 years of CCP implementation:*

- in conjunction with efforts identified in Objective 3.4, use seasonal contractors to conduct migratory shorebird monitoring on at least 3 Refuge islands per year determine shorebird use of habitats; utilize seabird management crews to monitor between May and early August. Surveys will also be initiated on appropriate mainland habitat.
- coordinate selection of shorebird monitoring sites and protocols used with national and regional efforts, including PRISM.
- complete cover type mapping for Refuge island habitats; update HMP as needed.

*Within 5 -10 years of CCP implementation:*

- evaluate monitoring data to determine habitat characteristics and dietary items preferred by shorebirds and whether active management is warranted; revise or update objectives in HMP as needed.

### Objective 4.5 (Winter Shorebird Surveys)

Within 1 year of CCP approval, initiate survey efforts on at least three Refuge islands per year to determine use by wintering purple sandpipers.



*Purple sandpiper banding*

*Background:* The purple sandpiper breeds in high northern latitudes and winters further north than any other shorebird. During winter months, they typically occur along wave-exposed rocky shores where they feed on amphipods, mollusks, and other intertidal invertebrates. The offshore habitats along the northeast Atlantic have been identified as extremely important to the survival of wintering purple sandpipers in the Western Hemisphere (Brown et. al. 2000). In addition, the North Atlantic Regional Shorebird Plan has identified as a high priority the need to identify and protect purple sandpiper winter habitats along the east coast (Clark and Niles 2000). Maine may play a significant role in providing winter habitat, as recent surveys indicate that approximately 33% of the eastern North American population of purple sandpipers winters off the coast of Maine.

#### *Strategies:*

- continue to conduct annual winter shorebird surveys in conjunction with harlequin duck surveys.

#### *Within 5 years of CCP implementation:*

- in cooperation with MDIFW, Acadia National Park (ANP), and the University of Maine, initiate boat surveys of coastal islands between the months of November and May to determine distribution and abundance of purple sandpipers; coordinate selection of shorebird monitoring sites and protocols used with national and regional efforts, including PRISM.
- cooperate in MDIFW and ANP efforts to capture and band purple sandpipers to facilitate monitoring movement among the islands used throughout the winter, and breeding areas.
- hire a Marine Ecologist (GS 11; same position as Objective 4.2)

#### *Within 5-10 years of CCP implementation:*

- by 2012, evaluate monitoring data to determine habitat characteristics preferred by purple sandpipers and whether active management is warranted; revise or update objectives in HMP as needed.

**Goal 5: Protect and Restore Nesting Seabird Populations on the Refuge's Coastal Islands to Contribute to Regional and International Seabird Conservation Goals**

**Seabird Nesting Islands with Active Restoration**

**Objective 5.1 (Common and Arctic Tern)**

Within the context of regional population goals identified in the Gulf of Maine Regional Tern Plan (USFWS 2002), increase the number of nesting pairs of Arctic and common terns (using the 2000 nesting season population estimates as a baseline), and achieve and maintain a productivity level of 1.0 fledged chick/nesting pair, on the six Refuge islands with active seabird restoration projects: Petit Manan, Ship, Metinic, Seal, Pond and Matinicus Rock islands.

*Background:* Arctic and common tern populations were decimated in the Gulf of Maine in the late 1800's due to a combination of shooting and eggging for food and bait, and feather collection for the millinery trade. Conservation legislation passed in the early 1900's provided protection from human persecution, but expanding gull populations soon caused tern numbers to again decrease significantly. By 1977, tern numbers in the Gulf of Maine had decreased to only 5,321 pairs from a previous high of just over 12,000 in 1940. Within the Gulf of Maine, the number of islands supporting nesting terns had decreased by half. Cooperative efforts by members of Gulf of Maine Seabird Working Group (GOMSWG) have reversed this decline, and both species are experiencing population growth.

Although recent efforts have tended to focus on population level goals, members of GOMSWG have begun to focus on reproductive parameters (fledgling and recruitment rates) that may indicate overall health of the populations. Researchers have set the productivity level of 1.0 fledged chick/nesting pair as an objective for both tern species. Population estimates for the 2000 nesting season will serve as a baseline for setting future population goals. The population and productivity objectives will be evaluated every five years in cooperation with the GOMSWG.

Predator management is an important part of the restoration effort. The presence of a single mammalian predator (e.g. mink) or avian predator (e.g., great-horned owl, black-crowned night heron, or gull species) on a seabird colony can have disastrous effects on nesting seabirds. Predation can limit the distribution and abundance of breeding seabirds and their reproductive success. The effects of predation will vary depending on the type of predator, seabird species, habitat on the island, and time of year the predator arrives on the island. However the significance of predators is even greater for species limited to a few nesting colonies. Similar efforts may be needed on Refuge islands not currently supporting an active restoration project.

*Strategies:*

- continue cooperation with NAS and Canadian Wildlife Service; annually census islands for nesting common and Arctic terns; conduct productivity studies to estimate reproductive success; identify factors

responsible for reduced productivity levels below the target of 1.0 chick/pair; continue to identify and initiate steps to minimize factors reducing productivity levels.

- continue cooperation with the Mid-Atlantic/New England/Maritimes Waterbird Working Group (MANEM) in setting population objectives for the region.
- continue to actively manage predator populations on an annual basis, using lethal and non-lethal methods to control gulls, owls, and small mammals. If trapping is necessary, utilize Refuge staff or a contracted local trapper to set and monitor traps throughout the season. Coordinate trapping efforts with MDIFW and utilize best management practices of the International Association of Fish and Wildlife Agencies Technical Committee.
- in cooperation with NAS and MDIFW, continue to annually monitor effectiveness of trapping program and evaluate new and different techniques.
- continue to annually document and evaluate how often and how close tour boats come to nesting islands and the response by seabirds.
- continue to annually meet with tour boat companies prior to the season to discuss best management practices while operating near seabird nesting islands.
- continue to participate in cooperative effort (University of New Brunswick, NAS, and USFWS) to study the Arctic tern metapopulation within the Gulf of Maine.
- continue to annually close alcid, tern, and storm-petrel nesting islands to public visitation between April 1 and August 31.
- continue working with FAA to have Refuge islands identified on Flight Charts so that pilots are alerted to the 2,000 ft.-minimum recommended altitude over a national wildlife refuge.

*Within 5 years of CCP implementation:*

- in HMP, include strategies to manage for and sustain nesting terns on Petit Manan, Ship, Metinic, Seal, Pond, and Matinicus Rock Islands in cooperation with National Audubon Society. Utilize the Regional Tern Plan (USFWS 2002) to identify characteristics of desirable tern nesting habitat. Consider habitat management tools such as prescribed burning, herbicides, fencing, mowing, and sheep grazing. Evaluate information on sheep grazing collected on Metinic Island. Consider applicability of sheep grazing to other seabird islands after evaluating factors related to grazing seasons, flock size, risk to soils and native vegetation composition. If utilized, sheep grazing will be implemented under a special use permit with controls on flock size, timing, and distribution.



- in HSIMP, evaluate current tern monitoring strategies, in cooperation with NAS.
- also in HSIMP, develop monitoring strategies for exotic and invasive vegetation on an annual basis.
- hire a Marine Ecologist (GS 11; same position as Objective 4.2)

### Objective 5.2 (Roseate Tern)

Within the context of regional population goals identified in both the Gulf of Maine Regional Tern Management Plan (USFWS 2002) and the Roseate Tern Recovery Plan (USFWS 1998), increase the number of roseate terns nesting on the refuge islands (using the 2000 nesting season population estimates as a baseline) and maintain a productivity level of 1.0 fledged chick/nesting pair.

*Background:* Roseate terns are listed as an endangered species by both the Federal government and the State of Maine. The history of population decimation and recent rebounding is similar to that mentioned above for common and Arctic terns. Currently, there are approximately 286 pairs of roseate terns nesting on five islands in Maine. However, over 95% of the roseate terns are nesting on two non-Service owned islands; Eastern Egg Rock and Stratton Island. Within the Refuge, roseate terns nest on Petit Manan and Seal islands; have historically nested on Metinic, Matinicus Rock, Thrumcap, and Egg Rock; and have attempted nesting on Pond Island. This limited nesting distribution significantly increases the potential for a single catastrophic event to affect a major percentage of the population. The Roseate Tern Recovery Plan (USFWS 1998) has targeted the expansion of the Northeastern U.S. population to over 30 colonies, with six sites supporting at least 200 nesting pairs with high productivity (1.0 fledged chick /pair).

While Arctic and common terns prefer more exposed habitat, roseate terns generally prefer dense vegetation or some form of overhead cover (~ 70% cover). Fortunately, management for roseate terns can usually be accommodated on the same islands managed for common and Arctic terns, despite the differences in nesting habitat. A significant component of a successful seabird program, regardless of species, is predator management.

As with common and Arctic terns, members of GOMSWG have begun to focus on roseate tern reproductive parameters (fledgling rate and recruitment rate) that may indicate overall health of the population. Researchers have set the productivity level of 1.0 fledged chick/nesting



*Roseate tern*

Photo courtesy of Bill Silliker, Jr.

pair as an objective for roseate terns; the same objective as common and Arctic terns. Population estimates for the 2000 nesting season will serve as a baseline for setting future population goals. The population and productivity objectives will be evaluated every five years in cooperation with the Gulf of Maine Seabird Working Group, National Audubon Society, and the Roseate Tern Recovery Team.

While this objective for roseate terns is similar to Objective 5.1 (Common and Arctic Tern), we chose not to combine them because of the roseate tern's endangered status and to maintain flexibility should future recovery plan efforts require new, specific actions for this species.

*Strategies:*

- in HSIMP, evaluate monitoring strategies for nesting roseate tern with NAS and recovery team.
- continue to place Federal bands and field readable bands on roseate tern chicks, and read bands on adult terns in cooperation with the USGS roseate tern metapopulation study.
- continue to evaluate roseate tern use of artificial nest boxes on Petit Manan Island.
- continue to map all roseate tern nests using a GPS and incorporate into a GIS database.
- continue to actively manage predators on an annual basis, including lethal and non-lethal methods to control gulls, owls and small mammals. If trapping is necessary, utilize Refuge staff or a contracted local trapper to set and monitor traps throughout the season.
- in cooperation with National Audubon Society, continue to annually monitor effectiveness of trapping program and evaluate new and different techniques.
- continue to annually close alcid, tern, and storm-petrel nesting islands to public visitation between April 1 and August 31.
- continue to annually document and evaluate how often and how close tour boats come to nesting islands and the response by seabirds.
- continue to annually meet with tour boat companies prior to the season to discuss Best Management Practices.

*Within 5 years of CCP implementation:*

- begin to evaluate the effects of experimental habitat alteration designed to attract nesting terns and monitor microhabitats of nesting locations.
- in HMP, include strategies to manage for and sustain nesting by roseate terns on Petit Manan and Seal Islands, and establish nesting on Pond Island. Utilize the Regional Tern Plan (USFWS 2002) to identify characteristics of desirable tern nesting habitat. Develop management

strategies in cooperation with National Audubon Society. Consider habitat management tools such as prescribed burning, herbicides, fencing, mowing, and sheep grazing. Evaluate information on sheep grazing collected on Metinic Island. Consider applicability of sheep grazing to other seabird islands after considering factors related to grazing seasons, flock size, risk to soils and native vegetation composition. If utilized, sheep grazing will be implemented under a special use permit with controls on flock size, timing, and distribution.

- in HSIMP, evaluate implementation, with NAS and the Roseate Tern Recovery Team, the monitoring strategies cooperatively developed for nesting roseate terns on the Refuge.
- also in HSIMP, develop monitoring strategies for exotic and invasive vegetation on an annual basis.
- annually coordinate efforts with Roseate Tern Recovery Team.

### Objective 5.3 (Alcids)

Within the context of MDIFW Species Assessment (MDIFW 2000) population goals, increase the number of active alcid colonies on Refuge islands; increase the number of breeding pairs of Atlantic puffins and razorbills by 50% (using the 2000 nesting season population estimates as a baseline); and maintain a minimum productivity level of 0.5 fledged chicks/nesting pair.

*Background:* Maine represents the southern extent of the breeding range for alcids, including Atlantic puffins, razorbills, and black guillemots, in the North Atlantic. Atlantic puffins and razorbills are listed as threatened species by the State of Maine, due to small population size and because their breeding distribution is limited to four or five islands (85% of the birds nest on two Refuge islands). During the 2002 breeding season, Maine supported 450 pairs of puffins, 310 pairs of razorbills, and 12,273 pairs of black guillemots (MDIFW 2002).



Razorbills  
USFWS photo

In 1901, after decades of hunting, only one pair of puffins nested south of the Canadian border. This pair was located on the Refuge island known as Matinicus Rock. In the presence of gull control, Matinicus Rock continued to support a small population of breeding puffins. Survey results indicate that the 75 pairs of puffins on Matinicus Rock in early 1980's were the only puffins breeding in Maine (S. Hall NAS pers. com.).

In an effort to enhance the recovery of this population, NAS and the Service initiated a puffin chick relocation project where young birds were



*Black guillemot*  
USFWS photo

brought from Newfoundland to Maine. This translocation effort is thought to have significantly enhanced the population growth rate and colony establishment for puffins in Maine. Puffins currently nest on three islands within the Refuge: Petit Manan, Seal, and Matinicus Rock

Records from the early 1900's indicate that razorbills no longer bred in the Gulf of Maine. Razorbills currently nest on three islands within the Refuge: Old Man and Seal islands, and Matinicus Rock.

MDIFW completed a Species Assessment for puffins and razorbills (MDIFW 1999) in which they identified the need to increase both the

size of the breeding populations and increase the geographic distribution and number of colonies.

*Strategies:*

- continue to conduct daily censuses of black guillemots, Atlantic puffins and razorbills on or adjacent to Petit Manan, Seal, and Matinicus Rock islands each year during the nesting season.
- continue to monitor productivity at 25 active puffin burrows on Seal and Matinicus Rock islands each year during the nesting season.
- continue to observe and record food deliveries to individual burrows to help determine reproductive success each year during the nesting season.
- continue to band adults and chicks where possible each year during the nesting season.
- continue to cooperate in the graduate study of Atlantic puffin survival and recruitment (Breton et al.) with NAS and University of New Brunswick by banding as many adult and juvenile puffins and reading as many bands as possible on birds returning to the islands.
- continue to annually close alcid, tern, and storm-petrel nesting islands to public visitation between April 1 and August 31.
- on Petit Manan Island, continue to map all active puffin and, if appropriate, razorbill burrows using GPS and incorporate into a GIS database.
- on Petit Manan Island, evaluate puffin and razorbill use of artificial burrows. On an annual basis, evaluate need to continue providing burrows and whether to expand efforts to new locations on island.
- continue to annually document and evaluate how often and how close tour boats come to nesting islands and the response by seabirds.

- continue to annually meet with tour boat companies prior to the season to discuss Best Management Practices when operating adjacent to seabird nesting islands.
- evaluate current and future Refuge islands for suitability as restoration sites. Develop management plans for selected islands including: predator control needs, staffing and equipment needs, logistical concerns, use of social attraction equipment, and habitat alteration considerations.

*Within 5 years of CCP implementation:*

- purchase at least one burrow scope to assist in determining productivity in individual burrows. Additional scopes will be purchased as funds become available.
- in HMP, include strategies to manage for and sustain nesting by alcids. Utilize MDIFW Species Assessment Plans to identify characteristics of desirable alcid nesting habitat. Develop management strategies in cooperation with NAS.
- in HSIMP, cooperate with NAS to evaluate monitoring protocol for alcids nesting within the Refuge.
- initiate alcid management effort on at least one Refuge island. Make effort to select an island that will provide nesting habitat for both puffins and razorbills. Coordinate with MDIFW and NAS. Purchase social attraction equipment (e.g., sound system and decoys) as needed.
- hire a Marine Ecologist (GS 11, same position as Objective 4.2).
- hire a Wildlife Biologist (GS 11).

*Within 5-10 years of CCP implementation:*

- initiate other alcid management projects (up to five) on Refuge islands.

#### **Objective 5.4 (Laughing Gulls)**

Reduce, or redistribute where possible, the number of laughing gull pairs nesting on Refuge islands (based on 2000 inventories) in an effort to minimize competition with, and predation on, common, Arctic, and roseate terns.

*Background:* Currently, laughing gulls nest on three islands within Maine, two of which are Refuge islands: Petit Manan Island and Matinicus Rock. The third island currently supporting nesting laughing gulls is MDIFW owned Eastern Egg Rock. These colonies represent the northern extreme of laughing gull breeding range in the United States, and they are listed as a species of special concern in Maine.

In recent years on Petit Manan Island, laughing gulls have experienced considerable population growth (175% in 10 years) and colony expansion. We documented 794 laughing gull nests on Petit Manan Island during the 2000 nesting season, and 961 nests during the 2001 season. Our staff and

GOMSWG members are concerned that the gulls act as competitors with the terns for limited nesting space, directly prey on the terns and their eggs, and steal food from the terns.

In an effort to limit the number of laughing gulls nesting on Petit Manan Island in 2002, we created a “gull free” area on the island. This was accomplished by removing all laughing gull nests on the northern and eastern sides of the island.



*Laughing gulls*  
Photo by Craig Snapp

Our effort was not directed at eliminating laughing gulls as a breeding component of Petit Manan Island, but simply to manage the population growth and productivity of the gull colony. Productivity studies conducted on the tern colony in 2002 indicated that Arctic terns experienced significantly higher levels of productivity, as compared to recent years. NAS also carried out a similar control effort on Eastern Egg Rock.

*Strategies:*

- continue to cooperate with NAS and annually monitor Matinicus Rock and Petit Manan for nesting laughing gulls; map their distribution using GPS; determine their numbers and density; and document laughing gull kleptoparasitism and predation rates on terns. Incorporate all data into a GIS database.
- on Petit Manan Island, continue to confine the laughing gull nesting area to approximately five acres of the island (west of the boardwalk); utilize results of earlier experiments and consider other habitat manipulations or lethal removal of birds or eggs. Results of gull control efforts and corresponding tern productivity levels will be reviewed annually by Refuge staff and members of GOMSWG.
- continue to determine the effectiveness of experimental habitat alteration on laughing gull nesting distribution and density on Petit Manan Island.
- continue to annually evaluate other techniques to manage distribution and reduce laughing gull populations on Refuge islands when they are determined to be harming the productivity objectives for other seabirds of concern. Lethal controls would be considered if non-lethal techniques are ineffective.
- continue to annually close alcid, tern, and storm-petrel nesting islands to public visitation between April 1 and August 31.

*Within 5 years of CCP implementation:*

- in HMP, include strategies to manage laughing gull populations consistent with other seabird objectives. Develop strategies in

cooperation with NAS and MDIFW. Consider habitat management tools such as prescribed burning, herbicides, fencing, mowing, and sheep grazing. Lethal controls, such as shooting and avicides would be used if non-lethal methods are ineffective.

- in HSIMP, in cooperation with NAS, evaluate protocol and continue monitoring laughing gulls nesting within the Refuge; include monitoring for exotic and invasive vegetation on an annual basis.

#### **Objective 5.5 (Herring and Black-backed Gulls)**

Control herring and great black-backed gulls nesting on Petit Manan, Ship, Pond, and Matinicus Rock islands and maintain selected areas of Seal (25 acres) and Metinic (15 acres) islands as “gull-free” areas, to minimize inter-specific competition and predation on common, Arctic, and roseate terns; puffins; razorbills, and common eiders.

*Background:* Expanding gull populations and habitat loss along the coast of Maine were responsible for wide-scale population declines in many seabird populations during the first half of the century. The prevalence of open landfills along the coast allowed herring and great black-backed gulls to produce a greater number of chicks. These gull chicks also experienced a greater survival rate due to the abundance of food during the winter months. Both species are effective predators of tern eggs and young, and their presence can lead to complete nesting failure or island abandonment by many species of seabirds. Gulls also initiate nesting earlier in the season than terns, forcing the terns to nest in marginal habitat. As a result, terns may be more vulnerable to increased predation, inclement weather, and tides. Gull control efforts on our managed islands have proven to be very successful. As a result, over 90% of the common, Arctic, and roseate terns, and all puffins and laughing gulls nesting within Maine nest on islands where gull populations are actively managed.

#### *Strategies:*

- continue to conduct daily censuses of nesting and loafing gulls on all six managed islands.
- continue to dissuade nesting and loafing gulls by maintaining a human presence throughout the nesting season on all six managed islands; remove all gulls determined to be preying on the terns or alcids using lethal and non-lethal techniques as warranted. Techniques include harrassment, destruction of nests and eggs, shooting and limited use of avicides. Continue to monitor gull colony at Green Island to determine whether these birds are contributing to predation on Petit Manan Island.
- continue to cooperate with MDIFW and USGS in documenting presence and activities of color banded gulls on Petit Manan Island.

*Within 5 years of CCP implementation:*

- in HMP, include strategies to manage herring and black-backed gull populations consistent with objectives for other seabirds of concern.
- in HSIMP, include method of monitoring herring and black-backed gull populations to insure other objectives for seabirds of concern can be met.
- initiate gull control efforts on future restoration sites, on an as-needed basis.

**Objective 5.6 (Common Murre)**

Establish and sustain a nesting colony of common murre on Matinicus Rock to contribute to the conservation of natural seabird diversity in the Gulf of Maine.

*Background:* Although common murrens are known to breed throughout eastern Canada, no nesting attempts have been documented within Maine during the past century. However, records from the mid- 1800’s indicate that murrens did breed on at least one island in outer Penobscot Bay (Scott Hall NAS pers. com.). Like many other seabird species, the murre was nearly decimated by over-harvesting throughout much of the 20<sup>th</sup> century

(Gaston and Jones 1998). We will continue working with NAS to utilize social attraction equipment (sound system and decoys) to re-establish a murre nesting colony in Maine. At present, our efforts are focused on Matinicus Rock, but murre routinely visit Seal and Petit Manan islands and we are monitoring this activity. Unfortunately, efforts to encourage birds to establish nesting colonies outside their current breeding areas has proven to be more difficult than establishing a new colony within an already occupied region.

*Strategies:*

- continue to utilize “social attraction” methods in cooperation with National Audubon Society to attract common murrens to Matinicus Rock; sound system broadcasting murre calls and murre decoys are set up each nesting season in early May.
- continue to annually close alcid, tern, and storm-petrel nesting islands to public visitation between April 1 and August 31.
- continue to utilize seasonal staff to monitor common murre use of Refuge islands throughout the nesting season.

*Within 5 years of CCP implementation:*



*Murre decoys*  
USFWS photo



- in HMP, incorporate strategies to manage common murres and minimize threats to nesting habitat.
- in HSIMP, work with NAS to develop monitoring strategy for common murres.
- evaluate potential to set up social attraction equipment to encourage murres to nest on additional Refuge islands.

### **Objective 5.7 (Leach's Storm-Petrel)**

Within the context of MDIFW Species Assessment population goals (MDIFW 2000) maintain or increase the nesting populations of Leach's storm-petrels nesting on Refuge islands (using 2000 data as a baseline) and maintain a productivity level of 0.5 fledged chick/nesting pair.

*Background:* GOMSWG data indicates that Leach's storm-petrels are currently nesting on approximately 35 islands in Maine, with 17 of those islands being part of the Refuge. Within the United States, only two other breeding colonies are known to exist outside of the State of Maine (Penikese Island and Nomans Land Island NWR, Massachusetts) (MDIFW 1999).

Leach's storm-petrels are burrow-nesters and are active at the breeding colonies only during the evening hours, making surveys difficult. MDIFW Species Assessment for Leach's storm-petrel (1999) has identified the lack of offshore islands with suitable soil conditions for burrowing, predation, disturbance from human activities, and habitat degradation as the most important factors limiting distribution, abundance, and productivity of these seabirds.

#### *Strategies:*

- continue to cooperate with National Audubon Society to monitor burrow occupancy of Leach's storm-petrels on Matinicus Rock Island. Each spring during the nesting season, monitor all burrows within the established plots, including documentation of hatching success.
- continue to annually close alcid, tern, and storm-petrel nesting islands to public visitation between April 1 and August 31.

#### *Within 5 years of CCP implementation:*

- in HMP, incorporate strategies to manage for Leach's storm-petrel and minimize threats to nesting sites.
- initiate storm-petrel surveys on Refuge islands in conjunction with ongoing baseline biological inventories (Objective 3.6) and seabird surveys (Objective 5.9).
- in HSIMP, develop a standardized census methodology with GOMSWG members; specifically work with MDIFW to develop censusing protocol

for Leach's storm-petrel; also establish a program to monitor productivity for Leach's storm-petrel on Petit Manan and Seal islands.

- hire a Wildlife Biologist (GS 11; same position as Objective 5.3).

### **Objective 5.8 (Common Eider)**

Maintain or increase populations of nesting common eiders (using 2000 as the base year) on all Refuge islands, and continue participation in State and regional research and banding efforts

*Background:* In recent years, concern over the status of sea ducks has risen worldwide, and the Atlantic Northern Forest Bird Conservation Region (BCR) 14 has identified common eider as one of the highest priority waterbirds in the region. Compared to many other species of waterfowl, common eiders are characterized by delayed sexual maturity, small clutch size, low rates of annual recruitment, and high adult survival rates under normal conditions (MDIFW 1999). These characteristics make eiders particularly sensitive to environmental change or to factors influencing adult survival rates. Although many of the variables controlling eider survival and recruitment are not clearly understood, we do know that gull predation particularly that by great black-backed gulls, remains the major cause of mortality among eider ducklings. Research has shown that duckling survival rates are significantly higher in areas where gull numbers are controlled as part of our tern management program. Efforts by Maine Department of Inland Fisheries and Wildlife, U.S. Geological Survey, and the Refuge to investigate common eider survival and recruitment rates in the Gulf of Maine have begun to address these management concerns and research needs.

In recent years, the level of interest in commercial aquaculture development has increased significantly in Maine. In addition, the interest in commercial harvesting of the eiders major prey items: blue mussels, periwinkles, and green sea urchins has also increased in recent years. We do not have sufficient information to effectively evaluate the effects of these commercial activities on breeding, migratory, and wintering seabirds and waterfowl, including eiders.

*Strategies:*

- continue to annually close to public access the Refuge islands where only common eider and/or gulls are nesting during the period April 1 to July 31
- in cooperation with MDIFW and USGS, continue banding efforts to evaluate survival and recruitment rates, movement rates, and hunting mortality

- initiate standardized surveys of the breeding population that allows population trends to be monitored, but minimizes disturbance to the nesting females
- document significant seasonal distribution of eiders, particularly brood rearing and molting areas
- coordinate with partners in efforts to evaluate significance of commercial harvesting of resources from eider molting and wintering habitats
- coordinate with partners to determine effects of commercial aquaculture development on distribution and feeding rates of eiders.

### **Objective 5.9 (New Seabird Restoration Projects)**

Consistent with Regional seabird population and distribution goals, and Refuge expansion opportunities, increase nesting tern and alcid populations and improve their distribution in the Gulf of Maine by establishing six new seabird restoration projects on Refuge islands.

*Background:* Expanding gull populations and recent increases in both recreational and developmental pressures along the coast of Maine continue to limit the availability of suitable nesting seabird sites. Over 90% of common, Arctic, and roseate terns, and all laughing gulls and Atlantic puffins in Maine currently nest on nine managed (i.e., seasonally staffed) seabird managed islands. In addition, over 90% of Arctic terns in Maine nest on three Refuge islands (Petit Manan, Matinicus Rock, and Seal), 85% of all puffins in Maine nest on two Refuge islands (Seal and Matinicus Rock), and 95% of the endangered roseate terns in Maine nest on two non-Refuge islands (Eastern Egg Rock and Stratton).

The number and geographic distribution of occupied seabird nesting islands has decreased significantly from historic levels (USFWS 2000). The potential for a single catastrophic event to significantly affect Gulf of Maine seabird populations is enhanced by the formation of large concentrations of seabirds nesting on a limited number of islands.

Unfortunately, we have limited opportunities to expand our restoration program to other Refuge islands currently in Service ownership. Instead, we are looking to expand our intensive management and restoration program with future acquisitions. New management sites are selected utilizing criteria established in the Roseate Tern Recovery Plan (USFWS 1998) and the Regional Tern Management Plan (USFWS 2000). Management activities will also be consistent with MDIFW species assessments for common eiders (MDIFW 2000), Atlantic puffins and razorbills (MDIFW 1999), and Leach's storm-petrel (MDIFW 1999). Depending on the suitability of an island for supporting nesting alcids and terns, management efforts may be coordinated with those outlined in Objectives 5.1, 5.2, and 5.3.

*Strategies:*

*Within 5 years of CCP implementation:*

- evaluate current and future Refuge islands for suitability as restoration sites.
- develop at least one restoration plan per year for those islands with potential. Plans will include: predator control needs, staffing and equipment needs, logistical concerns, use of social attraction equipment, ability to increase geographic distribution of colonies, habitat alteration needs, and public use and access restrictions.
- initiate one seabird restoration project on a Refuge island, with subsequent projects initiated every two to three years thereafter. Increase the number of seasonal crews staffing the islands commensurate with the number of projects.
- establish the public access seasonal closures, similar to existing Refuge islands, from April 1 to August 31.
- update HMP and HSIMP as needed.
- coordinate all efforts on an annual basis with GOMSWG members.
- hire a Wildlife Biologist (GS 11; same position as Objective 5.3).
- hire a Marine Ecologist (GS 11; same position as Objective 4.2).
- purchase new boat (>20') to support management activities on coastal islands.

**Seabird Nesting Islands with No Active Restoration**

**Objective 5.10 (Seabirds)**

On the 25 Refuge seabird nesting islands without active seabird restoration projects, maintain nesting populations of common terns, razorbills, black guillemots, common eiders, great cormorants, double-crested cormorants, Leach's storm-petrels, and herring and black-backed gulls (using the 2000 survey season as a baseline) to contribute to state and regional population and distribution goals.

*Background:* Recent increases in both recreational and developmental use patterns of coastal islands have limited the number of islands that are suitable for nesting seabirds. Increasingly fewer opportunities exist for expanding seabird populations in the Gulf of Maine. Of the 3,500 islands along Maine's coast, seabirds currently utilize approximately 18% of these islands. Gull control efforts utilized by our staff and National Audubon Society are specifically focused on managed seabird islands. No efforts are made to control overall population levels of gulls on any other Refuge islands. Herring and great black-backed gulls contribute to the seabird diversity of the Gulf of Maine, and in fact, the presence of nesting gulls may be a significant reason for island acquisition.

In addition to the six seabird restoration islands currently within the Refuge, 25 additional Refuge islands provide nesting habitat for one or more species of seabird. These islands are infrequently visited by our staff, and statewide surveys have routinely been done by boat and aerial observation. A new survey protocol, initiated in 2001, will require that each seabird nesting island be visited, at a minimum, once every five years during the nesting season.

As previously noted, population and distribution goals for many of these species have been established by the Regional Tern Management Plan (USFWS 2000), the Roseate Tern Recovery Plan (USFWS 1998), and MDIFW Species Assessments for common eiders (MDIFW 2000), Atlantic puffins and razorbills (MDIFW 1999), and Leach's storm-petrels (MDIFW 1999).

*Strategies:*

- continue to annually close to public access the Refuge seabird nesting islands from April 1 and August 31. The only exception is those islands with only gull or eider nesting. These will be closed to public access from April 1 to July 31 to conform more closely to State island closures.
- continue to survey five Refuge islands each year using Refuge staff, contractors, or partners to determine whether active management is warranted to maintain suitable nesting habitat; work in cooperation with the National Audubon Society and other partners to develop plans; utilize proven habitat management techniques consistent with other Refuge management projects. Update HMP for the Refuge as needed.
- continue to coordinate all efforts with GOMSWG members on an annual basis.
- continue cooperation with the Mid-Atlantic/New England/Maritimes Waterbird Working Group (MANEM) in setting population objectives for the region.
- continue to coordinate with MDIFW and USGS in the common eider survival study.

*Within 5 years of CCP implementation:*

- develop a standardized census methodology with GOMSWG members; specifically, work with MDIFW to develop census protocol for Leach's storm-petrel.

**Objective 5.11 (Great Cormorant)**

Increase the number of great cormorants nesting within the Refuge (based on 2000 inventories) and maintain a productivity level of 1.0 chicks/pair in an effort to maintain seabird diversity within the Gulf of Maine.

*Background:* The Atlantic Northern Forest Bird Conservation Region (BCR) 14 identified the great cormorant as one of the highest priority waterbird species for this region. Current information indicates that 80%

of the North American population of great cormorants nests within this BCR. The total North American population of great cormorants is estimated at 11,600 pairs (Kushlan et.al. 2002). Although only 192 pairs of great cormorants nested in Maine in 2002, they represent the southern extreme of their breeding range. Within Maine, the birds nest on six islands, two are within the refuge; Little Roberts and Seal islands. To date, little information regarding factors that may be limiting population growth are available for Maine.

*Strategies:*

- continue to annually close seabird nesting islands to public visitation between April 1 and August 31.

*Within 5 years of CCP implementation:*

- in cooperation with NAS, MDIFW, and contractors initiate annual surveys of breeding colonies to determine population status and productivity rates for each colony.
- in conjunction with winter waterfowl and purple sandpiper surveys, monitor Refuge islands and adjacent waters for wintering great cormorants.
- in HSIMP, include strategies for monitoring great cormorants.

**Goal 6: Provide Enjoyment and Promote Stewardship of Coastal Maine Wildlife and their Habitats by Providing Priority, Wildlife-Dependent Recreational and Educational Opportunities**

**Objective 6.1 (Environmental Education)**

Within 5 years of CCP approval, 25% of school children within 15 miles of each Refuge office will participate in a Refuge environmental education program each year and will identify an action to undertake in their own community to support wildlife conservation.

*Background:* Environmental education is one of the six priority public uses designated by the Refuge System Improvement Act of 1997. The other five priority uses are hunting, fishing, wildlife observation and photography, and environmental interpretation. These six uses are to receive enhanced consideration in refuge planning and opportunities to engage in these activities should be provided to the extent compatible with Refuge goals and objectives. Educating young people about the significance of Maine's coastal nesting islands and the Service's management efforts will foster an appreciation of wildlife conservation and encourage them to make responsible environmental decisions in the future.

We currently have no curriculum-based environmental education program to offer local schools, but would accomplish this in the future through programs offered at the education facility described below. In addition, we would continue to support teachers who wish to lead on-site programs. We would also continue to support the National Audubon Society and Damariscotta River Association's classroom environmental education programs, while ensuring the Service's messages on conservation are

shared. In addition, we would continue our partnership with the Chewonki Foundation and Hurricane Island Outward Bound School, who have established environmental education programs. We continue to issue a Special Use Permit to the Humboldt Research Station (formerly Eagle Hill Institute) for an “outdoor laboratory” on Refuge lands.

We describe in detail the need to work with partners for a mid-coast education center on the mainland in Chapter 3. In summary, this need is based on the fact that half of the Refuge’s acreage is on offshore islands, inaccessible to most visitors, except a few islands which are seasonally accessed by tour boats or kayak. These offshore islands are fragile and vulnerable to human use, yet they are globally significant habitats. A mid-coast education center could reach many of the 5.4 million travelers passing through Rockland on U.S. Route 1 each year (MDOT, 2000). It will offer an opportunity for people to learn about these significant habitats, the unique species they support, and our seabird research, management, and restoration goals. The development of this center will dramatically increase our ability to conduct environmental education programs to larger and more diverse audiences. In addition, it could also serve as a focal point for our outreach and interpretive programs. We have developed a Project Identification Document (June 2002) which describes our concept of this center. We are working with National and Maine Audubon to refine this concept and will further explore partnerships as new ideas and opportunities develop.

A goal of our proposed environmental education program is to get young people to take action in their own communities and to provide them with a foundation for making informed decisions affecting natural resources.

With approximately 9,000 students within 15 miles of both Refuge offices, our environmental education programs could reach at least 2,250 students each year.

*Strategies:*

*Within 5 years of CCP implementation:*

- hire one additional Outdoor Recreation Planner (GS-11) to plan, implement, monitor, and evaluate environmental education programs, and other Refuge public use programs. Within one year of hire, develop a monitoring and evaluation protocol to insure Refuge environmental education program is meeting objectives.
- complete a Visitor Service’s Plan for the Refuge incorporating strategies identified herein; establish thresholds of acceptable change to resources resulting from public use;



*Environmental education*  
USFWS photo

develop monitoring strategies to measure changes and to measure achievement of objective, and to evaluate visitor experiences. Modify or restrict access, or adapt management strategies as warranted.

- Evaluate opportunities to provide access on select islands during the nesting season for educational purposes
- establish partnerships with other conservation organizations and schools to conduct field-based environmental education in the Rockland area.
- develop hands-on environmental education activities for teachers to use in classrooms; consider an interactive, computer-based environmental education program about the Refuge and seabird management.
- conduct special environmental education events involving schools to celebrate International Migratory Bird Day and National Wildlife Refuge Week.
- implement annual monitoring protocol to evaluate the quality of the environmental education program.
- hold at least one “Teach the Teacher” workshop annually in the Milbridge area.
- utilize Partners In Flight plans for ideas to incorporate into environmental education programs related to migratory landbird conservation.
- develop an environmental education video about seabird restoration and management for use in the visitor center and schools.
- establish a partnership with NPS, Acadia National Park’s Schoodic facility, to participate in managing a Learning Center which will provide opportunities for Refuge staff to live and work on-site with NPS and other conservation groups.
- create an internship program in conjunction with Unity College or other institutions. Students in the program will work at the Coastal Education Center for a semester. Seek housing for interns and volunteers.
- develop at least one on-site, teacher-led environmental education program on a mainland division.
- in partnership with NAS and ME Audubon, finalize concept and design for a Refuge coastal education center in the mid-coast area along Route 1 that will provide interactive exhibits and staff- and volunteer-led environmental education programs.

### **Objective 6.2 (Environmental Interpretation)**

Within 5 years of CCP approval, 90% of Refuge visitors will be able to name the Service as the agency managing the Refuge and will be able to identify at least one important Refuge habitat type and relate its significance to migratory birds and other native wildlife.



*Background:* Environmental interpretation is a priority public use identified in the 1997 Refuge Improvement Act and is one of the most important ways we can raise our visibility, convey our mission, and identify the significant contribution the Refuge makes to wildlife conservation. Public understanding of the Service and its activities in the state of Maine is currently very low. Refuge visitors often confuse our agency with the MDIFW. Many are unaware of the Refuge System and its scope, and most do not understand the importance of the Refuge in the conservation of migratory birds.

Our proposed future programs will achieve our objectives through increased visitor contacts, on-site programs, and new and improved infrastructure. We want people to recognize that the Refuge has a priority to manage a variety of habitats to benefit migratory birds, with particular emphasis on restoring colonies of nesting seabirds. Through an expanded interpretive program, visitors will gain a better understanding of the unique and important contribution of this Refuge to migratory birds. Maps 2-5 to 2-8 depict new infrastructure to support this program.

*Strategies:*

- continue to allow all trails to remain open to foot traffic only, including snow shoes and cross country skis; however, no bicycles, horses, or ATVs would be allowed.

*Within 5 years of CCP implementation:*

- complete a Visitor Service's Plan for the Refuge incorporating strategies identified herein; establish thresholds of acceptable change to resources resulting from public use; develop monitoring strategies to measure change, measure achievement of objective, and to evaluate visitor experiences. Modify or restrict access, or adapt management strategies as warranted.
- develop interpretive signs for Halifax Island focusing on the rare plant community.
- install information kiosks outside of Refuge Headquarters and satellite offices
- hire one additional Outdoor Recreation Planner (GS-9) to plan, implement, monitor, and evaluate environmental interpretive programs, and other Refuge public use programs. This position will be used in other public use programs. Within one year of hire, develop a monitoring and evaluation protocol to insure Refuge interpretive program is meeting objectives to plan and implement programs.
- hire a summer intern to conduct interpretive programs for the mainland units; this position will also assist environmental education program. Seek housing for interns and volunteers.

- utilize Partners In Flight Plans for ideas to incorporate into interpretive programs related to migratory landbird conservation.
- enhance interpretation on Birch Point Trail on the Petit Manan Point Division, including interpretive overlook and interpretive panels at Carrying Place Cove; move the interpretive panels on the Hollingsworth Memorial Trail to a location less intrusive on the viewshed.
- construct low-impact interpretive trails and overlooks at the Gouldsboro Bay and Sawyers Marsh divisions, and at Corea Heath once acquired by the Service.
- develop a Refuge video, fact sheets, and brochures for use at on-refuge and off-refuge events.
- install Refuge interpretive panels at three coastal Maine roadside rest areas.
- in partnership with NAS and others, finalize concept and design for a Refuge coastal education center in the mid-coast area along Route 1 that will provide interactive exhibits and staff- and volunteer-led environmental education programs.
- hire two maintenance workers to help with public use facilities and other Refuge programs as needed.
- create an internship program in conjunction with Unity College or other institutions whereby students will work at the Coastal Education Center for a semester. Seek housing for interns and volunteers.

**Objective 6.3 (Environmental Interpretation - Commercial Tours)**

Within 3 years of CCP approval, 90% of the patrons who go on a commercial, Maine-based, seabird-tour boat excursion to a Refuge island will understand the value of Maine’s coastal islands for nesting seabirds and be able to identify the Refuge’s role in seabird conservation at the conclusion of their trip.

*Background:* Approximately 25,000 people annually take commercial seabird tour boat excursions from Bar Harbor, Maine past the Refuge’s Petit Manan Island. The Bar Harbor-based companies typically hire on-board naturalists to provide information about the natural history of seabirds and associated management and restoration projects. Since the boats do not land, they provide a unique opportunity for many people to observe and photograph seabirds without disturbing them. Our staff provides updated information weekly



Visitors touring Machias Seal Island  
USFWS photo

about the Petit Manan Island seabird colony to the tour companies. In the spring and summer, staff periodically go on tours to monitor the accuracy of presentations.

In addition to Bar Harbor, two other smaller operators are based in Jonesport and Cutler and take approximately 2,000 patrons annually to Machias Seal Island. These boats land on the island and patrons are allowed to view nesting seabirds through blinds.

In the future, we would like to increase the visibility of the Service and promote our conservation efforts through more direct involvement in these commercial operations. Below we propose to place interpreters on each tour boat viewing Refuge resources.

*Strategies:*

*Within 5 years of CCP implementation:*

- complete a Visitor Service's Plan for the Refuge incorporating strategies identified herein; develop monitoring strategies to evaluate visitor experiences, and to measure achievement of objective. Adapt management strategies as warranted.
- annually meet with tour boat operators with destinations to Refuge islands to provide information on the Service, the Refuge and its management purposes. Continue to provide the operators with updates on nesting status throughout the season.
- place interpretive panels about the Refuge and seabird conservation in tour boat operator's offices or launch sites and on the tour boats.
- hire enough summer interns or volunteers to regularly work as interpreters on tour boats viewing Refuge resources; seek challenge grants as possible funding source. Also, seek housing for interns and volunteers.
- develop method of surveying tour boat patrons at the end of their tour to determine if our objective is met; look for partners to help with surveys.

**Objective 6.4 (Hunting)**

Provide an expanded, high quality hunting program in which 80% of Refuge visitors, both hunters and non-hunters, will report having had a positive experience on the Refuge during any hunting season.

*Background:* In May 2001, we issued a final Refuge Hunt Plan and environmental assessment after a 30 day public review and comment period. These documents resulted in approval to open up portions of the Refuge to hunting for the first time since in Service ownership. With our hunt program, we intend to: 1) maintain a diversity of habitats within the Refuge that are capable of supporting a diversity and abundance of wildlife species, and 2) provide wildlife-dependent recreational opportunities. We

recognize hunting as a healthy, traditional, outdoor pastime that is deeply rooted in American heritage and, when managed appropriately, can instill a unique understanding and appreciation of wildlife, their behavior, and their habitat needs. It is also a priority public use on national wildlife refuges, where compatible, as stipulated in law.

The Refuge Hunt program was first implemented during the 2001-2002 State seasons. The Gouldsboro Bay and Sawyer's Marsh divisions are open to migratory game bird and waterfowl and small and big game hunting. Bois Bubert Island is open to white-tailed deer hunting only. Twenty-two additional Refuge islands are open to migratory waterfowl hunting.

The Petit Manan Point Division was not opened to any hunting under this 2001 hunt plan, but our proposal under this alternative is to open this division, above the entrance road in the Birch Point trail area, to: 1) hunters with disabilities during the regular rifle season, and 2) hunters of all abilities during the regular muzzle-loader season. This change is in response to MDIFW's request for the additional hunting opportunity and Service direction to accommodate high priority recreational opportunities on NWRs where compatible.

According to the draft policy on hunting on national wildlife refuges, issued in the January 16, 2001 Federal Register, a quality hunting experience is one that: 1) maximizes safety for hunters and other visitors; 2) encourages the highest standards of ethical behavior in taking or attempting to take wildlife; 3) is available to a broad spectrum of the hunting public; 4) contributes positively to or has no adverse effect on population management of resident or migratory species; 5) reflects positively on the individual refuge, the System, and the Service; 6) provides hunters uncrowded conditions by minimizing conflicts and competition among hunters; 7) provides reasonable challenges and opportunities for taking targeted species under the described harvest objective established by the hunting program; 8) minimizes the reliance on motorized vehicles and technology designed to increase the advantage of the hunter over wildlife; 9) minimizes habitat impacts; 10) creates minimal conflict with other priority wildlife-dependent recreational uses or Refuge operations; and 11) incorporates a message of stewardship and conservation in hunting opportunities. These are all criteria we will use to evaluate our hunt program.



*White-tailed deer on Petit Manan Point Division*  
Photo by Craig Snapp

#### *Strategies:*

- continue policy that all trails open to hunting will remain open to foot traffic only; no bicycles, horses, or ATVs will be allowed.

- continue to allow dogs off leash only to facilitate the hunt effort and only under control of the hunter at all times. This would include flushing, pointing, and retrieving dogs.
- continue to annually conduct patrols of Refuge lands, both open and closed to hunting.
- continue to annually review the Refuge Hunt Plan and institute changes as appropriate.

*Within 5 years of CCP implementation:*

- complete a Visitor Service's Plan for the Refuge incorporating strategies identified herein; establish thresholds of acceptable change to resources resulting from hunt program; develop monitoring strategies to measure resource change, measure achievement of objective, and evaluate visitor experiences. Modify or restrict access, or adapt management strategies as warranted.
- annually hold at least one hunter orientation program on the Refuge or in local communities.
- within 1 year of CCP approval, open Petit Manan Point to the following deer hunting opportunity: a) hunters with disabilities during the regular rifle season, and 2) hunters of all abilities during the regular muzzle-loader season. Modify the existing hunt plan to incorporate this change.
- produce a Refuge hunting brochure, including Refuge regulations and maps.
- establish a monitoring protocol for evaluating the quality of experience for hunters and non-hunters during various hunting seasons.
- hire GS-7 and GS-9 law enforcement officers to help administer the program and conduct visitor outreach.

**Objective 6.5 (Wildlife Observation and Photography on Mainland Divisions)**

Within 5 years of CCP approval, create and enhance opportunities for high quality wildlife observation and photography on the Refuge mainland divisions, while insuring that 80% of adult visitors report they will return to the Refuge because it represents to them an ideal natural environment within which to observe and photograph wildlife (Maps 2-5 to 2-8).

*Background:* Wildlife observation and photography are two of six priority public uses designated by the Refuge System Improvement Act of 1997. The other four priority uses are hunting, fishing, and environmental education and interpretation. These six uses are to receive enhanced consideration in refuge planning and opportunities to engage in these activities should be provided to the extent compatible with Refuge goals and objectives.

We believe we can improve our existing programs and create new, high-quality opportunities for wildlife observation and photography on our

mainland divisions. We currently maintain two foot trails: the Hollingsworth Memorial Trail (1.5 miles roundtrip) and the Birch Point Trail (4.0 miles roundtrip). Both trails are on the Petit Manan Point Division and are open year round. The John Hollingsworth Memorial Trail has parking for approximately eight cars; the Birch Point Trail has parking for approximately



*A visitor on the Birch Point Trail, Petit Manan Point Division*  
USFWS photo

approximately 10 cars. There are many times during summer when the parking lots are full. We are currently monitoring trail and road usage on Petit Manan Point using volunteers, interns, and counting machines. During 2001, approximately 19,000 people visited the area. Our current program also allows commercial photographers access to Refuge lands, which are otherwise closed to public access, under individual special use permits. The only fully accessible facility on the Refuge is an informational kiosk on the main access road to Petit Manan Point.

Under this alternative we are proposing to develop a wildlife observation, photography, and interpretative trail on each of the mainland divisions.

*Strategies:*

- continue policy that all trails will remain open from sunrise to sunset, to foot traffic only, including snowshoeing and cross country skiing; no bicycles, horses, or ATVs will be allowed. The only vehicle access is on Petit Manan Road, Petit Manan Point Division.
- continue to allow commercial filming and photography on the Refuge only when there is a direct benefit to the Refuge and/or the Service. All allowed commercial filming and photography will operate under a special use permit once determined compatible by the Refuge Manager.

*Within 5 years of CCP implementation:*

- complete a Visitor Service's Plan for the Refuge incorporating strategies identified herein; establish thresholds of acceptable change to resources resulting from public use; develop monitoring strategies to measure change, measure achievement of objective, and evaluate visitor experiences. Modify or restrict access, or adapt management strategies as warranted.
- Move the signs near Chair Pond on the Hollingsworth Memorial Trail to a location that is less imposing on the viewshed.
- construct a parking area and wildlife observation and photography trail on the Gouldsboro Bay Division.

- construct a parking area and accessible trail with overlook on the Sawyers Marsh Division.
- construct one barrier-free trail and observation platform at Corea Heath Division. Trail will occur on existing raised road foot print and be approximately 1,000 ft in length.
- hire GS-7 and GS-9 law enforcement officers to help administer the program and conduct visitor outreach (same positions as Objective 6.4).

### **Objective 6.6 (Public Access on Refuge Islands)**

With primary consideration to wildlife protection and public safety, allow access to Refuge islands so visitors can observe and photograph these unique, natural landscapes. Within 3 years of CCP approval, at least 90% of island visitors contacted can explain, and fully support, the purpose of access restrictions, and further support island conservation by conducting themselves according to “Leave No Trace” principles.

*Background: Background:* Our primary responsibility is to protect wildlife and promote wildlife conservation. To this end, some sensitive areas require us to restrict public access to minimize disturbance to wildlife, especially during the nesting season. The Refuge’s seabird nesting islands are closed to public use and access from April 1 to August 31 each year. The only exception to these dates is on islands where only gulls or eiders are nesting. The closure period on those islands is April 1 to July 31, which more closely conforms to State closure periods. On active bald eagle nesting islands, the closure period is February 15 to August 31 each year. Historic bald eagle nesting islands, which are not currently active, will have a closure period from February 15 to May 15 to encourage nesting. If no bald eagle activity is observed by May 15, the island will be opened to public use and access. If bald eagle activity is observed, the island will remain closed until August 31. As new islands are acquired by the Service, or new biological information is obtained on current Refuge islands, the closure periods will be modified to conform to the respective dates noted above.

Most of Halifax Island is closed to protect botanical resources. Seal Island is closed to all public use due to unexploded ordnance. Cross, Scotch, Bois Bubert, and the remainder of Halifax Island are open to public use year round. In addition, camping is allowed in designated areas on Bois Bubert and Halifax islands as part of the Maine Islands Trail Association (MITA) trail system. Unfortunately, we do not currently have a systematic and objective way to measure impacts to island resources. We would like to work with MITA and other partners to establish thresholds on what is acceptable change to resources and when should restrictions or mitigation measures be imposed to reverse unacceptable change before it's too late.

We utilize interns to help manage potential visitors trying to land on a seabird island during the nesting season. They alert visitors to the closure regulations and discourage them from disembarking.



*Freshwater pond on Bois Bubert Island*  
USFWS photo

Notwithstanding these restrictions, we encourage visitors to engage in compatible, priority public uses on Refuge islands to gain an appreciation of their beauty and significance to migratory birds. Although rugged in appearance, Maine's offshore islands are delicate ecosystems. "Leave No Trace" is a nationally recognized curriculum of outdoor ethics that promotes mindful use of recreational lands. We will encourage visitors to use Leave No Trace principles by promoting them during visitor encounters and through Refuge literature and outreach information.

*Strategies:*

- continue to annually evaluate island access restrictions, and considering new information, modify as necessary to protect sensitive areas or species of management concern.
- continue to work with MITA, under a special use permit, to manage the camping on two islands; no expansion of camping opportunities would occur.

*Within 5 years of CCP implementation:*

- insure interpretive and regulatory signs are posted on all Refuge islands with restrictions.
- develop Refuge criteria or guidance on appropriate protective measures required for visitation to the Refuge's nesting islands within 2 years of CCP approval, in conjunction with the Visitor Services plan. Also, evaluate whether opportunities exist for education programs on a limited number of nesting islands during the nesting season.
- meet with MITA two to three times per year to discuss the Island Stewardship Program on Refuge islands open to day use.
- train all Refuge staff members in "Leave No Trace" principles.
- hire GS-7 and GS-9 law enforcement officers to help administer the program and conduct visitor outreach (same positions as Objective 6.4).
- work with MITA, ME Bureau of Parks and Lands, and other partners to design and implement a monitoring protocol to establish thresholds of acceptable change on both day use and camping islands to prevent unacceptable, irretrievable damage from occurring to resources. Such things as vegetation and soil erosion both inside and outside of designated camping sites would be monitored on a regular basis. Also develop protocol to measure "Leave No Trace" compliance.
- establish an Island Stewardship Program on at least five Refuge islands to help monitor public use and associated effects on wildlife and



habitats. Existing informal stewardship programs with local land trusts for Little Thrumcap, Outer White, and Roberts Islands should be formalized.

- develop a Refuge brochure about colonial nesting seabirds and the importance of the use of “Leave No Trace” principles when visiting the islands.
- as new islands are acquired by the Refuge (see Goal 7, Objective 7.1), priority compatible uses would generally be allowed consistent with seasonal restrictions during the nesting season, unless there are overriding resource concerns. Existing compatibility determinations will be amended accordingly.

**Goal 7: Protect the Integrity of Coastal Maine Wildlife and Habitats through an Active Land Acquisition and Protection Program, and through Special Land Designations**

**Objective 7.1 (Service Island Acquisition)**

To insure the permanent protection of important Maine coastal island habitats, during the 15-year life of this CCP, the Service will pursue acquisition, from willing sellers, of an additional 87 nationally significant coastal nesting islands, which currently lack permanent protection (see Table 2-2, Table 2-3, and the Land Protection Plan, Appendix A).

*Background:* We described in Chapter 1 how we have worked with the Service’s GOMP, MDIFW, MCHT, and our other land conservation partners to develop a “nationally significant coastal nesting islands” list for coastal Maine. Three hundred and seventy-seven (377) islands are currently on the list; 226 of these are already protected long-term (GOMP, December 10, 2001). The remaining 151 islands are still in need of permanent protection. The ultimate goal among all partners is to achieve permanent protection for these 151 islands, and to manage them as needed to insure the long-term nesting success of species of management concern.

The Service can contribute to this goal best through acquisition, especially for those islands that need active management for Federal trust species. We have determined that, based on our rate of acquiring Maine coastal islands since 1993, 87 islands is a reasonable and practical 15-year objective for the Service. Eighty-seven is based on assuming an average acquisition rate of approximately six islands/year for the 15-year planning period. This seemed reasonable to us based on the fact the Service has acquired up to 12 islands/year (1995), and has twice acquired more than 6 islands/year. As such, 6 islands represents the mid-point in the range of the historic acquisition rate; from a maximum of 12 to a minimum of 0 in any given year. The Service would consider fee simple acquisition, purchase of conservation easements, acceptance of land donations, land transfers or exchanges, as methods of acquisition from willing sellers.

Since no single partner, including the Service, has the resources to achieve the 151 island protection goal single-handedly, this goal necessitates a strong land protection partnership. As an individual island becomes avail-

able for sale from a willing seller, the Service and its coalition of island protection partners determines which partner, through ownership, could best serve the long-term protection of the respective island. The island's specific resources of significance (e.g. seabirds, bald eagles, wading birds, or the endangered roseate tern), the level of management or restoration required, its proximity to other partner-owned islands, current owner preferences, timing, and availability of financial and administrative resources are all considered when determining the recommendation for ownership.

In developing this alternative, we have identified which 87 unprotected nationally significant coastal nesting islands we believe, given current resource information and consideration of the factors above, should be in Service ownership (Table 2-2 and Appendix A). It is important to recognize that there may be a need to reconsider individual islands as new information becomes available. In the future, any island being considered for Service acquisition that is not on the Appendix A list may require additional NEPA compliance documentation.

While our principal mission in acquiring these islands is the protection of Federal trust wildlife resources, there are other important resources on the islands identified, such as cultural and historical resources. It is not the Service's intent to acquire historic structures, such as lighthouses, which may occur on these islands unless it is essential to secure the protection and management of wildlife resources. If possible, the preference is to seek partners willing to undertake responsibility for the management and protection of these resources.

*Strategies:*

- continue to acquire private lands on islands from willing sellers within currently approved acquisition boundary; 25 tracts on 14 islands (347.5 acres). All lands acquired would become part of Petit Manan Refuge.
- continue to participate in annual coordination with the Gulf of Maine island protection partners including: GOMP, MDIFW, TNC, MCHT, local land trusts, and private landowners.
- continue to work annually with GOMP to insure nationally significant island list is updated.
- once approved, begin to implement the Land Protection Plan (LPP) for the Refuge (Appendix A), authorizing acquisition of 87 islands (approximately 2,306.4 acres) from willing sellers.

**Objective 7.2 (Cooperative Protection and Management of Islands)**

Support the efforts of our land conservation partners in protecting and managing the other 64 nationally significant coastal nesting islands, as well as all other islands supporting Federal trust species not permanently

protected, and not proposed for Service acquisition in the Land Protection Plan.

*Background:* As noted above under the Background for Objective 7.1, all 151 islands are nationally significant and the goal is to seek permanent protection for each one. Protection of nationally significant Maine coastal islands has always been a partnership effort, and would continue to be so. We would continue to play a role in identifying the most important islands for Federal trust resources. Under this alternative, the Service would not be acquiring all the islands considered nationally significant. It would be our hope that our partners would take the lead in acquiring whatever rights are needed to permanently protect the 64 islands and all other islands important to Federal trust species. However, within the limits of our funding and staffing, we would also be willing to share in management of these islands. Cooperative management agreements with conservation landowners are one tool to achieve resource objectives on many islands where the owner “can’t do it all.” An agreement may involve the Service helping to manage public use, or providing signage, conducting banding for long term monitoring, or doing periodic habitat manipulations. Each agreement would need to be specific to the island.

Strategies:

- continue to participate in annual coordination with the Gulf of Maine island protection partners including: Service’s GOMP, MDIFW, TNC, MCHT, local land trusts, and private landowners.
- continue to work with Service’s GOMP to insure the nationally significant island list is updated.
- on a case-by-case basis, continue to consider cooperative management agreements with other ownerships where protection of Federal trust resources is a priority.

### **Objective 7.3 (Service Mainland Acquisition and Protection)**

Within the established Maine Wetlands Protection Coalition Team framework, each year continue to identify and pursue long-term protection of Maine coastal properties important for Federal trust resources conservation.

*Background:* The Refuge has for many years worked in cooperation with conservation partners on mainland acquisition and protection of important habitats in coastal Maine. Partners such as MDIFW, Maine Coast Heritage Trust, and the Service’s Gulf of Maine Program meet periodically to discuss opportunities to protect important wildlife habitats on the mainland. Included in this partnership is the Maine Wetlands Protection Coalition Team effort, which was convened to implement the North American Waterfowl Management Plan. With MDIFW as the lead agency, this interagency team is developing regional protection plans which will identify and prioritize biologically significant wetlands within each region

in need of long-term protection. The team is currently evaluating the mainland coast nearest the mainland divisions. Once a regional plan is developed, we will work with the team to determine which properties contain Federal trust resources and are best served under Service ownership.

Over the years, many landowners have expressed interest in selling their land to the Service. In fact, over the last 25 years, landowners have willingly sold several thousand acres, resulting in our three mainland divisions in the Towns of Milbridge, Steuben, and Gouldsboro. A fourth division, Corea Heath, comprised of 400 acres in the Town of Gouldsboro is in the process of being transferred to the Service from the Department of the Navy (U.S. Navy). Since 2000, we have been working with the U.S. Navy, the Town of Gouldsboro, and Congressional staffers to protect this undeveloped area of heathland, an ecologically significant bog community. An additional 57-acre developed area would be transferred to a state or municipal entity.

This alternative would include Service acquisition of 119.6 acres of private inholdings in 3 tracts already approved for acquisition, and an expansion of 153.3 mainland acres. The expansion acres include a 3.3 private tract in our Gouldsboro Bay Division and a 150 acre area known as “Sprague Neck” in the Town of Cutler on Machias Bay. Sprague Neck is a priority protection area under the Atlantic Coast Joint Venture Plan and has been identified by MDIFW and our GOMP as a significant habitat for migrating shorebirds. Sprague Neck is currently U.S. Navy property, and we would pursue acquisition via a no-cost transfer.

*Strategies:*

- continue to acquire 120 acres of private lands within the currently approved Refuge boundary on the mainland divisions; two tracts on Petit Manan Pt and one on Sawyers Marsh. All lands acquired would become part of Petit Manan Refuge.
- once approved, begin to implement the LPP for Petit Manan Refuge (Appendix A), authorizing an expansion of 153.3 acres of significant Federal trust resources habitat, when willing sellers become available.
- beginning in 2005, Refuge staff will participate on the interagency Maine Wetlands Protection Coalition Team. We expect this team may develop a plan within 3 years of CCP approval. Pursue contacts with landowners to establish willingness to sell. These lands are not covered by the LPP and approval would require additional environmental analysis and compliance documentation.
- Until the Wetlands Protection Coalition Team plan is completed, and/or considering significant habitats other than wetlands, continue to cooperate with the Service’s GOMP, MDIFW, TNC, MCHT, local land

trusts, and private landowners to seek a means of protection when parcels become available. Consider acquisition of these properties on a case-by-case basis if the partnership determines that protection is best served by Service ownership. These lands are not covered by the LPP and approval would require additional environmental analysis and compliance documentation. Pursue Service fee acquisition or conservation easements of these lands as warranted by approvals.

#### **Objective 7.4 (Local Support for Service Land Acquisition)**

To develop local support for continued Refuge expansion, within 5 years of CCP approval, contact each affected town's elected officials to share information on the benefits of refuge lands to their community.

*Background:* Our desire is to be considered a welcomed and appreciated asset to the local communities within which refuge lands occur. We recognize that some residents and elected officials are concerned with the impact refuge lands has on the local tax base since the Service does not pay property taxes. On the other hand, since 1935, the Service has made annual refuge revenue sharing payments to affected towns based on an annual allocation formula determined by Congress. This amount can sometimes equal or exceed the amount of tax revenue that would have been collected if in private ownership.

We believe most residents view the presence of refuge lands in their community as positive. By maintaining natural landscapes, we are affording opportunities for residents to enjoy nature and observe wildlife. We also promote this enjoyment through outreach, environmental education and interpretive programs. Local communities can also benefit when a refuge draws visitors who spend money at local businesses. We would like to promote these benefits to enhance our support by local residents.

*Strategies:*

*Within 5 years of CCP implementation:*

- each year, with distribution of refuge revenue sharing payments, staff will make personal contacts with respective local elected town officials to discuss benefits of refuge lands and land acquisition opportunities.
- each year, contact community officials in towns where Service land acquisition is approved to provide information on the Refuge System, and the values of refuge lands in their community.
- each year, make periodic contacts with local community leaders, such as chambers of commerce, bed and breakfast associations, the Down East Corridor Association, service clubs and organizations to promote the benefits of refuge lands and our land acquisition program.
- each year, meet with the Star Island Corporation to update them on Refuge programs and management projects on Smuttynose Island.

- each year, meet with members of the Damariscotta River Association and Boothbay Region Land Trust to update them on Refuge programs in the mid-coast area.

### **Objective 7.5 (Wilderness Designation)**

Recommend wilderness designation for 13 Refuge islands in 8 Wilderness Study Areas and manage these islands to retain their wilderness character and values consistent with refuge establishment purposes and the Refuge System mission.

*Background:* The Service's Refuge System Planning Policy requires that a wilderness review be conducted concurrent with the CCP process. During 2001, we initiated a wilderness review of existing Refuge lands. The review process consists of three phases: inventory, study, and recommendation. Our wilderness review process and maps of the Wilderness Study Areas (WSAs) are presented in detail in Appendix D.

To summarize, the inventory phase took a broad look at existing Refuge lands to identify lands and waters that meet the minimum criteria for wilderness, as defined in section 2(c) of the Wilderness Act (16 U.S.C. 1131-1136). The criteria used are size, naturalness, opportunities for solitude or primitive recreation, and supplemental values. Areas that meet these criteria are defined as WSAs. We determined 13 islands met the minimum criteria. We combined these 13 islands into 8 WSAs. The boundaries around these WSAs are defined by the high water mark, and exclude private inholdings and rights-of-way on Cross and Bois Bubert islands, and the common boat landing and Lily Pond on Bois Bubert Island (Appendix D).

In the study phase, we evaluated whether we could manage these 8 WSAs, individually and collectively, over the long-term to maintain the quality of their wilderness values and character without compromising our ability to meet refuge purposes and the Refuge System mission. We specifically evaluated the impacts wilderness designation would have on our current or planned refuge management activities and refuge uses, including allowed public use and access. No impacts were identified. We also considered the potential impacts to the wilderness resources from off-site activities such as tour boat operations, commercial and recreational fishing, aquaculture facilities, and intertidal harvesting activities, and do not believe the current levels of activity and facility developments diminish wilderness character in the 8 WSAs. We also do not anticipate that wilderness designation would cause any restrictions on current levels of these uses.

In this alternative, we would recommend all 8 WSAs for designation as wilderness in the final CCP. As part of this recommendation, if the exclusions noted above are acquired by the Service, we propose to incorporate them into the respective WSA or designated wilderness, through administrative action.

This wilderness recommendation would be a preliminary administrative determination that will receive further review and possible modification by the Director. If approved, we would forward our recommendations from the Director, through the Secretary and the President, to Congress in a wilderness study report. Congress has reserved the authority to make the final decisions on wilderness designation.

Insofar as it does not impact our ability to meet refuge purposes, and the Refuge System mission as outlined in the 1997 National Wildlife Refuge System Improvement Act, we would manage the WSAs in accordance with management direction in the final CCP and maintain the islands' wilderness character, natural values, and outstanding opportunities for solitude and primitive recreation. This direction would remain in place until Congress makes a final determination on their addition into the National Wilderness Preservation System (NWPS), or unless we obtain information that warrants a modification to the recommendation. If a modification is necessary, we would amend the final CCP to change or remove the wilderness recommendation.

*Strategies:*

*Within 5 years of CCP implementation:*

- evaluate all planned and future proposed Service activities, projects, or new uses in the WSAs for their potential to directly, indirectly, or cumulatively impact the wilderness values and character. We will conduct a “minimum requirement analysis” (MRA) for each activity to assess potential impacts and identify mitigating measures to protect wilderness character.
- allow, in general, activities that involve temporary uses that create no new surface disturbance and do not involve placement of permanent structures.
- once formal designation occurs, within two years, develop a wilderness stewardship plan (WSP) as a step-down plan. The WSP will identify goals, objectives, and stewardship strategies for wilderness areas based on refuge purposes, the Refuge System mission, and wilderness stewardship principles.
- evaluate all future Refuge acquisitions for their wilderness potential concurrent with the next required revision of the CCP.

**Objective 7.6 (Special Designation for Corea Heath Division)**

Within 5 years of CCP approval, evaluate the Corea Heath Division for its potential as a Research Natural Area or other special area designation.

*Background:* Numerous studies have identified Corea Heath as an exemplary coastal plateau bog ecosystem (e.g. Worley, 1980; Glanz and Connery, 1998). It is best described as a clearly raised, essentially treeless, coastal

peatland with some rare and unique coastal vegetation. This peatland is designated as a Maine Critical Area because it is one of the largest and most southerly coastal raised peatlands in North America, and because its unique concentric arc pattern of vegetation is rare in the coastal region (Worley 1980). It was formerly a U.S. Navy electronics facility and public use was not allowed. The limited construction that occurred, and the restricted access, has resulted in very little disturbance to the peatland. Since drainage patterns appear unaltered, and since the peat deposit seems intact, the site offers a significant opportunity to study this unique ecosystem.

*Strategies:*

*Within 5 years of CCP implementation:*

- review special designations within Service's authority to determine if the Core Heath Division qualifies; pursue designation according to Service policy as warranted.

**Objective 7.7 (Archaeological Resources)**

Preserve archaeological resources on the Refuge from destruction by coastal erosion or artifact looting.

*Background:* Service actions likely to affect archaeological and historic sites are routinely reviewed and assessed under the provisions of Sec. 106 of the National Historic Preservation Act. To date, projects requiring such review on the Refuge have been confined to architectural rehabilitation of lighthouse structures, so Refuge lands have never had a systematic archaeological survey.

Based on archaeological studies of similar environments in Maine (Kellogg, 1982; Yesner 1980), it is likely that many unrecorded coastal archaeological sites exist on the current Refuge and on islands proposed for acquisition. It is also very likely that all these sites are undergoing some erosion. All recorded prehistoric archaeological sites on the Refuge have been severely damaged by erosion, and some have probably vanished into the sea since they were reported. Archaeologists in the State Historic Preservation Office, universities, museums, and consulting firms working in Maine all agree that erosion is the greatest single threat to coastal archaeological sites in the state. If a concerted campaign is not undertaken soon to locate, monitor, and assess such sites for listing in the National Register of Historic Places, and preserve or conduct archaeological excavation of them, a major piece of the region's prehistory and early history will be lost forever.

Current looting of artifacts from eroding sites on the Refuge is not documented, but it is noteworthy that most of the prehistoric sites and one of the historic sites were reported by local residents who collected material from them prior to Federal ownership. Most of these sites contain clam shell, which makes them highly visible to anyone walking the shore or skirting it in a small boat.



No staff has taken the Federal Law Enforcement Training Center's Archaeological Resources Protection Act (ARPA) course. This severely hinders our ability to investigate looting violations. Even more notably, the absence of any visible day-to-day law enforcement presence on the islands makes enforcement virtually impossible unless it can be accomplished through public education and monitoring partnerships with agencies and communities that have an interest in Refuge lands and resources.

*Strategies:*

- continue to consult with the Maine Historic Preservation Commission regarding Refuge undertakings that have potential to affect archaeological resources, performing archaeological studies of project areas as needed.

*Within 5 years of CCP implementation:*

- ensure that an ARPA message is incorporated into Refuge brochures, including those produced by Refuge partners, following Leave No Trace themes.
- perform surface surveys of selected Refuge island shorelines to locate archaeological resources at risk from coastal erosion or artifact looting. The late Dr. Douglas C. Kellogg developed a model for both the location of such coastal sites and an assessment of erosion impacts upon them (Kellogg, 1982). A testing of his model may be a good starting point to focus this effort. Develop site management and protection plans as warranted.
- ensure that at least one staff person receives ARPA training.
- hire GS-7 and GS-9 law enforcement officers to help administer the program and conduct visitor outreach (same positions as Objective 6.4).
- produce a Cultural Resources Management Plan. This plan will include a prioritized program to perform additional surveys as properties are acquired, and a systematic program to monitor erosion and looting of known sites, as well as a management program for historic structures on the Refuge. The plan will also identify areas with a high probability of containing archaeological sites. Consult with the Maine Historic Preservation Office and Tribal Historic Preservation Office in developing this plan.

**Objective 7.8 (Historic Resources)**

Within 2 years of CCP approval, establish an annual program of historic lighthouse maintenance on the Refuge to meet the Department of the Interior's historic preservation standards.

*Background:* The National Historic Preservation Act considers deterioration of historic structures as an adverse effect upon them. Historic struc-



*Historic photo of Petit Manan Island Lighthouse*  
Photo from The National Archives

tures, currently limited to four lighthouse stations (Petit Manan Island, Libby Island, Matinicus Rock, and Egg Rock), were all in various states of repair when acquired by the Service. Most of these structures have received repairs since acquisition, but all require further repairs to place them in stable condition. Establishment of a regular program of cyclical maintenance, involving items such as painting and roofing repairs, will also be essential to protect these structures from further deterioration. These structures are perceived by the general public, preservation advocates, and historians as among the most significant in Maine, and their preservation is a trust responsibility for the Service.

*Strategies:*

- continue to consult closely with the Maine Historic Preservation Commission regarding repairs and annual and cyclical maintenance to the four National Register listed light stations on the refuge.

*Within 5 years of CCP implementation:*

- develop a formal agreement with U.S. Coast Guard (USCG) to coordinate USCG maintenance activities on lighthouse islands and to insure there will be minimal

disturbance to nesting seabirds; address timing of routine maintenance activities, develop protocols for USCG access to lighthouse islands for emergency activities; establish what logistical support can be provided to USCG.

- establish formal relationship with Friends of Nash Island Light and Friends of Franklin Island Light; utilize MOUs, Challenge Grants, and cooperative agreements as needed to support work.
- complete an inventory of maintenance needs necessary to bring each lighthouse to national and State preservation standards; incorporate needs into MMS system. Seek alternative funding sources and pursue partnerships to accomplish priority work.
- establish “Friends of Lighthouse” groups on Libby and Two Bush Islands, Egg Rock, and Matinicus Rock. Friends groups will work toward developing political and public support for maintenance of these historical structures and developing interpretation and educational programs related to the history of lighthouses on the Maine coast.

**Goal 8: Communicate and Collaborate with Local Communities, Federal, State, Local, and Tribal Representatives, and Other Organizations throughout Coastal Maine to Further the Mission of the National Wildlife Refuge System**

- establish a relationship with national lighthouse preservation organizations; seek mutually beneficial partnerships.

**Objective 8.1 (Research Partnerships)**

Expand existing research partnerships to further our knowledge and understanding of Maine coastal ecosystems and the Federal trust resources which depend on them.

*Background:* Fortunately for us, the Refuge is sought after as a place to conduct research on undeveloped coastal environments. We have obtained a tremendous amount of information through research partnerships. This has particularly benefited us as we have not had the staff or funding to accomplish this work on our own. Some of the current research partnerships include: an Arctic tern and Atlantic puffin metapopulation study with the University of New Brunswick, Canada, a common eider survival and recruitment study with MDIFW and U.S. Geological Survey (USGS), and a purple sandpiper study with MDIFW and Acadia National Park. We would continue these research partnerships and encourage new ones to enhance our ability to achieve our goals and objectives. We have identified several potential research projects under our biological objectives that we hope to pursue in the near future.

*Strategies:*

- continue partnership with Humboldt Research Station under a special use permit to provide outdoor laboratory opportunities on Refuge lands; seek an expansion of their activities to include inventory and monitoring of resources.
- continue research partnerships with MDIFW and other State agencies, USGS, NPS, NAS, and universities, and initiate new ones, that are directly beneficial to the Service on a local, regional, or national level.

*Within 5 years of CCP implementation:*

- insure all entities currently operating on Refuge lands are under a cooperative agreement, memorandums of understanding, and/or special use permits. All agreements should include a provision to annually share data and reports.
- in cooperation with partners, identify the highest priority research needs for the Refuge which will further the conservation and management of Federal trust resources. Refer to all proposed research projects identified under the biological objectives in this CCP.
- with priority research needs identified, cooperate with research facilities, educational institutions, and other agencies to establish research goals and methodology.

- Refuge staff will engage in developing research study designs, conducting field work, and writing publications to raise the visibility of the Refuge System within the research community and to elevate our contribution to science-based management. Staff will co-author papers on a regular basis.
- annually investigate alternative sources of funding to support research activities on Refuge lands.
- annually investigate and secure housing for researchers, interns, and biological technicians.

### **Objective 8.2 (Law Enforcement Partnerships)**

Initiate partnership with other Federal, State, and local enforcement agencies and Tribal Nations to further the conservation and protection of Federal trust resources.

*Background:* Law enforcement staff plays an important role on the Refuge. Officers not only enforce regulations, but just as importantly, they conduct outreach and serve to raise the visibility of the Service in local communities while out on patrol.

It will be even more important in the future, should we implement this alternative with new programs and new regulations, that we have the capability to alert people to these changes and can enforce them, as necessary. We believe that a law enforcement partnership could substantially increase our ability to effectively manage and conserve Refuge resources.

*Strategies:*

*Within 5 years of CCP implementation:*

- hire GS-7 and GS-9 law enforcement officers to facilitate partnership and conduct visitor outreach (same positions as Objective 6.4).
- establish annual meeting with the local MDIFW game warden prior to and during hunting season to identify and monitor concerns.
- develop MOUs with Federal (e.g. Coast Guard), State and local law enforcement agencies, including Maine DMR, and MDIFW game wardens to establish agreements for back-up assistance, Refuge patrol, and the sharing of radio frequencies.

### **Objective 8.3 (Community Outreach)**

Within 7 years of CCP approval, through increased community outreach, 65% of adults contacted who reside within 10 miles of refuge lands, will know the Refuge exists, that it is part of a national system of refuges, and can identify its management priorities for migratory bird conservation and seabirds.

*Background:* This objective strives to develop an effective outreach program targeted at Maine coastal communities whose residents may not be

aware that a national wildlife refuge is nearby. It is particularly important that local residents understand, appreciate, and support the Refuge System mission and this Refuge's unique contribution to that mission. In addition, our volunteer program could grow and our Friends of Maine Seabird Islands groups could see enhanced membership and support. The proposed Refuge Headquarters and Coastal Education Center will serve as an important resource for Mid-coast residents, providing meeting and exhibit space for local conservation organizations, as well as educational and recreational opportunities.

Our current outreach program includes regular submissions of news releases and a biweekly column relating Refuge news and issues to local newspapers. We also provide at least four presentations annually to local civic organizations and staff a Refuge booth at approximately four fairs, sporting shows, or other community events.

Over the past few years as the Refuge has grown, and we have conducted more extensive outreach, we have noticed some confusion over the Refuge's name as "Petit Manan NWR Complex." This name made no sense to individuals who did not have an historical context. As such, under this alternative, we are recommending the name of the refuge complex be changed to "Maine Coastal Islands National Wildlife Refuge" to better reflect the Refuge's mission and its geographic context.

*Strategies:*

*Within 5 years of CCP implementation:*

- annually coordinate with Moosehorn and Rachel Carson refuges on outreach and education.
- regularly participate in Chamber of Commerce and other community events in Maine coastal towns where effective outreach of Refuge programs can occur.
- develop survey protocol to measure success with meeting objective.
- develop a Refuge video for use at on-refuge and off-refuge events.
- purchase a new phone system for the Refuge Headquarters that will provide current Refuge regulations, island openings/ closings, and upcoming events for Refuge offices.
- expand the existing Friends of Maine Seabird Islands Group based in Rockport to include a second chapter in downeast Maine. This will enhance the Refuge staff's capability of meeting Goals 1 through 7 above. Develop recruitment strategies with Regional Friends Coordinator; consider workshops and attracting people through the media.
- publish a quarterly newsletter; utilize volunteers, interns, and Friends Group for publication.
- hire a Volunteer Coordinator (GS-7) to plan and implement volunteer programs.

- complete development of a guide for island owners interested in island stewardship practices
- initiate administrative actions to change the name of the refuge complex to “Maine Coastal Islands National Wildlife Refuge”

#### **Objective 8.4 (Elected Officials Outreach)**

Within 5 years of CCP approval, 75% of all Federal, State, and local elected officials representing the surrounding Refuge communities will have visited the Refuge, and will understand its significance to migratory birds and other native wildlife.

*Background:* Gaining Congressional, State, and local elected officials support for Refuge programs is essential to meeting our goals. This can only happen when these elected officials understand and appreciate the nationally significant contribution of the Refuge and its programs to the permanent protection of Federal trust resources. We need to impress upon them the importance of refuge lands to current and future generations of Americans.

We are proud of our relationship with the Maine Congressional delegation, and have benefited by their involvement in recent years. Our relationships are not as strong with State and local elected leaders, and we hope to improve upon this situation with actions identified below.

*Strategies:*

*Within 5 years of CCP implementation:*

- continue annual Capitol Hill visits begun in 2001 and brief Congresspersons and staff on Refuge programs and projects.
- insure public offices receive all notices of Refuge events.
- host an annual field visit for elected officials and local community leaders to familiarize them with Refuge management priorities and issues.

#### **Objective 8.5 (Adjacent Landowners Outreach)**

Within 5 years of CCP approval, 80% of adjacent landowners will have been personally contacted by Refuge staff at least once in an effort to improve local community relationships and secure local support for Refuge management activities.

*Background:* As a public land management agency, it is very important to us that we are viewed as responsible and conscientious neighbors. Keeping in touch with adjacent landowners makes good business sense as it would serve to strengthen support for the Service and Refuge activities in the local communities. We have not had formal meetings with adjacent landowners or landowner associations to date. We periodically meet with landowners adjacent to our mainland divisions while in the field, but it has been infrequent and has been more on an opportunistic basis rather than planned.

Our ability to meet with island landowners is more difficult. In recent years, we have deferred to local land trusts to contact and inform island owners of some of our activities. Under this alternative, we would like to conduct more direct outreach to adjacent landowners to improve our relationships.

*Strategies:*

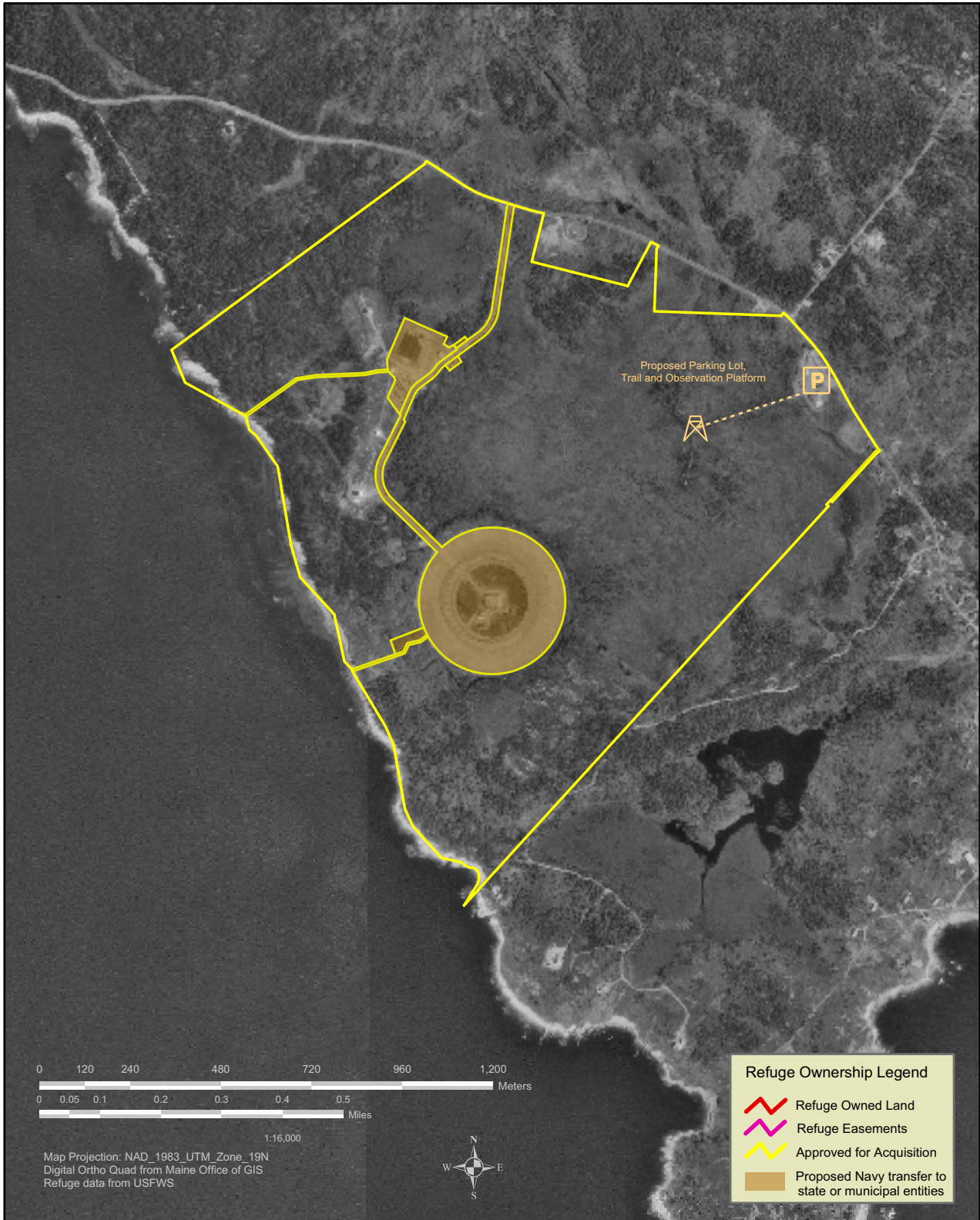
*Within 5 years of CCP implementation:*

- compile an adjacent landowner mailing list; insure adjacent landowners receive notices of Refuge events and receive Refuge newsletters. Offer to meet with any landowner with an interest in learning more about Refuge activities.
- meet annually with Section 1 landowners on Petit Manan Point.
- meet with adjacent landowners to the Sawyers Marsh and Gouldboro Bay divisions.
- meet with the following land trusts: Damariscotta River Association, Boothbay Region Land Trust, Vinalhaven Land Trust, and Harpswell Region Land Trust.
- meet with Star Island Corporation to discuss management on Smuttynose Island.
- meet with landowners on Bois Bubert and Metinic islands.
- identify where homeowners organizations exist adjacent to Refuge lands, establish a contact, and attend meetings where Refuge outreach is appropriate.
- personally contact owners of islands proposed for Service acquisition; offer to meet with anyone interested in learning more about Service programs and policies.



MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Corea Heath Division Public Use  
Alternative B - Service's Preferred Alternative



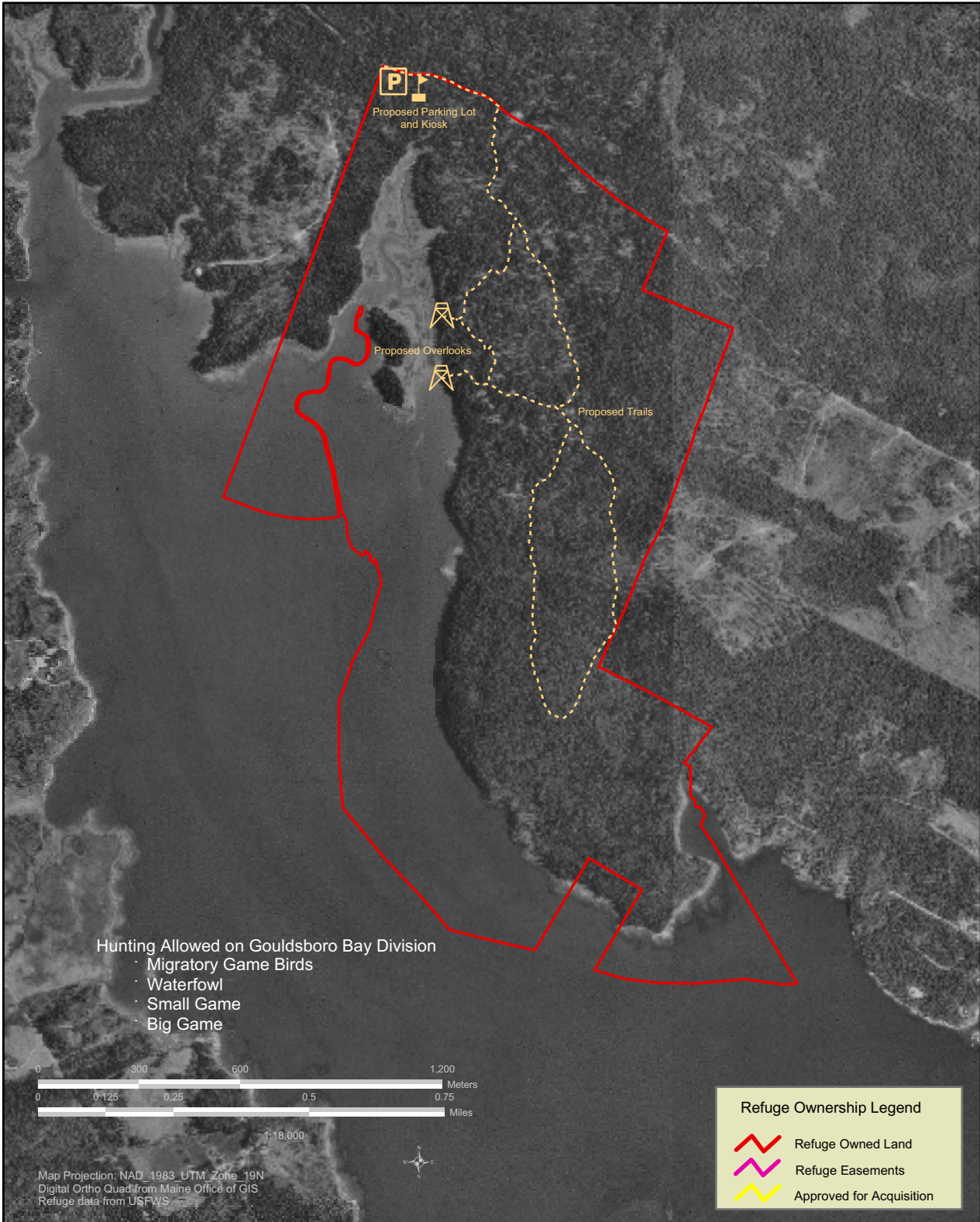




MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Gouldsboro Bay Division Public Use

Alternative B - Service's Preferred Alternative

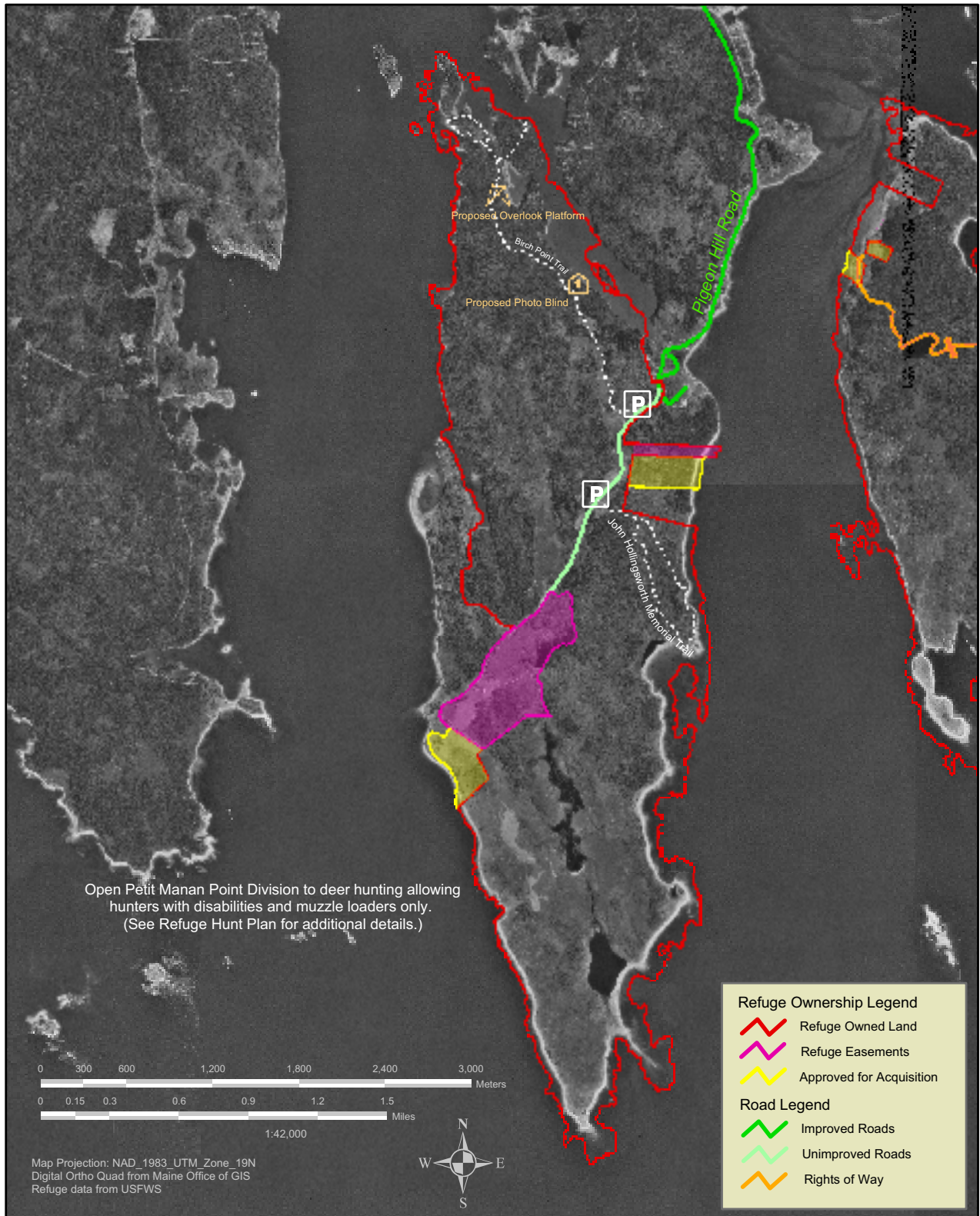




MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Petit Manan Point Division Public Use

Alternative B - Service's Preferred Alternative





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Sawyers Marsh Division Public Use  
Alternative B - Service's Preferred Alternative



## Alternative C

### Introduction

Alternative C essentially expands upon Alternative B, with the expectation that more funding and staffing would allow us to implement more extensive biological programs, substantially increase the number of Refuge islands, and appreciably increase the number and quality of our priority public use programs. The objectives under each goal are very similar to Alternative B; generally, the difference is in the strategies, whereby a greater commitment of resources would allow us to reach our goals and objectives sooner and more comprehensively.

The protection, management, and restoration of seabirds would remain our top management priority. We would increase our responsibility in promoting nesting seabird management in the Gulf of Maine by establishing 12 new seabird projects over the next 15 years. As with Alternative B, our other priority biological programs would become more focused to benefit species of concern, namely migratory land birds, waterfowl and shorebirds. Similar to Alternative B, we would continue our habitat management activities on the Petit Manan Point Division and the seabird management islands using a combination of treatments such as mechanical, prescribed fire, herbicides, and sheep grazing, as necessary. Our biological inventory and monitoring program would be even further expanded from that proposed in Alternative B.

In comparison to the other alternatives, Alternative C would recommend the most expansive land acquisition and cooperative land protection program. This alternative would include Service acquisition of the 467.1 acres in the currently approved boundary, as well as all, or portions of the larger, 151 unprotected, nationally significant coastal nesting islands (approximately 6,310 acres; see Table 2-2 and Table 2-3). In addition, the same mainland tracts (153 acres) important to migratory waterfowl and shorebirds proposed in Alternative B would be included. We would also evaluate additional mainland tracts for Service acquisition, on a case-by-



*Double-crested cormorants*  
USFWS photo

case basis as they become available from willing sellers, if they are identified in the North American Waterfowl or Joint Venture plans as important wetlands. In addition to Service acquisition, we would continue to work with MDIFW, other GOMSWG members, and land conservation partners to support their efforts to protect other coastal habitat areas important to Federal trust resources.

Alternative C would notably increase opportunities for priority wildlife-dependent public uses, especially in environmental education and interpretation on the mainland. We would expand on those opportunities proposed in Alternative B, featuring more programs on Refuge lands. Under Alternative C, we would

evaluate all islands individually to determine the time period for restricting public use and access depending on which species occur there, how many are nesting, and their timing in a given year. This would result in a range of seasonal public access restrictions among the islands, but might afford more user access days overall compared to the other alternatives. We would expect an increase of 25-30% in our current visitation as a result of expanding our environmental education and interpretive programs, providing access and interpretation on each of our mainland divisions, and working much more extensively in local communities. Most of this increased visitation would occur on the mainland divisions. Maps 2-9 to 2-12 (pages 2-127 to 2-130) depict our existing and proposed infrastructure on the four mainland divisions.

Similar to Alternative B, implementation of Alternative C would enhance local community outreach and partnerships, continue to encourage our Rockportbased Friends of Maine Seabird Islands group and create two more chapters, and improve our relationships with our neighbors and elected officials. We believe these efforts would strengthen support for the Service and our Refuge management priorities in the local communities we serve.

Finally, as with Alternative B, we would recommend to our Director that we pursue Federal wilderness designation on 13 Refuge islands, which we have grouped into 8 wilderness study areas. Our management of these islands would not change appreciably over how we manage them currently. We have no infrastructure in place, nor do we have any management activities planned that would be affected by this designation. We believe these islands would be an important addition to the National Wilderness Preservation System. Under Alternative C, we would review all newly acquired Refuge lands for their wilderness potential at the time of acquisition.

Since Alternative C primarily builds off of the goals and objectives in Alternative B, our description below highlights the differences between the two alternatives. This is intended to minimize redundancy.

**Goal 1: Perpetuate the Biological Diversity and Integrity of Upland Cover Types on the Refuge's Mainland to Sustain High Quality Habitat for Migratory Birds**

**Objective 1.1 (Blueberry Barrens - Old Field)**

Same as Alternative B, except modify the strategies to include:

- Up to 250 acres could be prescribed burned in any given year to achieve this and other habitat objectives. Consult with Regional Fire Management Officer when developing prescribed fire management prescriptions.

**Objective 1.2 (Northern Hardwood-Mixed Forest)**

In addition to Alternative B, include a strategies to:

- with assistance from a professional forester, evaluate the health of these forested stands to determine whether active management is needed to

enhance their condition and ensure longevity. Develop stand prescriptions including the consideration of regeneration needs (e.g. planting, selective harvest of overstory, thinning of understory) to maintain desired species composition and stand structure, and control of pests and pathogens. Also, evaluate the need to improve the density and composition of the shrub understory, a vital component of the overall habitat quality for many land birds of conservation concern.

- work with a Service's Land Management Demonstration Biologist to demonstrate and evaluate forest management to benefit high priority bird species. In particular, evaluate how well stand-level management could provide for habitat needs of priority bird species not well known.

### **Objective 1.3 (Mature Red Spruce-Balsam Fir)**

In addition to Alternative B, include strategies to:

- with assistance from a professional forester, evaluate the health of these forested stands to determine whether active management is needed to enhance their condition and ensure longevity. Develop stand prescriptions including the consideration of regeneration needs (e.g. planting, selective harvest of overstory, thinning of understory) to maintain desired species composition and stand structure, and control of pests and pathogens. Also, evaluate the need to improve the density and composition of the shrub understory, a vital component of the overall habitat quality for many land birds of conservation concern.
- work with a Service's Land Management Demonstration Biologist to demonstrate and evaluate forest management to benefit high priority bird species. In particular, evaluate how well stand level management could provide for habitat needs of priority bird species not well known.

### **Objective 1.4 (Early Successional Forest-Edge)**

Same as Alternative B.

### **Objective 1.5 (Rare Plants)**

In addition to Alternative B, include strategies to:

- develop individual site management plans for each rare plant population, establishing inventory and monitoring guidelines, and an implementation schedule for habitat enhancement or restoration projects.
- Up to 250 acres could be prescribed burned in any given year to achieve this and other objectives. Consult with Regional Fire Management Officer when developing prescribed fire management prescriptions.

**Goal 2: Maintain High Quality Wetland Habitat on the Refuge's Mainland Coast, Primarily to Benefit Migratory Birds of High Conservation Priority, while also Supporting other Native, Wetland-dependent Species of Concern**

**Objective 2.1 (Maritime Saltmarsh and Estuary)**

Same as Alternative B.

**Objective 2.2 (Freshwater Impoundments)**

Same as Alternative B.

**Objective 2.3 (Vernal Pool Wetlands)**

Same as Alternative B.



*Arctic tern feeding chick*

Photo by Bill Silliker, Jr.

**Goal 3: Perpetuate the Biological Diversity and Integrity of Upland Cover Types on the Refuge's Coastal Islands to Sustain High Quality Habitat for Nesting Bald Eagles and Migratory Songbirds and Raptors, and to Protect Rare Plant Sites**

**Sites Objective 3.1 (Bald Eagle Nesting Islands)**

Same as Alternative B, except modify the strategy on the seasonal restriction to read:

- each nesting site would be evaluated separately to determine the most effective public access closure period based on the timing of each pair's nesting cycle and their observed sensitivity to disturbance. As such, the public closure period would be expected to vary among the four active nest sites, requiring extensive use of signing and outreach to let the public know the differences. It is possible that some island closure periods could be shorter than the existing February 15 to August 31 period, while others could be longer.

**Objective 3.2 (Mature Red Spruce-Balsam Fir)**

In addition to Alternative B, include the following strategy: with assistance from a professional forester, evaluate the health of these forested stands to determine whether active management is needed to enhance their condition

and ensure longevity. Develop stand prescriptions including the consideration of regeneration needs (e.g. planting, selective harvest of overstory, thinning of understory) to maintain desired species composition and stand structure, and control of pests and pathogens. Also, evaluate the need to improve the density and composition of the shrub understory, a vital component of the overall habitat quality for many land birds of conservation concern.

**Objective 3.3 (Early Successional Forest-Edge)**

Same as Alternative B.

**Objective 3.4 (Migratory Landbirds)**

Same as Alternative B.

**Objective 3.5 (Baseline Biological Inventories)**

Same as Alternative B, except modify the strategy on the number of inventory surveys to read:

- establish protocol to conduct baseline vegetation and wildlife inventory surveys on at least 12 Refuge islands per year (double the effort in Alternative B). Efforts would continue until all Refuge islands are inventoried. Consider the use of contractors or initiate cooperative efforts with universities to complete the surveys. Store all relevant information in GIS database.

**Objective 3.6 (Rare Plants)**

Same as Alternative B, except modify the strategy on prescribed fire to include:

- Up to 250 acres could be prescribed burned in any given year to achieve this and other objectives. Consult with Regional Fire Management Officer when developing prescribed fire management prescriptions.

**Goal 4: Protect the High Quality Wetland Habitats on the Refuge's Coastal Islands to Benefit Nesting and Migrating Shorebirds and Waterfowl**

**Objective 4.1 (Coastal Saltmarsh - Cross Island)**

Same as Alternative B.

**Objective 4.2 (Intertidal Harvesting)**

In addition to Alternative B, include a strategy to:

- cooperate with MDIFW, MDMR, USGS, and our other conservation and university partners to design and sponsor a research program to fully evaluate the short and long-term impacts of inter-tidal resource harvesting on Federal trust species, their habitats, and the integrity of



the island ecosystem. Of particular interest is determining what factors are influencing productivity and survival of Federal trust species.

#### **Objective 4.3 (Aquaculture Facilities)**

In addition to Alternative B, include a strategy to:

- cooperate with MDIFW, MDMR, USGS, and our other conservation and university partners to design and sponsor a research program to fully evaluate the short and long-term impacts of aquaculture facilities on Federal trust species, their habitats, and the island ecosystem. Of particular interest is determining what factors are influencing productivity and survival of Federal trust species.

#### **Objective 4.4 (Fall Shorebird Migration)**

Same as Alternative B.

#### **Objective 4.5 (Winter Shorebird Migration)**

Same as Alternative B.

### **Goal 5: Protect and Restore Nesting Seabird Populations on the Refuge's Coastal Islands to Contribute to Regional and International Seabird Conservation Goals**

#### **Seabird Nesting Islands with Active Management**

##### **Objective 5.1 (Common and Arctic Tern)**

In addition to Alternative B, include strategies to:

- develop island-specific HMPs establishing population and habitat goals and objectives for these seabirds as well as other species of concern.
- develop partnership agreements with private landowners of coastal nesting islands to promote their protection, management, and restoration of habitats for nesting seabirds and other species of concern.

##### **Objective 5.2 (Roseate Tern)**

Same as Alternative B, and including the seabird strategies noted above for common and Arctic tern.

##### **Objective 5.3 (Alcids)**

Same as Alternative B, and including the seabird strategies noted above for common and Arctic tern.

##### **Objective 5.4 (Laughing Gulls)**

Same as Alternative B.

**Objective 5.5 (Herring and Black-backed Gulls)**

Same as Alternative B.

**Objective 5.6 (Common Murre)**

Same as Alternative B, and including the seabird strategies noted above for common and Arctic tern.

**Objective 5.7 (Leach's Storm-Petrel)**

Same as Alternative B, and including the seabird strategies noted above for common and Arctic tern.

**Objective 5.8 (Common Eider)**

Same as Alternative B, and including the seabird strategies noted above for common and Arctic tern.

**Objective 5.9 (New Seabird Management Projects)**

Modify the Alternative B objective to read:

Consistent with Regional seabird population and distribution goals, and Refuge expansion opportunities, increase nesting seabird populations and improve their distribution in the Gulf of Maine by establishing 12 new seabird management projects on Refuge lands.

Strategies would be the same as Alternative B, except modify the strategy on the new island management schedule to read:

- initiate at least two seabird management projects within five years of CCP implementation, with subsequent projects initiated every two to three years thereafter until twelve are established. Increase the number of seasonal crews staffing the islands commensurate with the number of projects.

**Seabird Nesting Islands with No Active Management**

**Objective 5.10 (Seabirds)**

Same as Alternative B.

**Objective 5.11 (Great Cormorant)**

Same as Alternative B.

**Goal 6: Provide Enjoyment and Promote Stewardship of Coastal Maine Wildlife and their Habitats by Providing Priority, Wildlife-Dependent Recreational and Educational Opportunities**

**Objective 6.1 (Environmental Education)**

In addition to Alternative B, include strategies to:

- develop a web-based environmental education program for students around the world to learn about seabirds. A camera would be installed to view puffins in their burrows, or to view the entire seabird colony on Petit Manan Island. Research data would be posted on the website with accompanying lesson plans.
- hire at least two interns to help develop and implement environmental education programs.

**Objective 6.2 (Environmental Interpretation)**

In addition to Alternative B, include strategies to (see Maps 2-9 to 2-12):

- install interpretive panels on at least three U.S. Route 1 roadside rest areas, showcasing seabird management and other Refuge coastal programs.
- hire at least two summer interpretive interns to help develop and implement interpretive programs on Refuge mainland divisions (same interns as objective 6.1).

**Objective 6.3 (Environmental Interpretation - Commercial Tours)**

Same as Alternative B.

**Objective 6.4 (Hunting)**

Same as Alternative B (See Maps 2-9 to 2-12).

**Objective 6.5 (Wildlife Observation and Photography)**

In addition to Alternative B, include strategies to (See Maps 2-9 to 2-12):

- evaluate the compatibility of opening up Petit Manan Island and other select Refuge islands to photography tours during the nesting season, implement if feasible and compatible..
- work with a sponsor to fund the placement of cameras at one or more seabird nesting sites and post the live footage in real time on the Refuge website.
- construct two additional photo blinds on mainland divisions.

**Objective 6.6 (Public Access to Refuge Islands)**

Same as Alternative B.

### Objective 6.7 (Furbearer Trapping Program)

Allow furbearer trapping to occur, in accordance with State and Refuge regulations, on Petit Manan Point, Gouldsboro Bay, and Sawyers Marsh divisions, and Cross and Bois Bubert islands.

*Background:* Furbearers are mammals that are harvested for their fur. In Maine, these include coyote, red and gray fox, bobcat, fisher, marten, raccoon, skunk, short-and long-tailed weasels, mink otter, beaver, muskrat, and opossum (<http://www.state.me.us>). Lynx, which are Federal-listed as threatened, are not included due to their low population levels across their range in the U.S. While furbearer trapping is not a priority public use as defined in the 1997 Refuge Improvement Act, it is an historic and traditional wildlife-dependent activity in Maine. Trapping provides income, recreation, and an outdoor lifestyle for those engaged in this activity.

Our program would basically adhere to State trapping regulations with some modifications to minimize disturbance to migrating waterfowl. The MDIFW manages furbearer populations for the benefit of a public with diverse opinions. According to their 2002 Wildlife Division Research and

Management Report, the furbearer management objectives include preserving or sustaining furbearer populations for their biological, ecological, economic, aesthetic and subsistence, as well as for recreational, scientific, and educational purposes (MDIFW, 2002). Through the International Association of Fish and Wildlife Agencies, there is an effort to develop Best Management Practices (BMPs) for regulated trapping in the U.S. These BMPs will be recommended to all state fish and wildlife agencies for incorporation into regulated trapping programs and trapper education programs. As these become available, they would be included in the Refuge program.

On the Refuge, we would not allow trapping on the mainland units during the waterfowl migration season (September through November). During this time, waterfowl are concentrating in the thousands in the wetlands; they are building up their reserves prior to their southerly migration by foraging and resting on refuge lands. Trappers placing and checking traps regularly in areas where birds are congregating would cause a flight response. This response results in the birds using energy reserves needed for migration.



*Terns flying overhead while researchers count nests*  
USFWS photo

*Strategies:**Within 5 years of CCP implementation:*

- develop a Furbearer Management Plan for the Refuge.
- complete the approval package to open Petit Manan Point, Gouldsboro Bay, and Sawyers Marsh divisions, and Cross and Bois Bubert islands to trapping under State and Refuge regulations.
- work with MDIFW to monitor and record annual harvest levels and administer the program.

**Goal 7: Protect the Integrity of Coastal Maine Wildlife and Habitats through an Active Land Acquisition and Protection Program**

**Objective 7.1 (Service Island Acquisition)**

To insure the permanent protection of important Maine coastal island habitats, during the 15-year life of this CCP, the Service will pursue acquisition, from willing sellers, of an additional 151 nationally significant nesting islands which currently lack permanent protection (see Table 2-2 and Table 2-3).

*Background:* We described in Chapter 1 how we have worked with the Service's GOMP, MDIFW, and our other conservation partners to develop a "nationally significant islands" list for coastal Maine. Three hundred and seventy-seven (377) islands are currently on the list; 226 of these are already protected long-term (GOMP, December 10, 2001). The remaining 151 islands, or portions of larger islands, are still in need of permanent protection. The ultimate goal among all partners is to achieve permanent protection for these 151 islands, and to manage them as needed to insure the long-term nesting success of species of management concern. Under this alternative, the Service would lead this effort through acquisition of all 151 islands, or portions of the larger islands identified in Table 2.2. On larger islands (>200 acres), the "portions" would include an approximately 125 acre protective buffer areas around active bald eagle nest sites. This would allow us the ultimate flexibility to actively manage these islands as needed for Federal trust species and would insure their permanent protection in perpetuity. The Service would consider fee simple acquisition, purchase of conservation easements, acceptance of land donations, land transfers or exchanges as methods of acquisition. Under this alternative, and given the number of islands proposed, we would pursue conservation easements, or acquisition by donation, transfer, or exchange in greater proportion than the other alternatives.

While the Service would take the lead in protecting all 151 islands, it would continue to be imperative that a strong land protection partnership exist. The sheer number of islands with significant resource values, and the fact that nesting bird populations could shift among the islands, requires this. We would continue to rely on our partners to share their expertise, equipment and other operational resources, and field assistance wherever possible. We would continue to seek their assistance in outreach

to island owners. In addition, this objective necessitates a notable increase in Service staffing and funding to acquire and manage these islands. We would also look to our partners to help us identify funding sources and mechanisms to purchase and manage islands.

*Strategies:*

- continue to acquire private lands from willing sellers within currently approved acquisition boundary; 25 tracts on 14 islands (347.5 acres). All lands acquired would become part of Petit Manan Refuge.
- continue to participate in annual coordination with the Gulf of Maine island protection partners including: GOMP, MDIFW, TNC, MCHT, local land trusts, and private landowners.
- continue to work annually with GOMP to insure nationally significant island list is updated.
- with approval, implement a Land Protection Plan (LPP) for the Refuge authorizing acquisition from willing sellers of all, or portions of larger, the 151 islands identified in Table 2.2. On larger islands (>200 acres), the “portions” would include an approximately 125 acre protective buffer areas around active bald eagle nest sites. Approximately 6,310 acres total would be targeted for Service acquisition.
- develop an outreach plan with partners to determine how and when it is best to contact island owners.

**Objective 7.2 (Cooperative Protection and Management of Islands)**

Support the efforts of our land conservation partners in protecting and managing islands important to Federal trust resources, but not protected long-term, and not proposed for Service acquisition in the Land Protection Plan.

*Background:* While we propose Service acquisition of all 151 nationally significant islands known to us that currently are not permanently protected, there are other unprotected islands supporting Federal trust species. Protection of Maine coastal islands has always been a partnership effort, and would continue to be so. We would continue to play a role in identifying important islands supporting Federal trust species.

Although we would take a lead role in protecting the nationally significant islands, it would be our hope that our partners would take the lead in acquiring whatever rights are needed to permanently protect other islands important for Federal trust species. Within the limits of our funding and staffing, we would be willing to share in management of these islands.

Cooperative management agreements with conservation landowners are one tool to achieve resource objectives on islands where the owner “can’t do it all.” An agreement may involve the Service helping to manage public use, or providing signage, conducting banding for long term monitoring, or

doing periodic habitat manipulations. Each agreement would need to be specific to the island.

*Strategies:*

- continue to participate in annual coordination with the Gulf of Maine island protection partners including: Service's GOMP, MDIFW, TNC, MCHT, local land trusts, and private landowners.
- continue to work with Service's GOMP to insure the nationally significant island list is updated.
- on a case-by-case basis, continue to consider cooperative management agreements with other ownerships where protection of Federal trust resources is a priority.

**Objective 7.3 (Service Mainland Land Acquisition and Protection)**

In addition to Alternative B, include a strategy to:

- as opportunities arise from willing sellers, pursue Service acquisition of mainland tracts with important migratory waterfowl values within Joint Venture focus areas, and which lie near current Refuge lands. Since none are known or anticipated at this time, a separate NEPA document would be necessary to obtain approval. All lands acquired would become part of Petit Manan Refuge.

**Objective 7.4 (Local Support for Land Acquisition)**

Same as Alternative B.

**Objective 7.5 (Wilderness Designation)**

Same as Alternative B.

**Objective 7.6 (Special Designation for Corea Heath Division)**

Same as Alternative B.

**Objective 7.7 (Archeological Resources)**

In addition to Alternative B, include strategies to:

- initiate an archeological field investigation on all Refuge lands and record all sites in a GIS.
- For all recorded sites, develop individual site plans to insure their protection from environmental and human impacts.

**Objective 7.8 (Historic Resources)**

Same as Alternative B.

**Goal 8: Communicate and Collaborate with Local Communities, Federal, State, Local and Tribal Representatives, and Other Organizations throughout Coastal Maine to Further the Mission of the National Wildlife Refuge System**

**Objective 8.1 (Research Partnerships)**

Same as Alternative B.

**Objective 8.2 (Law Enforcement Partnerships)**

In addition to Alternative B, include strategies to:

- hire two full time Park Rangers (GS-7 and GS-9) to increase outreach and law enforcement.
- obtain an AM radio frequency for visitors to tune in for current Refuge information and regulations (e.g. openings/closings, events, etc.)

**Objective 8.3 (Community Outreach)**

In addition to Alternative B, include strategies to:

- expand the existing Friends of Maine Seabird Islands group to include two additional chapters; one would be in downeast Maine, another would be located south of Rockport.
- conduct annual workshop for kayak/canoe outfitters and guides, focusing on the importance of coastal islands to Federal trust resources and teaching low impact, responsible use of the islands.
- promote guided educational tours with special programs for members of the local community on Refuge mainland.
- hire two full time Park Rangers to increase outreach and law enforcement (same positions as objective 8.2 above).
- obtain an AM radio frequency for visitors to tune in for current Refuge information and regulations (e.g. openings/closings, events, etc.)

**Objective 8.4 (Elected Officials Outreach)**

Same as Alternative B.

**Objective 8.5 (Adjacent Landowner Outreach)**

In addition to Alternative B, include strategies to:

- in the vicinity of Refuge islands, work with private island owners of coastal nesting islands to promote their protection, management, and restoration of nesting seabirds, wading birds, and bald eagles.
- develop an outreach plan with partners to determine how and when to contact island owners, especially those that own islands in the LPP.

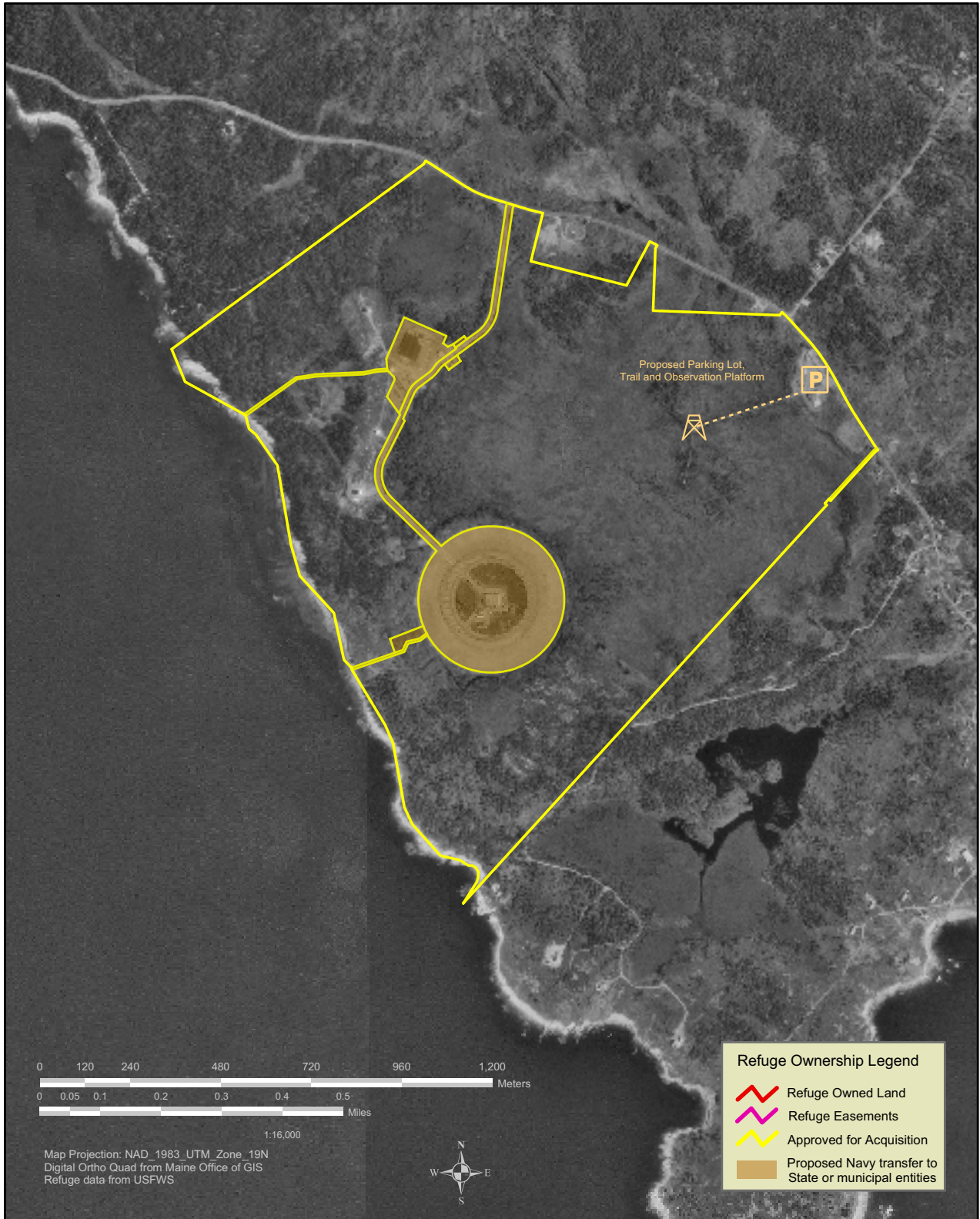




MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

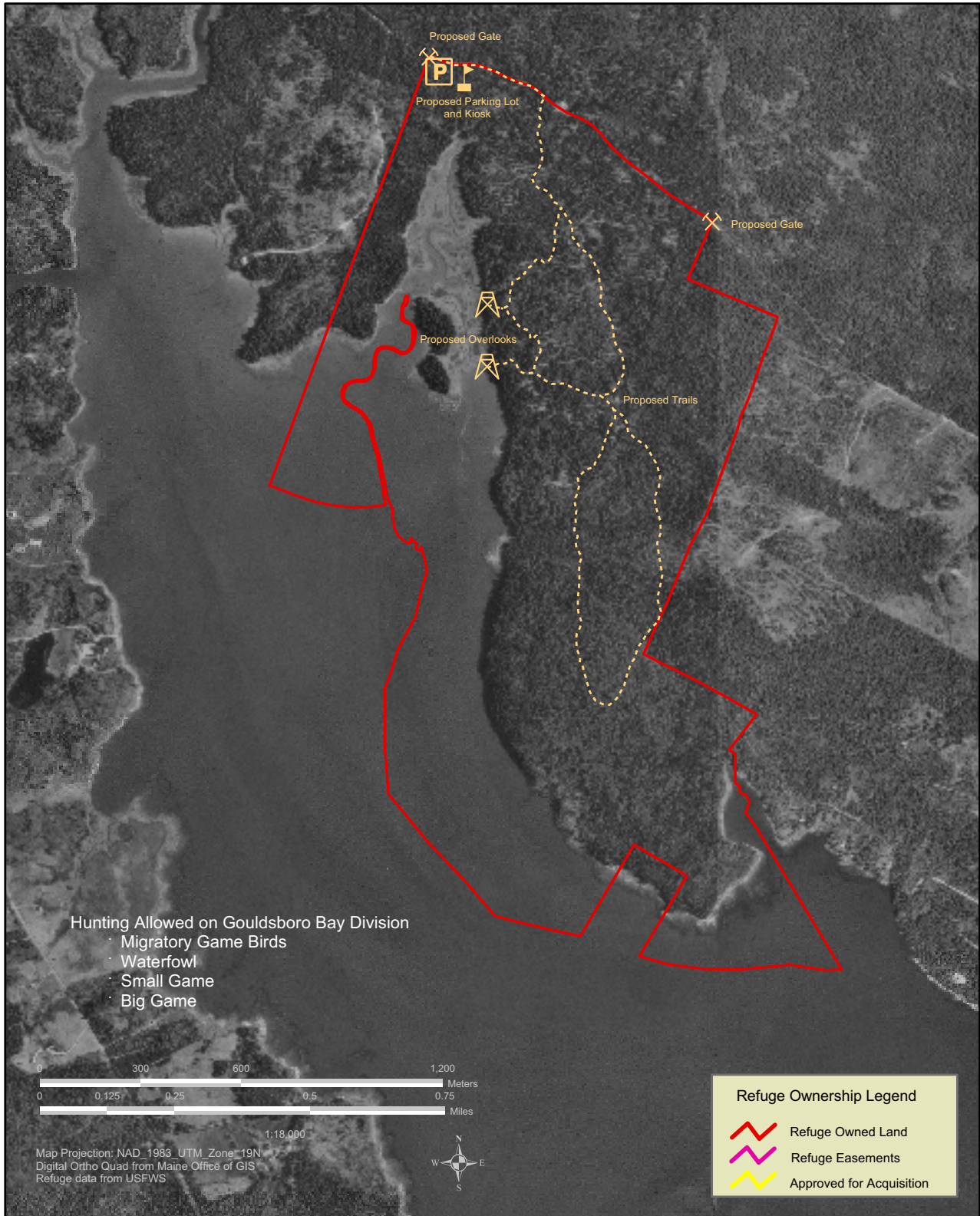
Corea Heath Division Public Use

Alternative C



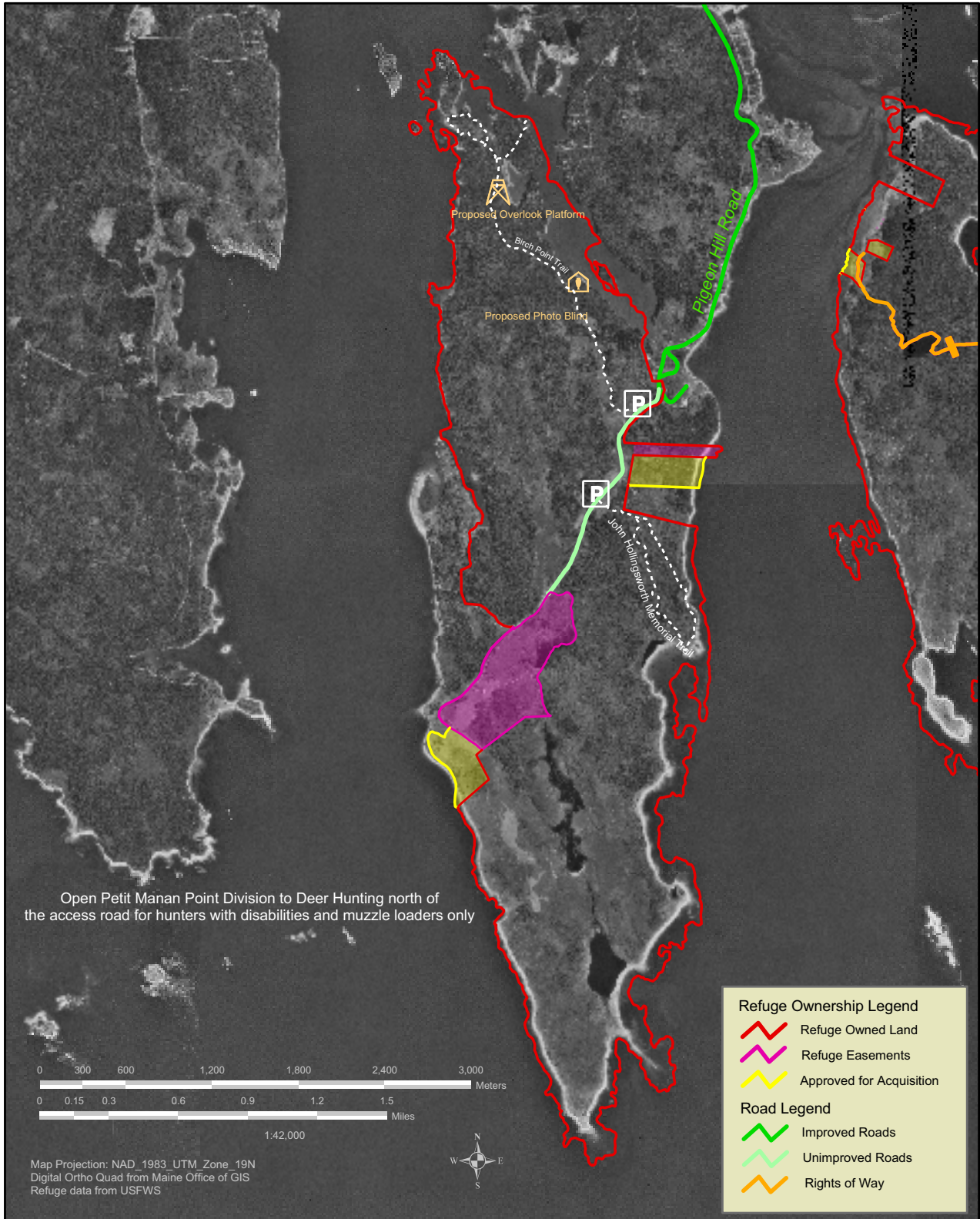


**MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE**  
**COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT**  
**Gouldsboro Bay Division Public Use**  
Alternative C





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT  
**Petit Manan Point Division Public Use**  
Alternative C





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Sawyers Marsh Division Public Use  
Alternative C



## Alternative D

### Introduction

This alternative represents a custodial or “passive management” approach to administering the Refuge and its resources. It is designed to maintain the islands’ current “natural and wild” character, similar to a wilderness area or an ecological reserve. This alternative minimizes human intrusions and intervention, except where necessary to protect threatened and endangered species, avoid catastrophic losses to current seabird populations on the Refuge, control invasive and exotic species, and enforce Refuge regulations.

Specifically, we designed this alternative to respond to the public scoping comments we received during our planning process which encouraged us to “let nature take care of itself” or “manage as a wilderness without officially designating it so.” This alternative also addresses those public comments requesting we close the islands to public access, remove all non-historic structures, and eliminate sheep grazing, hunting, lethal control of predators on seabirds, and the use of prescribed fire and herbicides.

We would reduce current management activities to focus on those that are necessary to meet minimum compliance requirements, including threatened and endangered species, human health and safety, and historic preservation. In general, we would manage vegetation only as necessary to control invasive or exotic species threatening the biodiversity of our Refuge islands and mainland divisions. Our tools would be limited to light mechanical or hand treatments. We would significantly reduce our management at seabird management projects, scaling back to only non-lethal gull management, such as destroying their nests before April when they lay eggs. We would eliminate sheep grazing, mowing, and prescribed burning as habitat management tools. We would reduce our monitoring of nesting seabirds to an annual census with one person assigned to management sites. Our other inventory and monitoring programs would be scaled back as well, as we would limit our efforts to only maintaining the MAPS

stations and continuing the baseline biological inventories on both the mainland and the islands.

This alternative would maintain the public use infrastructure on Petit Manan Point as described in Alternative A, but would not otherwise implement any public use programs that would encourage visitation on Refuge lands. Rather, our focus would be on off-site environmental education and interpretive programs. We would close all Refuge islands to public access, except when organized through a staff or partner-led tour, or operating under a special use permit. We would continue to provide commercial seabird tour boat operators with current information on island nests, and would



*Saltmarsh on Gouldsboro Bay Division*  
USFWS photo

pursue placing interpreters and interpretive displays on boats. We would eliminate hunting from all Refuge lands Maps 2-13 to 2-16 (pages 2-140 to 2-143) depict our existing and proposed infrastructure on the four mainland divisions.

We would continue to pursue Service acquisition from willing sellers of the 467 private acres within our approved boundary. No other Service land acquisition is proposed; however, we would continue to work with our partners to support their land protection efforts in coastal Maine.

Under Alternative D, no new infrastructure would be developed for any of our programs, but we would continue to maintain the administrative facilities we identify in Chapter 3. We would maintain the current staffing level; that is, eight permanent employees (see Appendix F), but this may be further reduced in the future through attrition. However, we would need to increase our outreach and law enforcement efforts using current staff to communicate the changes in management under this alternative.

We would increase our use of the local media, newsletters, and our Friends Group to reach local communities and look to partner with other Federal, State, and local law enforcement agencies to insure our regulations are adhered to. We would maintain a volunteer program and rely more on our partners to help us maintain our facilities, conduct biological inventories and monitoring, and organize our environmental education and interpretation programs. Our use of seasonal employees and interns would be limited.

Similar to Alternative A, we would not propose that any of the 13 islands meeting the minimum wilderness characteristics be recommended for inclusion in the National Wilderness Preservation System. Designation would require additional staff time and resources to plan and manage these islands to maintain their wilderness character, which we would not be prepared for under this alternative.

**Goal 1: Perpetuate the Biological Diversity and Integrity of Upland Cover Types on the Refuge's Mainland to Sustain High Quality Habitat for Migratory Birds**

**Objective 1.1 (Upland Cover Types)**

Allow natural vegetative succession to occur on all Refuge mainland areas, intervening only when necessary to control invasive or exotic species threatening native vegetation.

*Background:* Under this objective, we would allow native, upland vegetation to grow unimpeded, except when levels of invasive or exotic species threaten the native biodiversity of the area. We would not expect our mature forested stands to change appreciably during the next 15 years. Rather, we would expect the most change to occur in our 70 acres of open field. Over the next fifteen years, this field would transition to a shrub-scrub field, with some interspersed birch, beech, maple, alder and aspen saplings. We would also expect the 235 acres of early successional forest-edge to transition into a young forest, pole-sized stand.

It is in the fields where we would expect undesirable levels of encroachment by invasive and exotic vegetation. When this occurs, we would use mechanical equipment or hand pulling to eliminate as many plants as possible. These treatments are very labor intensive and depending on the size of the area to be treated, would require significant use of volunteers and other partners to be effective. Fortunately, we do not currently have significant areas impacted. We would need to be diligent in our observations and monitoring of these areas to ensure invasive and exotic species do not gain a stronghold.

We would continue the seasonal Neotropical migratory landbird monitoring which is contributing to national and regional population trend studies.

*Strategies:*

- continue Petit Manan Point and Gouldsboro Bay divisions MAPS stations and Regional landbird surveys on all three mainland divisions according to established protocol. Continue respective surveys only as often as needed to monitor population trends confidently. Incorporate data into GIS database.

*Within 5 years of CCP implementation:*

- review and revise existing cover type maps for the mainland units and incorporate into a GIS database.
- in HMP, include strategies to manage invasive and exotic vegetation using mechanical or hand-pulling treatments only.

**Goal 2: Maintain High Quality Wetland Habitat on the Refuge's Mainland Coast, Primarily to Benefit Migratory Birds of High Conservation Priority, while also Supporting Other Native, Wetland-dependent Species of Concern**

**Objective 2.1 (Maritime Saltmarsh and Estuary)**

Monitor saltmarsh and estuary areas to ensure they are not being lost or degraded by human-caused activities such as trampling, adjacent development, or pollution.

*Background:* Saltmarsh and estuaries are perhaps the most productive areas on the Refuge. They support more species than any other cover type, when you consider the number of vertebrate and invertebrate species that forage, nest, spawn, migrate through, or use them as nurseries. Numerous Federal trust resources, such as land birds, waterfowl, and shorebirds, rely on this habitat type for either nesting or migration. They also filter nutrients, waste, and sediment from upland runoff. These areas provide immensely valuable functions in the coastal ecosystem.

*Strategies:*

- continue to monitor these areas for degradation; observe for signs of trampling, adjacent construction or developments, and pollution.

**Objective 2.2 (Freshwater Impoundments)**

Same as Alternative A.

**Goal 3: Perpetuate the Biological Diversity and Integrity of Upland Cover Types on the Refuge's Coastal Islands to Sustain High Quality Habitat for Nesting Bald Eagles and Migratory Songbirds and Raptors, and to Protect Rare Plant Sites**

**Objective 3.1 (Bald Eagle Nesting Islands)**

Same as Alternative A, with the exception that islands would be closed to public use year round, except under special use permit.

**Objective 3.2 (Baseline Biological Inventories)**

Same as the baseline biological inventories in Alternative A, Objective 3.3.



*Bald eagle*

Photo courtesy of the Cornell Laboratory of Ornithology

**Goal 4: Protect the High Quality Wetland Habitats on the Refuge's Coastal Islands to Benefit Nesting and Migrating Shorebirds and Waterfowl**

**Objective 4.1 (Coastal Saltmarsh - Cross Island)**

Monitor the saltmarsh on Cross Island to ensure it is not being lost or degraded by human-caused activities such as trampling, adjacent development, or pollution.

*Background:* As noted in Objective 2.1, coastal saltmarsh areas provide immensely valuable functions in the coastal ecosystem supporting an incredible diversity of vertebrate and invertebrate life.

*Strategies:*

- continue to monitor these areas for degradation; observe for signs of trampling, adjacent construction or developments, and pollution.

**Objective 4.2 (Intertidal Harvesting)**

Same as Alternative A.



**Goal 5: Protect and Restore Nesting Seabird Populations on the Refuge's Coastal Islands to Contribute to Regional and International Seabird Conservation Goals**

**Objective 5.1 (Seabird Nesting Islands)**

Protect current seabird population levels and their distribution on Refuge islands (using year 2000 population levels as a baseline), especially against controllable catastrophic losses.

*Background:* The number and geographic distribution of occupied seabird nesting islands has decreased significantly from historic levels (USFWS 2000). Expanding gull populations and recent increases in both recreational and developmental pressures along the coast of Maine are two factors that continue to limit the availability of suitable nesting islands.

Over 90% of common, Arctic, and roseate terns, and all laughing gulls and Atlantic puffins in Maine currently nest on nine managed (e.g. seasonally-staffed) seabird management islands. In addition, over 90% of Arctic terns in Maine nest on three Refuge islands (Petit Manan, Matinicus Rock, and Seal), 85% of all puffins in Maine nest on two Refuge islands (Seal and Matinicus Rock), and 95% of the endangered roseate terns in Maine nest on two non-Refuge islands (Eastern Egg Rock and Stratton).

The potential for a single catastrophic event to significantly affect Gulf of Maine seabird populations is enhanced by the fact the seabirds are nesting on a limited number of islands. It is therefore imperative that we protect these islands on the Refuge against any significant losses. Controlling the impacts from gulls and human development and disturbance would be the management emphasis under this alternative.

*Strategies:*

- continue to work cooperatively with NAS, Canadian Wildlife Service, and MDIFW in monitoring seabird populations on non-Service owned management sites.
- on Petit Manan Island, continue to map all active puffin and razorbill burrows, using GPS and incorporate into a GIS database; monitor their use of existing artificial burrows, but do not create additional ones.
- continue to observe and record food deliveries to individual burrows to help determine reproductive success of nesting alcids.
- continue to monitor nesting and loafing herring and black-backed gull distribution on the six managed islands; document presence and activities of color-banded gulls on Petit Manan Island.
- continue to actively manage gulls and other seabird predator populations on an annual basis, but limit methods to non-lethal techniques such as harassment and destruction of nests, if gulls, prior to their egg laying.
- continue to annually document and evaluate how often and how close tour boats come to nesting seabird islands and the response by seabirds.

- continue to annually meet with tour boat companies prior to the season to discuss best management practices while operating near seabird nesting islands.
- continue to work with the FAA to have Refuge islands identified on flight charts so that pilots are alerted to the 2,000 ft-minimum recommended altitude over national wildlife refuges.
- continue to cooperate with NAS in monitoring Matinicus Rock and Petit Manan Island for laughing gull expansions; on Petit Manan Island continue to confine nesting laughing gulls to a five acre area (west of the boardwalk); use non-lethal methods of managing laughing gulls.

*Within 3 years of CCP implementation:*

- limit annual seabird monitoring on the six seabird management islands to pair counts only; no handling of birds, including banding of adults or chicks would occur. No new artificial nest boxes would be installed for roseate tern.
- in HMP, determine strategies to maintain nesting habitat for seabirds using mechanical or hand tools. No herbicides, prescribed fire, or sheep grazing would be employed.
- in HSIMP, develop monitoring strategies for invasive and exotic vegetation establishment on islands.

**Goal 6: Provide Enjoyment and Promote Stewardship of Coastal Maine Wildlife and their Habitats by providing Priority, Wildlife-dependent Recreational and Educational Opportunities**

### **Objective 6.1 (Environmental Education)**

Continue to support partner-led environmental education programs with field programs focused on the Refuge's mainland divisions.

*Background:* Environmental education programs can be very effective in establishing an appreciation for Refuge resources and communicating the importance of the Refuge as part of the National Wildlife Refuge System. Further, these programs are also important in showing how each individual can share in the stewardship of these important coastal resources by following certain conservation practices in their own lives and promoting them in their local communities.

Annually, we cooperate with the NAS and Damariscotta River Association in their classroom environmental education programs. We also have a partnership with the Chewonki Foundation and Hurricane Island Outward Bound School, who have established an environmental education program using Refuge lands. We currently issue a special use permit to the Humboldt Research Station (formerly Eagle Hill Institute) for an "outdoor laboratory" on the Refuge.

Under this alternative, we would continue to allow environmental education programs to be developed and led in the field by our partners under a special use permit; however, the majority of these would be on the Refuge

mainland divisions. Established island programs would be the exception. Also, we would not allow any infrastructure to be built to support these programs.

*Strategies:*

- continue to partner with the Chewonki Foundation, Damariscotta River Association, National Audubon Society, and Hurricane Island Outward Bound to conduct curriculum-based educational programs in classrooms and on Refuge lands.

**Objective 6.2 (Environmental Interpretation)**

Same as Alternative A, except for the following:

- islands are closed to public use year round; except for those programs operating under a special use permit.

**Objective 6.3 (Wildlife Observation and Photography)**

Same as Alternative A, except for the following changes to strategies (Maps 2-13 to 2-16 depict changes):

- islands are closed to public use year round; except those programs operating under a special use permit

**Objective 6.4 (Public Access to Refuge Islands)**

Restrict public access to Refuge islands to maximize protection of sensitive island resources, allowing access only through staff- or partner-led programs under a special use permit.



*Alcids on Petit Manan Island*  
USFWS photo

*Background:* Under this alternative, the islands are managed as ecological reserves, with minimal human impact and intervention. There would be exceptions to the public closures, as noted in objectives 6.1, 6.2, and 6.3, to conduct a limited number of programs operating only under special use permit.

*Strategies:*

- islands are closed to public access year round; except for those programs operating under a special use permit
- Halifax and Bois Bubert islands would be closed to camping year round.

**Goal 7: Protect the Integrity of Coastal Maine Wildlife and Habitats through an Active Land Acquisition and Protection Program**

**Objective 7.1 (Service Land Acquisition)**

Continue Service acquisition of significant Maine coastal habitats from willing sellers within our currently approved boundaries.

*Background:* As we described in the land protection discussion in Chapter 2, “Actions Common to All Alternatives,” all alternatives include, at a minimum, continued Service acquisition of lands from willing sellers within the currently approved Refuge boundary. At present, we have approval to acquire 467.1 acres total, consisting of two tracts (25 acres) on Petit Manan Point Division; one tract (95 acres) on the Sawyers Marsh Division; and 25 tracts on 14 islands (347.5 acres). We believe acquisition of these lands is essential to meeting Refuge purposes and goals. These lands are not only important for their Federal trust resource values, but many would also make more effective boundaries for our management and administrative purposes.

Strategies:

- continue to acquire private lands from willing sellers within currently approved acquisition boundaries; tracts on 14 islands (347.5 acres) and 120 acres of mainland are approved. All lands acquired would become part of the Petit Manan Refuge.
- continue to participate in annual coordination meetings with the Gulf of Maine island protection partners including: GOMP, MDIFW, TNC, MCHT, local land trusts, and private landowners.
- continue to work annually with GOMP to insure the nationally significant island list is updated.

**Objective 7.2 (Cooperative Protection and Management of Islands)**

Same as Alternative A.

**Objective 7.3 (Cooperative Protection and Management of Important Mainland Habitats)**

Same as Alternative A.

**Objective 7.4 (Archeological and Historic Resources)**

Same as Alternative A.

**Goal 8: Communicate and Collaborate with Local Communities, Federal, State, Local and Tribal Representatives, and other Organizations throughout Coastal Maine to Further the Mission of the National Wildlife Refuge System**

**Objective 8.1 (Research Partnerships)**

Same as Alternative B.

**Objective 8.2 (Law Enforcement Partnerships)**

Same as Alternative B.

**Objective 8.3 (Community Outreach)**

Same as Alternative B.

**Objective 8.4 (Elected Officials Outreach)**

Same as Alternative B.

**Objective 8.5 (Adjacent Landowner Outreach)**

Same as Alternative B.



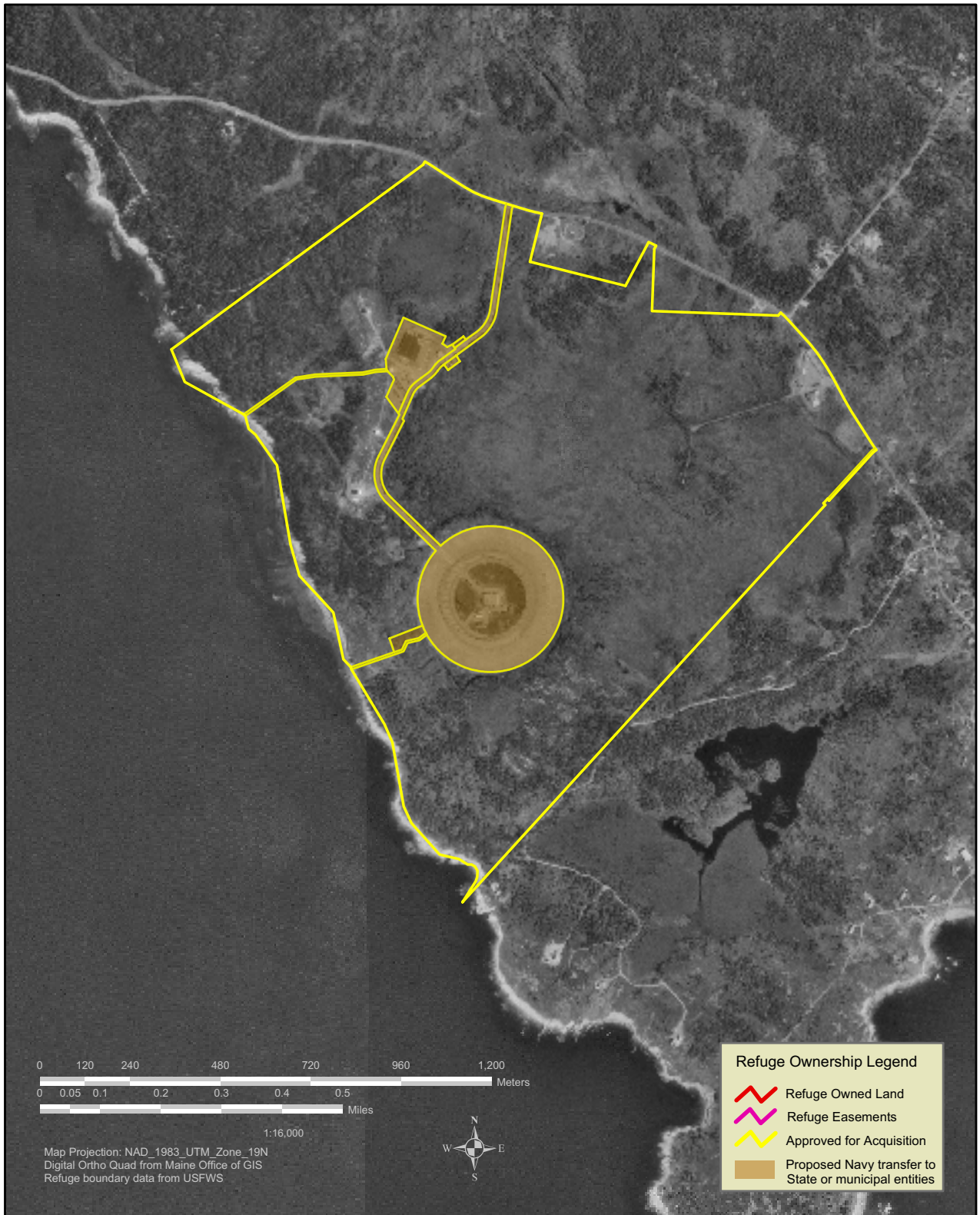
*Black guillemots*  
USFWS photo



MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

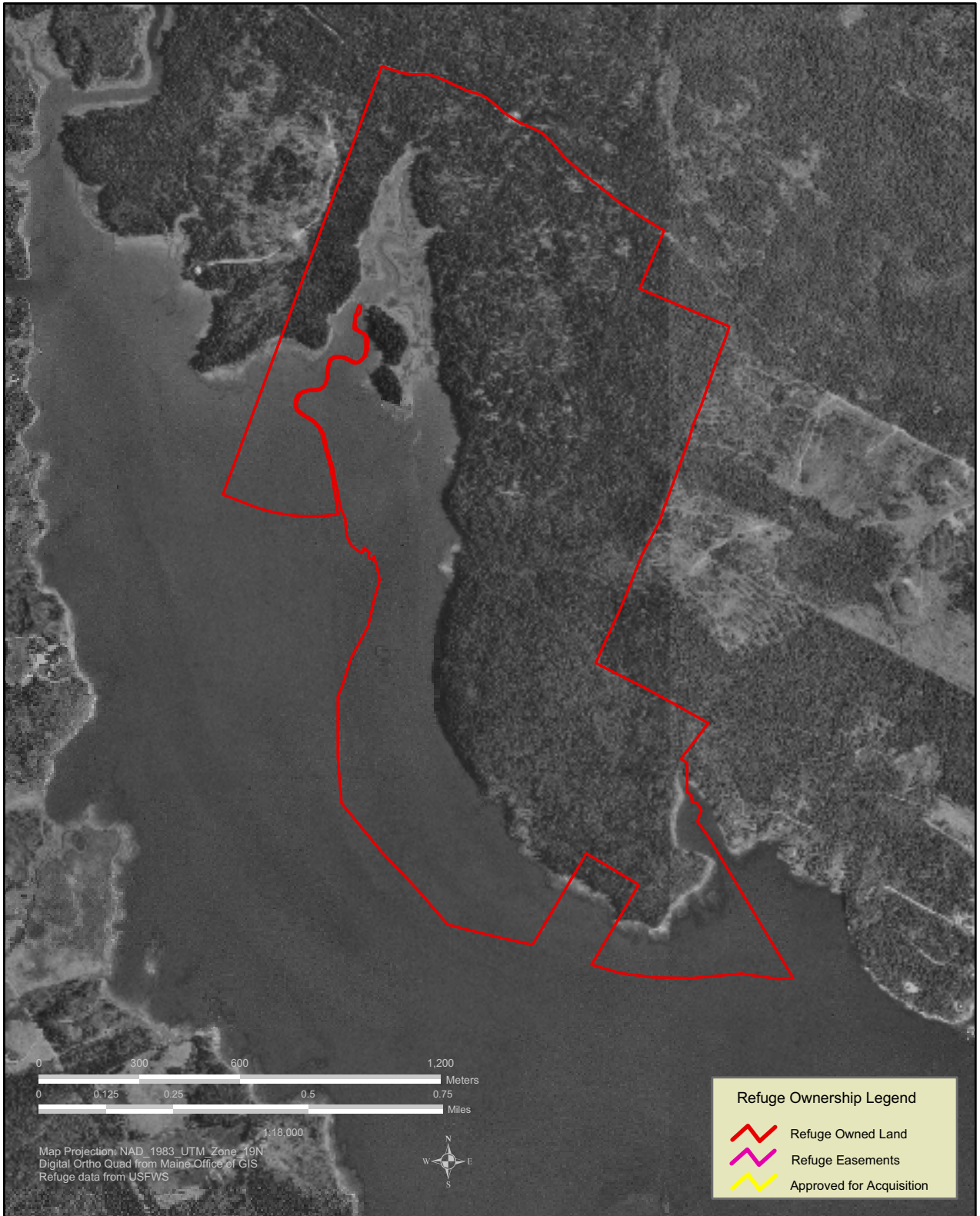
Corea Heath Division Public Use

Alternative D



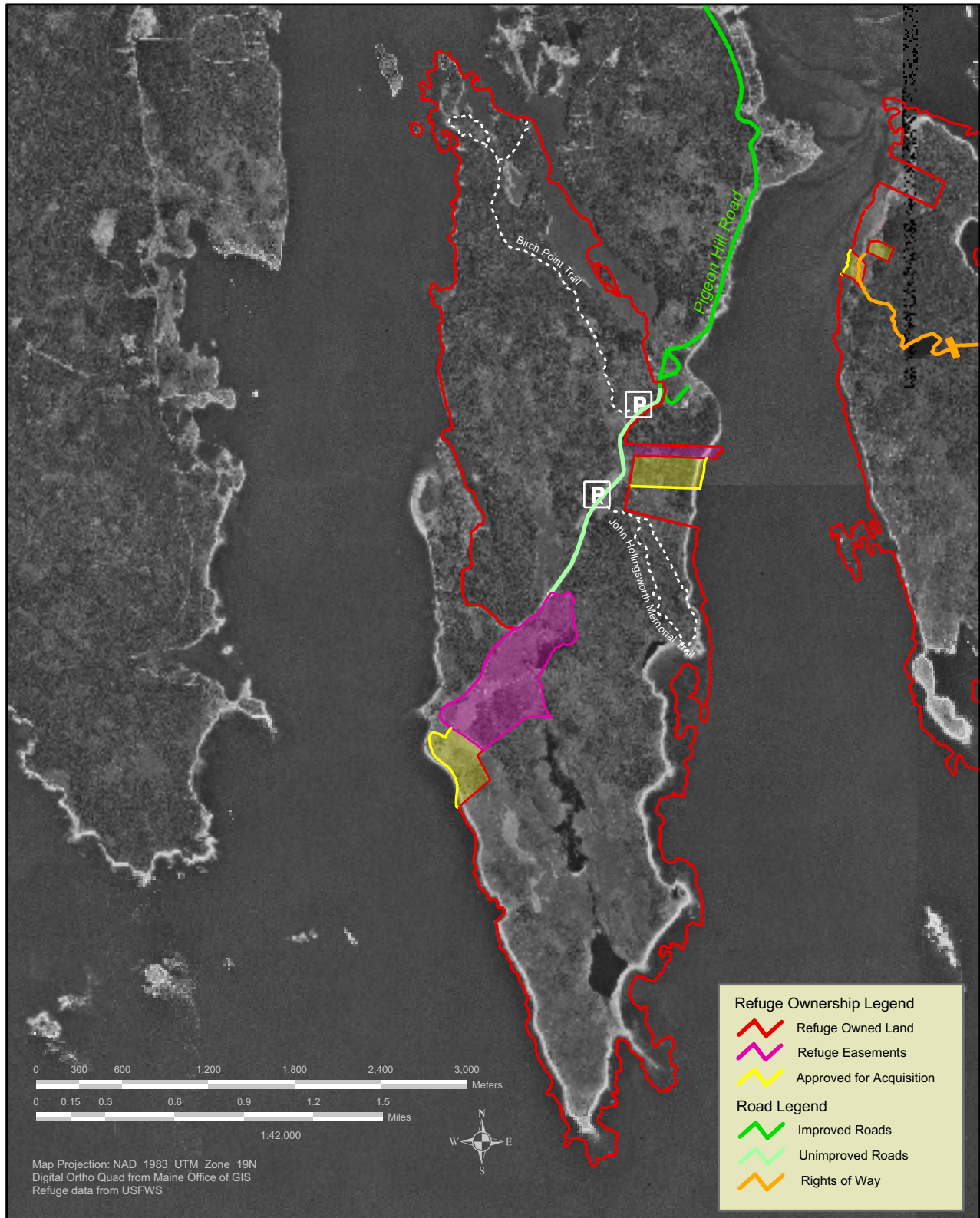


**MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE**  
**COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT**  
**Gouldsboro Bay Division Public Use**  
Alternative D





**MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE**  
**COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT**  
**Petit Manan Point Division Public Use**  
Alternative D



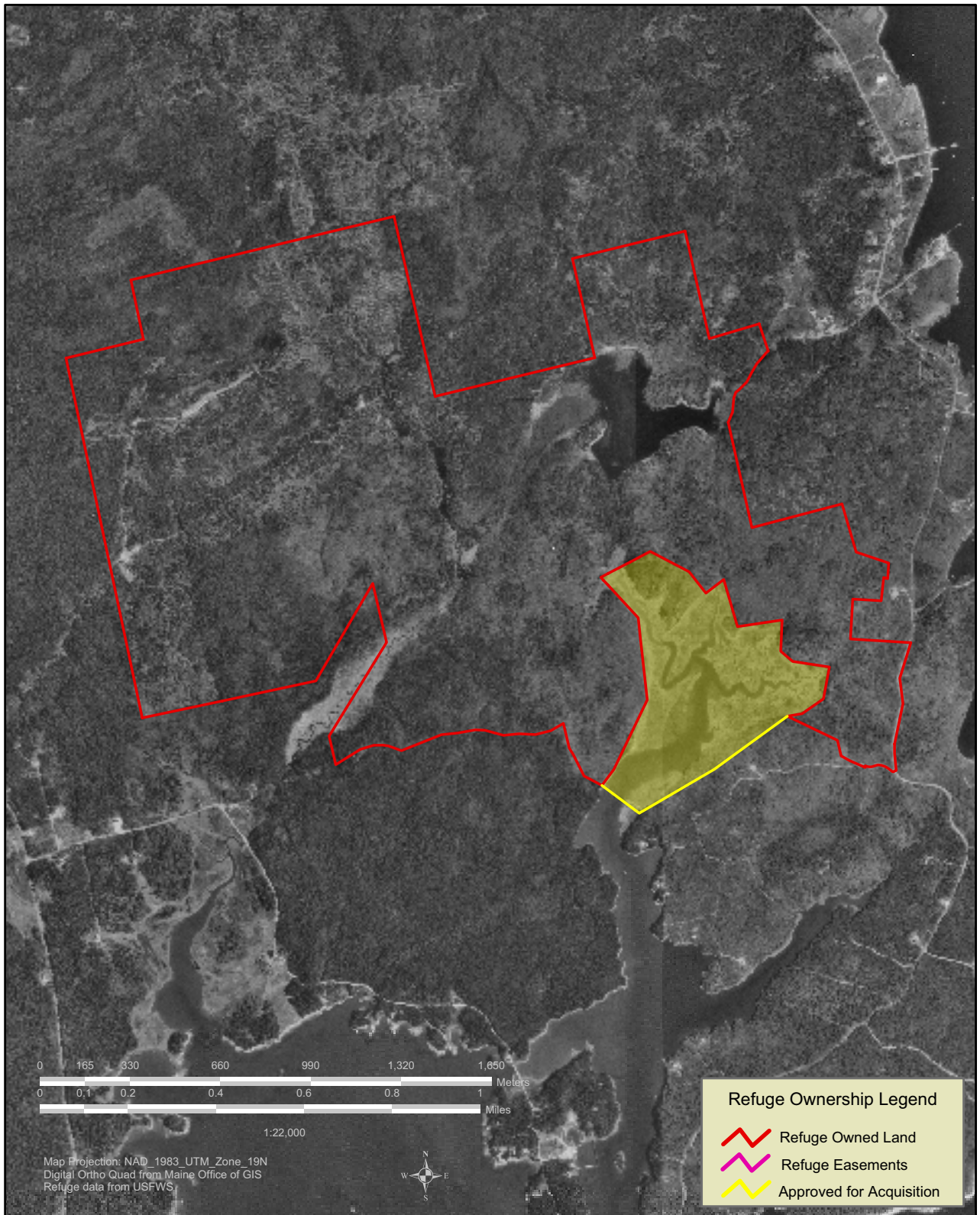




**MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT**

**Sawyers Marsh Division Public Use**

Alternative D



## Comparison of Actions by Alternative As they Relate to Issues

Table 2-1 compares and contrasts important management actions and strategies by alternative. Earlier in this chapter we presented the actions common to all alternatives. This table, however, emphasizes the differences among the alternatives. In addition, we show which actions address the issues identified in Chapter 1. These same actions are also found throughout Chapter 2 under the respective goal and objectives statements.

Unless otherwise noted, all actions are to be initiated within the 15 year CCP planning horizon, with the Refuge staff as the lead responsible party.

**Table 2-1 Comparison of Management Actions by Alternative**

<b>Issue 1. How will we protect coastal nesting islands in the Gulf of Maine, given the finite number of islands suitable for seabird, wading bird, and bald eagle nesting?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Manage the 43 islands that are part of the Refuge; 37 are owned by the Service in fee title, 5 in conservation easement, and 1 under a Memorandum of Understanding (MOU) with the State of Maine.</p> <p>Coordinate with the Services's Gulf of Maine Program Office (GOMP) to identify nationally significant coastal nesting islands in need of permanent protection (currently 151 identified)</p> <p>Continue to pursue acquisition of lands from willing sellers within the currently approved Refuge boundary. This includes 14 islands (347.5 acres) and 3 mainland tracts (119.6 acres).</p> <p>Continue to pursue the no-cost transfer of Corea Heath tract within the currently approved Refuge boundary.</p> <p>Seek approval and pursue acquisition of 30 additional nationally significant coastal nesting islands(see Table 2.2) and 153.3 acres of mainland over the next 15 years. This expansion assumed funding levels remain similar to recent years.</p>	<p>Continue to manage the 43 islands that are part of the Refuge.</p> <p>Continue coordination with the Services's Gulf of Maine Program Office (GOMP) to identify nationally significant coastal nesting islands in need of long-term protection (currently 151 identified)</p> <p>Continue to pursue acquisition of lands from willing sellers within the currently approved Refuge boundary. This includes 14 islands (347.5 acres) and 119.6 acres of mainland in 3 tracts.</p> <p>Continue to pursue the no-cost transfer of Corea Heath tract within the currently approved Refuge boundary.</p> <p>Acquire up to 87 additional nationally significant islands (2,306.4 acres; see Table 2.2) and 153.3 acres of mainland in need of permanent protection according to Land Protection Plan (Appendix A), if available from willing sellers.</p> <p>Work with conservation partners, as opportunities arise, to support their protection and acquisition of the remaining 64 nationally significant islands.</p>	<p>Expand Alternative B to include the following:</p> <p>Acquire all, or portions of, 151 nationally significant islands in need of long term protection (see Table 2.2). Portions of large islands (&gt;200 acres) may be all that is needed to provide protection of bald eagle nesting sites. Given this consideration, approximately 6,310 acres is targeted for Service acquisition from willing sellers.</p> <p>This alternative assumes currently unprotected nationally significant islands are best served by Service ownership. It also assumes a significant increase in Refuge funding and staffing.</p> <p>Staff involvement in outreach to island owners would dramatically increase.</p>	<p>Continue to manage the 43 islands that are part of the Refuge.</p> <p>Continue to pursue acquisition of 14 islands and 119.6 acres of mainland from willing sellers within the currently approved Refuge boundary, similar to Alternative A, and the Corea Heath tract as a transfer within the currently approved boundary.</p> <p>No new land expansion is proposed.</p> <p>This alternative assumes nationally significant islands are best served by conservation partner ownership. The Service would, however, continue to identify important islands needing protection and assist partners in seeking funding options.</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 2: How will we deal with increased recreational and commercial activities on or near Refuge islands?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>At kiosks, our offices, and in conjunction with other programs, provide information to public on responsible uses of islands.</p> <p>Meet with MITA 2 - 3 times/year to support their efforts to control and manage islands throughout the Maine coast, and their Island Stewardship Program.</p> <p>Meet annually with seabird tour boat operators to provide information on "best operating procedures."</p> <p>Provide tour boat operators with Refuge brochures and updated management and biological information.</p> <p>Monitor tour boat operations and resource harvesting in intertidal zones of Refuge islands.</p> <p>Work with partners to monitor aquaculture facilities near "nationally significant" islands and Refuge islands.</p> <p>On seasonally staffed seabird nesting islands, document public use in the intertidal zone and the response of nesting seabirds.</p>	<p>In addition to Alternative A:</p> <p>Coordinate annually with ME DMR, Corps of Engineers , MDIFW, MITA, and NPS through GOMSWG, or other forum, to identify and address potential threats to nesting seabirds from commercial industries and recreational uses. Specifically, establish monitoring program on proposed and existing aquaculture facilities near nationally significant islands and in areas frequented by inter-tidal harvesters. Involve commercial aquaculture and recreational representatives in developing and implementing best management practices.</p> <p>Hire summer interns or volunteers to interpret Refuge resources on commercial tour boats. Explore option of funding positions with a share of tour boat profits. Place interpretive panels on tour boats and in tour boat offices.</p> <p>Establish formal Island Stewardship program with MITA or other partners, with the goal of covering 5 Refuge islands. Involve volunteers, similar to existing programs on Roberts, Little Thrumcap, Inner White, and Outer White Islands. Highest priority would be establishing a program on Halifax Island.</p>	<p>In addition to Alternative B:</p> <p>Conduct an annual workshop for kayak guides and outfitters, focusing on responsible uses of coastal islands.</p> <p>Design and sponsor research to determine the short and long term effects from aquaculture and intertidal resource harvesting on the entire island ecosystem.</p>	<p>Same as Alternative A</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<i>Issue 3: How will our management activities affect public access to the Refuge's coastal nesting islands?</i>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Continue to allow the following three non-nesting islands to remain open year round for day use, assuming no sensitive areas, species, or habitats of concern become established: Cross, Scotch, and Bois Bubert islands.</p> <p>Continue to allow approximately 1/4 of Halifax Island to be open for day use; most is closed (and marked) to protect botanical resources.</p> <p>Continue seasonal closures to public access on all seabird nesting islands from April 1 to August 31.</p> <p>Continue seasonal closure to public access at active bald eagle nesting sites from February 15 to August 31.</p> <p>Continue seasonal closures at historical eagle nesting sites from Feb. 15 to May 15 to encourage re-nesting. On May 15 each year, determine whether eagle activity warrants an extended closure.</p> <p>Continue to maintain year round closure on Seal Island due to unexploded ordnance and concerns with public safety.</p> <p>Continue to allow camping on Bois Bubert and Halifax islands as part of the Maine Islands Trail.</p> <p>Access to newly acquired Refuge islands is evaluated on a case-by-case basis, but generally follows the guidelines above.</p>	<p>In addition to Alternative A:</p> <p>Post interpretive and regulatory signs on all Refuge islands. Work with other island owner partners to try to standardize regulatory signs to extent possible.</p> <p>Hire at least 2 Park Rangers to patrol Refuge islands.</p> <p>Implement Leave No Trace program; develop and implement monitoring protocols.</p> <p>Establish an formal Island Stewardship program on at least 5 Refuge islands in cooperation with MITA and other conservation partners.</p> <p>Modify public access closures on eider or gull-only nesting islands to April 1 to July 31. These dates conform more closely to State-owned island closures.</p> <p>Camping on Bois Bubert and Halifax islands would continue under permit-reservation, but only with cooperative planning and implementation by MITA, ME Bureau of Parks &amp; Lands., and other partners. With partners establish a monitoring program to identify threshold impact limits for island usage and limits of acceptable change to ensure there is no site deterioration from current use. For example, vegetation and soil erosion both inside and outside of designated camping areas would be monitored on a regular basis as agreed to by the partners.</p> <p>In conjunction with Visitor Services Plan, evaluate opportunities on select islands for on-island seabird viewing where compatible. Also develop Refuge policy on island visitation to insure consistency in management.</p>	<p>Same as Alternative B, except:</p> <p>Evaluate each island separately to determine the most effective public access closure period for protecting species nesting there. Closure periods may vary from the currently used Feb. 15 to August 31 dates, if appropriate.</p> <p>This approach necessitates an extensive signage program, intensive outreach and partnership coordination effort, and monitoring of public use to ensure effective implementation.</p> <p>Implement additional island closures as necessary to protect sensitive areas (vegetation or other species or habitats of management concern). Groups of 6 or more for day-use will need to obtain a permit.</p> <p>Allow camping to continue under conditions identified in Alternative B.</p>	<p>Close all Refuge islands to general public access year round. Islands would be managed to minimize human intervention and presence.</p> <p>The only public access would be through staff- or partner-led programs or organized under special use permits.</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<i>Issue 4: How will we manage Refuge habitats to protect endangered, threatened, and other species of management concern?</i>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Continue to manage 6 existing seabird restoration projects on Refuge lands and participate in management of 4 other islands with NAS, including bird censuses, vegetation management, lethal and non-lethal predator management, and controlling access to minimize disturbance.</p> <p>Vegetation management to benefit nesting seabirds would continue to occur on 3 Refuge islands and includes use of mechanical, chemical, fencing, sheep grazing, and prescribed fire treatments.</p> <p>Continue to manage 70 acres of open field on Petit Manan Pt Division to maintain habitat diversity and to benefit nesting landbirds of concern. Use mechanical, chemical, and prescribed fire techniques as needed.</p> <p>Up to 55 acres/year could be burned to meet habitat objectives</p> <p>Continue to manage the 3 freshwater impoundments on Petit Manan Pt Division for migratory waterfowl.</p> <p>Continue to protect the 4 active bald eagle sites from habitat loss or human disturbance.</p>	<p>In addition to Alternative A:</p> <p>Complete an HMP for the Refuge within one year. As a priority, develop strategies for achieving high quality seabird nesting habitat. Evaluate sheep grazing as a vegetation management tool, in addition to mechanical, chemical, burning, fencing, and predator management strategies.</p> <p>Up to 110 acres/year could be burned to meet habitat objectives.</p> <p>With development of Refuge HSIMP, establish protocol to evaluate not only the number of seabirds responding to habitat restoration, but also the overall species composition and distribution. Adapt management to monitoring results.</p> <p>Establish 6 new seabird restoration projects, in cooperation with partners, and enhance existing 6 seabird restoration sites (12 sites total). The overall objective with new restoration sites is to maintain or increase species diversity at individual sites, increase productivity and fledging rates, and improve the overall distribution of nesting seabirds in the Gulf of Maine. New sites will be identified as new islands are acquired.</p> <p>Develop individual seabird restoration plans for each new project site.</p> <p>Implement strategies to enhance nesting habitat for Leach's storm-petrels.</p> <p>Initiate common murre attraction program on additional Refuge islands when determined feasible.</p>	<p>Same as Alternative B, except:</p> <p>Initiate 12 new seabird restoration projects (18 sites total), involving a significantly increased partnership effort, in conjunction with new island acquisitions where potential has been identified.</p> <p>Develop individual, island-specific HMPs, establishing population and habitat management goals and objectives for not only seabirds, but other species/habitats of concern as well. Management efforts would focus on providing habitat diversity.</p> <p>Up to 250 acres/year could be burned to meet habitat objectives.</p> <p>Work with private landowners of coastal nesting islands to promote their efforts to protect &amp; restore nesting seabirds, wading birds, and eagles.</p> <p>Develop and initiate monitoring protocol to ascertain sustainability of rare plant communities based on earlier inventory efforts. Design and implement habitat enhancement or restoration as warranted.</p>	<p>Eliminate herbicide use, sheep grazing, and mowing. Burning will be limited to less than 5 acres/year namely to reduce fire hazards, eliminate brush piles, or to maintain boundaries.</p> <p>Complete a Refuge HMP emphasizing a "custodial" low-intervention management approach.</p> <p>Decrease management intensity at the 6 existing seabird restoration projects. Primarily, management is limited to non-lethal gull control for seabird nesting site protection.</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 5: How will we control the impacts of predators on species of management concern on Refuge lands?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Conduct gull control ( non-lethal and infrequently, lethal), in association with the 6 seabird restoration projects, to minimize nest competition and predation from gulls on nesting seabirds.</p> <p>Conduct mammalian and avian predator control ( non-lethal and lethal) on selected islands where these predators are adversely affecting seabird nesting success and survival.</p>	<p>In addition to Alternative A:</p> <p>Increase predator control activities commensurate with the increased number of islands acquired and the 6 new seabird restoration projects. Techniques would be similar to Alternative A, including lethal and non-lethal control of mammalian and avian predators on nesting seabirds.</p> <p>Initiate predator control efforts on non-staffed islands as appropriate.</p>	<p>In addition to Alternative A:</p> <p>Increase predator control activities commensurate with the increased number of islands acquired and the 12 new seabird restoration projects. Techniques would be similar to Alternative A, including lethal and non-lethal control of mammalian and avian predators on nesting seabirds.</p> <p>Initiate predator control efforts on non-staffed islands as appropriate.</p>	<p>Use only non-lethal techniques for predator control.</p>
<b>Issue 6: How will we manage sheep grazing on Refuge lands?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Work with landowners to ensure sheep grazing on Refuge lands (Metinic and Nash Islands; where the Service only owns portions of the islands) is not adversely affecting nesting seabirds.</p> <p>Monitor vegetation plots in sheep exclosures, comparing grazed vs. ungrazed areas and effects on nesting habitat quality.</p> <p>Use exclosure fencing, where appropriate, to protect active seabird nesting colonies from disturbance and trampling by sheep, and to provide cover for nesting. Evaluate effectiveness of fencing.</p>	<p>In addition to Alternative A:</p> <p>Complete special use permit with sheep owners on Metinic and Nash islands. Objective would be to use sheep to manage vegetation at seabird nesting sites. Experiment with timing and intensity of grazing, and fencing. An adaptive management approach is necessary due to the unique situation (getting equipment on island, timing of treatments needed, tradition of grazing, and shared ownership of the islands).</p> <p>Develop Refuge HMP with specific objectives and strategies for vegetation management on coastal islands, including sheep grazing.</p> <p>With development of the Refuge HSIMP, establish monitoring and evaluation protocol to determine effects of grazing on nesting seabirds, soils, and plant species composition, density, and structure. Establish thresholds of acceptable change to resources. Evaluate effectiveness within 5 years of CCP approval.</p>	<p>Same as Alternative B.</p>	<p>Discontinue sheep grazing on Refuge lands.</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<i>Issue 7: How will we manage non-native invasive and exotic species on Refuge lands?</i>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Conduct baseline inventories of Refuge lands to identify occurrence and abundance of invasive plants (2 islands per year). Limited use of mechanical, chemical, and prescribed burning treatments would continue to control their spread.</p>	<p>Complete a Refuge HMP including strategies for mapping and managing invasive and exotic species.</p> <p>Expand baseline inventories of Refuge lands to at least 6 islands per year. Target identification and mapping of invasive and exotic species and develop integrated management plan to include biological, prescribed fire, mechanical, and limited herbicide treatments as warranted.</p>	<p>Conduct baseline inventories for all Refuge lands, with follow-up monitoring every three years.</p> <p>Aggressively eradicate invasive species, using mechanical and chemical means and burning. Actively restore native vegetation to control sites.</p> <p>Develop island-specific habitat management plan which address non-native invasive and exotic species occurrence and focus on protection of rare plant communities.</p>	<p>Use limited mechanical intervention or hand-pulling only to control invasive species.</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<i>Issue 8: How will we effectively monitor and inventory wildlife populations and habitats on the Refuge?</i>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Hire 18 seasonal researchers (May 15 - Aug. 15) each year, including Service- and partner-funded biotechs, to monitor seabird nesting. Use researchers to also document use by neotropical migrants.</p> <p>Hire 1 seasonal researcher to do landbird and marsh bird surveys on Refuge mainland units.</p> <p>Survey Refuge islands for nesting bird species diversity on a 5-year cycle.</p> <p>Hire seasonal researcher to do breeding bird survey and fund avian research project (MAPS) on Petit Manan Point, Sawyers Marsh and Gouldsboro Bay divisions.</p> <p>Maintain cover type mapping on large islands and mainland divisions.</p> <p>Continue to support biological surveys conducted by volunteers or researchers.</p> <p>With MDIFW, NPS, and private researchers, conduct winter shorebird surveys along the coast.</p>	<p>In addition to Alternative A:</p> <p>Develop cover type maps for all mainland properties.</p> <p>Complete HSIMP to establish baseline information needs, prioritize projects, and develop an implementation schedule. Utilize established Service, TNC and MDIFW monitoring protocols.</p> <p>Develop partnerships, specifically with universities, USGS, and MDIFW, to facilitate research on Refuge lands.</p> <p>Expand baseline floral and faunal island inventories to at least 6 islands/year.</p> <p>Conduct intensive surveys on at least 3 islands each year specifically to determine use by landbirds, shorebirds and raptors during spring and fall migrations. Hire seasonal researchers or contractors as necessary.</p>	<p>In addition to Alternative B:</p> <p>Work with partners to develop inventory &amp; monitoring protocols for burrow-nesting species, e.g., Leach's storm-petrels &amp; alcids.</p> <p>Coordinate with the NMFS and MDMR to evaluate status of and identify threats to coastal fishery populations that support species of conservation concern.</p> <p>Coordinate with NMFS and Univ. of Maine to document use and distribution of marine mammal haul-out &amp; pupping locations on Refuge islands.</p> <p>Initiate major effort to conduct baseline floral inventories of all Refuge properties; attempt at least 12 islands/year.</p> <p>Initiate research and monitoring efforts on intertidal and marine habitats surrounding Refuge lands. Efforts would focus on factors influencing productivity and survival of species of concern.</p>	<p>Establish priorities for baseline inventory needs and determine an implementation schedule.</p> <p>Attempt to conduct baseline floral and faunal inventories on at least 2 Refuge islands/year.</p> <p>Conduct seabird pair counts only on the 6 Refuge islands that are currently part of intensive seabird restoration project.</p> <p>Partner with land trusts, LE agencies, adjacent landowners, and volunteers to monitor Refuge lands.</p> <p>Continue MAPS station monitoring on mainland divisions.</p> <p>Review and revise cover type maps bi-annually.</p>



Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 9: How will we build partnerships to protect coastal wildlife and habitats and support priority, wildlife-dependent public uses?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Maintain strong island protection and partnership with the Service's GOMP, MDIFW, TNC, MCHT, local land trusts, and private landowners.</p> <p>Coordinate with interagency Maine Wetlands Coalition to identify priority mainland coastal wetlands for protection by Service and other conservation partners.</p> <p>Maintain environmental education partnerships with Chewonki Foundation, Damariscotta River Association, National Audubon Society, and Hurricane Island Outward Bound School.</p> <p>Continue to support and encourage the Refuge Friends of Maine Seabird Islands group.</p> <p>Maintain informal Island Stewardship Program with Maine Island Trail Association (MITA) on 5 Refuge islands.</p>	<p>In addition to Alternative A:</p> <p>Maintain, or establish new, MOU's with universities and colleges, the NPS (NPS), NAS, Humboldt Research Station, MDIFW, other Service programs, and other partners to cooperatively accomplish biological and human dimensions monitoring, inventorying, and research needs.</p> <p>Explore opportunities to partner on Coastal Education Center in the mid-coast area. Partner with universities and colleges to create internship program for students to work at Coastal Education Center or in field programs for a semester.</p> <p>Conduct regular briefings with Congressional offices, including annual trips to Capitol Hill.</p> <p>With MITA or other partners, establish a formal Island Stewardship Program on 5 new Refuge islands.</p> <p>Expand the Refuge Friends group by adding a second chapter.</p> <p>Partner with tour boat companies to hire a summer interns or volunteers to provide interpretation on tour boats viewing Refuge. Produce interpretive panels to be displayed in tour boat offices or on boats.</p> <p>Establish formal relationship (MOA or MOU) with Friends of Nash Island Lighthouse. Also establish a Friends Group for lighthouses on Two Bush, Egg Rock, and Libby islands.</p>	<p>In addition to Alternative B:</p> <p>Expand the Refuge Friends group further by adding a third chapter.</p>	<p>Coordinate with interagency Maine Wetlands Coalition to identify priority wetlands in need of protection by conservation partners.</p> <p>As opportunities arise, establish MOU's with local universities and colleges to cooperate in baseline inventories and monitoring.</p> <p>Partner with land trusts, LE agencies, adjacent landowners and volunteers to monitor Refuge lands.</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 10: How will we improve communications, raise the visibility of the Service and the Refuge System, and build working relationships with local communities?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Give talks and Refuge slide presentations to local organizations upon request.</p> <p>Participate in special local events including fairs, sporting shows, and festivals.</p> <p>Issue occasional news releases and conduct interviews with media; prepare bi-weekly column in Rockland's Free Press.</p> <p>Sustain and improve volunteer program at the Refuge headquarters.</p> <p>Distribute Refuge brochures to chambers of commerce, welcome centers along Maine coast.</p> <p>Support the Friends of Maine Seabird Islands group in Rockport</p> <p>Maintain Refuge website with basic information on resources and opportunities.</p> <p>Continue to pursue site for a mid-coast Refuge Headquarters and Coastal Education Center with NAS and MAS as partners.</p>	<p>In addition to Alternative A:</p> <p>Expand volunteer programs at the Refuge Headquarters and Rockport offices. Use volunteers to help with outreach and informational programs.</p> <p>Publish a quarterly newsletter.</p> <p>Hire a summer interns for outreach, education, and interpretation on Refuge's mainland divisions.</p> <p>Expand the Friends Group to a second chapter downeast.</p> <p>Develop a Refuge Complex video for use at off-site events.</p> <p>Install Refuge System/Refuge interpretive panels at 3 coastal rest areas.</p> <p>Purchase a new phone system with voice mail menu that allows public access to regulations, upcoming events, current information of interest.</p> <p>Conduct annual briefings with Congressionals to discuss Refuge programs.</p> <p>Hold annual field visits for elected officials and community leaders.</p> <p>Meet with adjacent landowner associations.</p>	<p>In addition to Alternative B:</p> <p>Obtain AM radio frequency for visitors to tune into for current information, regulations, or upcoming events.</p> <p>Install up to 6 Refuge System/Refuge interpretive panels at coastal rest areas, and install 3 at Maine State Tourism Centers.</p>	<p>Same as Alternative A</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 11: How will we provide and maintain quality environmental education and interpretation programs on the Refuge?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Maintain kiosks on Petit Manan Point Division and trail interpretation signs on Hollingsworth Memorial Trail.</p> <p>Conduct 2-to-3 staff- and volunteer-led programs on Refuge and partner lands.</p> <p>Meet annually with Bar Harbor-based seabird tour boat operators, provide them with information to distribute; provide weekly updates of nesting seabird activities.</p> <p>Recruit and train volunteers to run programs.</p> <p>Cooperate with NAS and Damariscotta River Association to develop materials and ensure the Service's messages are shared.</p> <p>Continue special use permit with Humboldt Research Station, using Refuge lands as an outdoor laboratory and classroom.</p> <p>Maintain partnerships with Chewonki Foundation, Hurricane Island Outward Bound School, and local schools to conduct field-based environmental and education programs.</p> <p>Pursue Coastal Education Center in mid-coast area with partners (see Issue 10) .</p>	<p>In addition to Alternative A:</p> <p>Develop Visitor Services Plan; establish protocols to monitor and evaluate the quality of programs and visitor satisfaction.</p> <p>Create accessible interpretive trails at Gouldsboro Bay, Sawyers Marsh, and Corea Heath divisions.</p> <p>Conduct school programs during Migratory Bird Day and NWRS Week.</p> <p>Conduct at least 1 Teacher workshop each year; develop environmental curriculums for teachers to use in classrooms, or for trips on the Refuge.</p> <p>Hire interns or volunteers to interpret on seabird tour boats; produce interpretive panels for tour boats and launch sites.</p> <p>Hire 3 additional outdoor recreation planners and at least two interns to implement programs.</p> <p>Enhance interpretation on the Birch Point Trail; develop at least one overlook with interpretive panels.</p> <p>Establish a partnership with NPS Schoodic Point facility to assist in their Learning Facility.</p> <p>Install interpretive signs on Halifax Island to raise awareness of rare plants.</p> <p>Install Refuge interpretive panels at 3 rest areas along coastal highway.</p> <p>Evaluate opportunities on select islands for on-island seabird viewing, where compatible. Include in Visitor Services Plan.</p>	<p>In addition to Alternative B:</p> <p>Hire at least 2 summer interns to provide programs on the Refuge's mainland divisions.</p> <p>Install Refuge interpretive panels on 3 additional rest areas along the coast, and 3 in Maine State Tourism Centers.</p> <p>Develop a program to live-feed a video broadcast to the website of puffins in their burrows or a view of the seabird colony from Petit Manan Light. Include a curriculum that could be used by students worldwide. Research data would also be posted on the site, and students would be led through lessons using the data.</p>	<p>Maintain existing interpretive infrastructure (trails and kiosks on Petit Manan Point), but there would be no expansion of interpretive opportunities.</p> <p>Conduct staff- or partner-led environmental education and interpretation programs on the mainland outside of sensitive nesting periods.</p> <p>Post all Refuge islands, with signs visible from the water, to identify that islands are closed to public use year round.</p> <p>Pursue Coastal Education Center in mid-coast area with partners (see Issue 10) .</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 12: How will we provide and maintain quality programs for wildlife observation and photography?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Mainland and island units are open, or seasonally open, to wildlife observation and photography. Access restrictions are noted in Issue 3.</p> <p>Manage tour boat operations to Machias Seal Island under Refuge special use permit. Coordinate annually with tour boat operators and Canadian Wildlife Service officials.</p> <p>Conduct occasional meetings with tour boat operators visiting Cross and Petit Manan islands. Provide weekly updates on status of nesting seabirds on Petit Manan Island to all tour boat companies visiting the island.</p> <p>Allow commercial photographers access to closed areas under special use permit.</p> <p>Use volunteers, interns, and electronic trail counters to intermittently monitor trail and road usage on Petit Manan Point division to determine levels and timing of use.</p>	<p>In addition to Alternative A:</p> <p>Develop Visitor Service Plan including strategies to evaluate the quality of programs, visitor satisfaction, and to establish capacities and thresholds for resource impacts.</p> <p>Restrict commercial filming to only those that provide a direct benefit to the Service. Issue a special use permit.</p> <p>Establish new trails to facilitate wildlife observation at the Gouldsboro Bay, Sawyers Marsh, and Corea Heath divisions, including observation platforms at Gouldsboro Bay and Corea Heath.</p> <p>Promote wildlife observation and photography especially on the Petit Manan Point Division through the development of brochures and other media. Direct visitors to this area because of the infrastructure provided, the diversity of habitats, and the greater likelihood of observing wildlife.</p>	<p>In addition to Alternative B:</p> <p>Evaluate compatibility of opening Petit Manan Island and other select Refuge islands to photo blind tours (similar to Machias Seal Island)</p> <p>Develop a live-feed video broadcast to the website focused on one or more seabird nesting sites. This would allow anyone with internet access to view these birds remotely.</p> <p>Construct 2 or more photo blinds on mainland divisions.</p>	<p>Same as Alternative A, except for the following:</p> <p>Islands would be closed to general public access year round except under special use permit or by staff- or partner-led programs.</p>
<b>Issue 13: How will we provide and maintain high quality hunting opportunities?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Maintain current hunt program for the Refuge which includes:</p> <p>Migratory game birds and waterfowl, and small and big game on Sawyer's Marsh and Gouldsboro Bay Divisions.</p> <p>White-tailed deer hunting on Bois Bubert Island.</p> <p>Migratory waterfowl hunting on 22 Refuge islands.</p> <p>Islands acquired by the Service in the future would be open to waterfowl hunting unless resource, administrative, or safety concerns become known and the activity is not compatible.</p>	<p>In addition to Alternative A:</p> <p>Develop a Visitor Services Plan and establish protocols for monitoring effectiveness, quality of hunt program, and hunter satisfaction.</p> <p>Amend hunt plan and annual program to allow deer hunting on Petit Manan Point Division according to the following:</p> <ol style="list-style-type: none"> <li>1) disabled hunters only during the regular rifle season;</li> <li>2) hunters of all abilities during the muzzle-loader season; and,</li> <li>3) hunt area will be defined as above the access road in the Birch Point trail area.</li> </ol>	<p>Same as Alternative B</p>	<p>No hunting would occur on Refuge lands.</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 14: How will we manage furbearer populations on the Refuge Complex?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
Allow trapping for management purposes only, typically to control predators on species of concern, to protect property and infrastructure, or for public safety.	Same as Alternative A, except:  Continue to evaluate opportunities for a general trapping season with MDIFW. Additional analysis and public review would be necessary.	In addition to Alternative A:  Allow trapping on Gouldsboro Bay, Sawyers Marsh, and Petit Manan Point mainland divisions, Cross Island and Bois Bubert islands, according to State and Refuge regulations. On mainland divisions, trapping would not be allowed from at least Sept through Nov during the waterfowl migration season.	No trapping or other lethal control would occur.
<b>Issue 15: How will we manage compatible, traditional or non-priority public uses on Refuge lands?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
Require special use permits, after determined compatible, for all "for-profit" Refuge island users.  Allow dog-walking on leash, on designated Refuge mainland trails. Dogs are not allowed on Refuge islands.  Continue to allow MITA to administer camping opportunities on Halifax and Bois Bubert islands on designated sites. Coordinate with MITA to monitor the number of users and their impacts.  Continue to allow berry-picking by hand (no rakes) for personal use on the Refuge mainland divisions.	Same as Alternative A, with the exception of the following:  Camping on the two Refuge islands: Halifax and Bois Bubert, would be administered as described in Issue 3.  Islands acquired in the future would not be opened to camping since all have active seabird or eagle nesting on them.  Establish a formal Island Stewardship program with MITA or other partners on at least 5 more island to conduct resource monitoring and to make contacts with day users.	Same as Alternative B, with the exception of the following:  Camping on the two Refuge islands: Halifax and Bois Bubert, would be administered as described in Issue 3.	Same as Alternative A, with the exception of the following:  All Refuge islands would be closed to public access year round, except under special use permit or in staff- or partner-led programs.

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 16: How will we curtail inappropriate, non-wildlife-dependent activities on Refuge lands?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>Continue support for Friends of Maine Islands Seabird group who assist with education and outreach.</p> <p>Post new refuge boundary signs immediately after acquisition; post Service identification signs, and list permitted/prohibited uses, at strategic access points.</p> <p>Hire seasonal staff on Petit Manan Point Division to maintain a presence there.</p> <p>Continue to work with other law enforcement agencies such as Maine DMR, MDIFW-Warden Service, and Maine State Police to enforce refuge regulations.</p> <p>Maintain informational kiosk at Petit Manan Point Division, and continue to post current regulations.</p> <p>Install informational kiosks at Rockport and Milbridge offices.</p> <p>Conduct media outreach (news releases, news columns) when an event is planned.</p>	<p>In addition to Alternative A:</p> <p>Insure kiosks at Refuge Offices, and the posting of information, regulations and allowed activities is accessible to visitors after hours.</p> <p>Install refuge boundary signs at secondary access point to Gouldsboro Bay Division.</p> <p>Hire at least 2 full time Park Rangers to conduct informational and outreach programs and to patrol islands and mainland units during summer and fall months.</p> <p>Purchase supplemental, automated phone service for both Refuge offices to announce current Refuge regulations, island openings/closings and upcoming events.</p> <p>Replace all existing Refuge island identification signs with improved design, including the new closure dates. Work with State and MITA to make consistent informational/regulatory signs.</p> <p>Install gates at Sawyers Marsh Division access points to preclude access other than by foot on designated trails.</p> <p>Pursue agreement with Town of Gouldsboro to allow the installation of gates at either end of Old County Road and limit vehicle use to emergency vehicles and private abutters only.</p> <p>Expand and formalize law enforcement partnerships with such agencies as Maine DMR, MDIFW-Warden Service, and Maine State Police to enforce refuge regulations.</p>	<p>In addition to Alternative B:</p> <p>Require groups of 6 or more to obtain a special use permit prior to visiting islands (day use).</p> <p>Hire 2 more full time Park Rangers for increased LE patrols.</p> <p>Obtain AM radio frequency for visitors to tune in for current Refuge information (e.g., regulations, openings/closing events, etc.)</p>	<p>Conduct regular outreach and education (news releases and news columns).</p> <p>Monitor Refuge lands with assistance from land trust partners, MDIFW, adjacent landowners, and volunteers.</p> <p>Expand and formalize partnership with other LE agencies such as Maine DMR, MDIFW-Warden Service, and Maine State Police.</p> <p>LE would be a collateral duty for at least 2 staff members.</p> <p>Hire at least one Refuge LE Officer.</p> <p>Access barriers may be used at some Refuge access points to stop illegal vehicular entry.</p>

Table 2-1 Comparison of Management Actions by Alternative (cont'd.)

<b>Issue 17: Which islands will be studied for their wilderness potential and recommended for inclusion into the National Wilderness Preservation System?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>No Refuge lands are currently designated as wilderness, and none are proposed for further wilderness study.</p>	<p>Recommend 13 islands in 8 wilderness study areas be approved for wilderness designation (see Appendix D).</p> <p>All 8 wilderness study areas would be managed for their wilderness character pending a final decision. Current management of these islands would not need to change; it is consistent with maintaining wilderness values. Also, no proposed activities would diminish wilderness character or values.</p> <p>WSA boundaries are defined by mean high water and exclude private inholdings and rights-of-way on Cross and Bois Bubert islands. They also exclude the common boat landing and Lily Lake on Bois Bubert island. As these exclusions are acquired by the Service, we will incorporate them into the respective WSA or designate wilderness area through administrative action.</p> <p>Undertake another wilderness review in 15 years as part of the next revision of the CCP.</p>	<p>Same as Alternative B except the following:</p> <p>Bi-annually conduct a wilderness review on newly acquired islands. Make recommendations as warranted with outcome of inventory and study phases of review.</p>	<p>No Refuge lands are recommended for special wilderness designation; however, those lands currently with wilderness character will remain as such since management is strictly limited.</p>
<b>Issue 18: What funding and staffing levels and infrastructure will we need to manage a Refuge that spans the coast of Maine and includes offshore islands?</b>			
<b>Alternative A Current Management</b>	<b>Alternative B The Service's Preferred Alternative</b>	<b>Alternative C</b>	<b>Alternative D</b>
<p>We would maintain our 7 permanent staff positions (see Appendix F).</p> <p>Based on the Service's essential staffing formula, which identifies the minimum number of staff needed for a refuge based on its complexity, the Regional Director approved 20.5 permanent staff positions for the Refuge.</p> <p>Funding levels for FY04 were as follows:</p> <p>Operations (1261): \$493,222.00 Maintenance (1262): \$34,100.00</p>	<p>Increase permanent staffing to 23 positions (see Appendix F), based primarily on approved, essential staffing formulas and needs for proposed programs. Some current positions would be given a higher grade. Most of the new positions are in the biological, public use, and law enforcement program areas.</p> <p>RONS project funding levels (primarily 1261-Operations dollars) would increase by the amounts presented in Appendix E; MMS funding levels (primarily 1262-Maintenance dollars) are also in Appendix E.</p>	<p>Increase permanent staffing to 27 positions (see Appendix F). Some current positions would be given a higher grade. Most of the new positions are in the biological and public use program areas.</p> <p>Funding levels would increase from current levels by the amounts presented in Appendix E.</p>	<p>Increase permanent positions to 11 (see Appendix F). Most of the new positions are in law enforcement.</p> <p>No new RONS projects are proposed and maintenance levels would be the same as Alternative A.</p>

**Table 2-2 All 151 Nationally significant islands which are not permanently protected and are proposed for Service acquisition in Alternatives A, B, and/or C\***

Island Name	CIREG+	Town	Acres#	CCP Alternative**		
				A	B++	C
Anguilla I	79-574	Jonesport	12.9			√
Appledore I	81-191	Kittery	99.1		√	√
Bald RK	59-036	Steuben	1.3		√	√
Bar I	63-802	Saint George	8.1		√	√
Bar I	79-820	Milbridge	82.2			√
Bar I	79-291	Machiasport	49.7			√
Bartlett I	59-240	Mount Desert	2,158.6			√
Beach I	59-687	Deer Isle	73.4			√
Bean I	59-190	Sorrento	30.1		√	√
Bear I	59-925	Deer Isle	20.1		√	√
Bear Head I	59-596	Brooksville	0.4			√
Big Nash I/Cone	79-626	Addison	75.3	√	√	√
Black I	59-132	Bar Harbor	13.8		√	√
Bluff Head	63-079	Vinalhaven	7.8			√
Buckskin I	59-110	Franklin	5.6		√	√
Burnt Porcupine I	59-198	Gouldsboro	37.6			√
Calf I	59-177	Sorrento	98.2			√
Cape Wash I	79-297	Cutler	21.1		√	√
Compass I	59-790	Deer Isle	7.0	√	√	√



**Table 2-2 All 151 Nationally significant islands which are not permanently protected and are proposed for Service acquisition in Alternatives A, B, and/or C\* (cont'd.)**

Island Name	CIREG+	Town	Acres#	CCP Alternative**		
				A	B++	C
Canary Nub	59-137	Blue Hill	0.2	√	√	√
Crane I (N)	63-501	Vinalhaven	35.9			√
Crane I (S)	63-505	Vinalhaven	1.6		√	√
Crawford I	73-072	Bath	7.6			√
Crow I	63-651	Matinicus Isle Plt	11.8		√	√
Crow I	59-448	Frenchboro	10.6		√	√
Current I	59-849	Deer Isle	2.3			√
Curtis I	63-313	Camden	7.8			√
Damariscove I	65-280	Boothbay	242.3	√	√	√
Double Shot I	79-580	Jonesport	7.5			√
Duck Ld I	79-412	Addison	1.1		√	√
Eagle I	81-010	Saco	3.1	√	√	√
Eastern I	79-843	Steuben	4.7	√	√	√
Eastern Mark I	59-956	Stonington	9.9		√	√
Fellows I	79-464	Roque Bluffs	33.0		√	√
Fisherman I	65-274	Boothbay	70.7		√	√
Fisherman I	79-694	Beals	48.1		√	√
Flat I	79-621	Addison	19.6	√	√	√
Fog I	63-264	Isle au Haut	56.7		√	√
Folly I	81-101	Kennebunkport	5.4		√	√

**Table 2-2 All 151 Nationally significant islands which are not permanently protected and are proposed for Service acquisition in Alternatives A, B, and/or C\* (cont'd.)**

Island Name	CIREG+	Town	Acres#	CCP Alternative**		
				A	B++	C
Foster I	79-789	Harrington	322.5			√
Freds I	79-193	Trescott Twp	3.4			√
French House I	79-523	Beals	8.1			√
Freyee I (W)	73-030	Topsham	5.3		√	√
Fuller RK	73-308	Phippsburg	2.4		√	√
Gooseberry I	79-219	Trescott Twp	4.5			√
Gooseberry I	59-398	Swans Island	5.4	√	√	√
Graffam I	63-634	Muscle Ridge Shoals Twp	65.1		√	√
Great Cranberry	59-270	Cranberry Isles	1,064.9			√
Great Wass I	79-512	Beals	2,653.6			√
Green I	65-423	Southport	19.6			√
Green LD	63-135	Vinalhaven	0.7		√	√
Greens I	63-157	Vinalhaven	432.5			√
Haddock I	65-200	Bristol	12.1	√	√	√
Harbor I	59-450	Frenchboro	19.9		√	√
Harbor I	63-701	Friendship	96.7	√	√	√
Hardwood I	79-410	Addison	20.2			√
Hog I	65-019	Damariscotta	4.7		√	√

Table 2-2 All 151 Nationally significant islands which are not permanently protected and are proposed for Service acquisition in Alternatives A, B, and/or C\* (cont'd.)

Island Name	CIREG+	Town	Acres#	CCP Alternative**		
				A	B++	C
Hope I	79-393	Roque Bluffs	5.5		√	√
House I	55-381	Portland	31.1		√	√
Hurricane	63-626	Matinicus Isle Plt	1.8		√	√
Inner Porcupine I	59-799	Deer Isle	10.2		√	√
Ironbound I	59-182	Winter Harbor	830.8			√
Isle Au Haut	63-230	Isle au Haut	6,808.9			√
Isle of Springs	65-408	Boothbay Harbor	104.9			√
Islesboro I	77-012	Islesboro	7,750.9			√
Jed I	59-136	Bar Harbor	11.8			√
Johns I	59-351	Swans Island	21.8		√	√
Kilkenny Cove I	59-089	Hancock	3.1			√
Lanes I	55-200	Yarmouth	28.2		√	√
Large Green I	63-655	Matinicus Isle Plt	85.3	√	√	√
Lower Birch I	79-742	Addison	23.9			√
Lt Black I	59-443	Frenchboro	2.9			√
Lt Cranberry I	59-313	Cranberry Isles	491.3			√
Lt Green I	63-654	Matinicus Isle Plt	36.0	√	√	√
Lt Green I	63-418	Matinicus Isle Plt	2.9	√	√	√
Lt Lines I	73-090	Woolwich	0.9			√
Lt Ram I	79-462	Roque Bluffs	2.0		√	√

**Table 2-2 All 151 Nationally significant islands which are not permanently protected and are proposed for Service acquisition in Alternatives A, B, and/or C\* (cont'd.)**

Island Name	CIREG+	Town	Acres#	CCP Alternative**		
				A	B++	C
Lt River I	79-304	Cutler	16.9			√
Lt Spruce I	79-481	Jonesport	84.3			√
Lt Sprucehead	59-772	Deer Isle	44.1		√	√
Lt Whaleboat I	55-282	Harpwell	18.0	√	√	√
Lt Whaleboat I (Se)	55-283	Harpwell	4.3		√	√
Mahoney I	59-933	Brooklin	7.0	√	√	√
Matthews I	79-128	Eastport	18.1			√
Mink I	79-679	Beals	2.6			√
Mouse I	63-330	North Haven	2.7	√	√	√
Mt Desert I	59-119	Bar Harbor	69,051.2			√
Nash I	79-627	Addison	16.7	√	√	√
Neck I	63-081	Vinalhaven	21.7			√
Nehumkeag I	61-002	Gardiner	2.3			√
Oak I	63-421	Matinicus Isle Plt	1.8	√	√	√
Outer Porcupine	59-800	Deer Isle	6.3		√	√
Outer Ram I	79-602	Beals	8.6		√	√
Penobscot I	63-093	Vinalhaven	257.0			√
Pig I	79-520	Beals	54.1			√
Pinkham I	79-787	Milbridge	79.6		√	√

**Table 2-2 All 151 Nationally significant islands which are not permanently protected and are proposed for Service acquisition in Alternatives A, B, and/or C\* (cont'd.)**

Island Name	CIREG+	Town	Acres#	CCP Alternative**		
				A	B++	C
Plummer I (w)	79-635	Addison	13.0			√
Pond I	59-347	Frenchboro	241.1		√	√
Pop I	79-832	Steuben	2.8			√
Ragged I	55-626	Harpwell	74.9		√	√
Ram I	55-521	Cape Elizabeth	2.8	√	√	√
Ram I	63-323	Rockport	1.1	√	√	√
Ram I	63-731	Friendship	1.3		√	√
Ram I	77-045	Islesboro	7.0		√	√
Ram I	79-601	Beals	29.3		√	√
Ram I	79-623	Addison	5.7			√
Ripley I	79-778	Harrington	0.9			√
Roque I	79-475	Jonesport	1,306.8			√
Sally I	59-037	Gouldsboro	5.3	√	√	√
Sams I	59-587	Pembroke	2.9			√
Sand I	63-730	Friendship	4.2		√	√
Scraggy I	59-836	Stonington	8.5	√	√	√
Seguin I	73-320	Georgetown	63.1		√	√
Sheep I	79-835	Steuben	7.9		√	√
Sheep I	63-393	Owls Head	62.3			√
Sheep I	59-039	Gouldsboro	9.4		√	√

**Table 2-2 All 151 Nationally significant islands which are not permanently protected and are proposed for Service acquisition in Alternatives A, B, and/or C\* (cont'd.)**

Island Name	CIREG+	Town	Acres#	CCP Alternative**		
				A	B++	C
Sheep I	79-514	Jonesport	4.2		√	√
Shingle I	59-959	Stonington	9.2		√	√
Sister I	59-447	Swans Island	30.3		√	√
Sow And Pigs	55-245	Freeport	2.9			√
Spectacle I	59-673	Brooksville	8.7	√	√	√
Spectacle I	79-132	Eastport	4.8	√	√	√
Spectacle I	63-503	Vinalhaven	3.7			√
Stave I	59-180	Gouldsboro	499.5			√
Stoney	73-065	Bath	1.5			√
Strout I	79-763	Harrington	20.8		√	√
Swans I	59-413	Swans Island	6,853.5			√
The Brothers (C)	63-580	Saint George	0.6		√	√
The Brothers (S)	63-581	Saint George	7.4		√	√
The Brothers N	63-579	Saint George	3.8		√	√
The Ladle	79-632	Addison	2.3	√	√	√
The Twinnies(N)	59-160	Bar Harbor	3.6		√	√
Thome I	73-067	Woolwich	11.5			√
Thread of Life	65-258	South Bristol	1.4		√	√
Three Bush I	59-980	Swans Island	1.6		√	√
Tinker I	59-242	Tremont	446.9			√

**Table 2-2 All 151 Nationally significant islands which are not permanently protected and are proposed for Service acquisition in Alternatives A, B, and/or C\* (cont'd.)**

Island Name	CIREG+	Town	Acres#	CCP Alternative**		
				A	B++	C
Toms I (N)	79-610	Addison	1.6			√
Trafton I	79-909	Harrington	113.2		√	√
Treasure I	59-170	Sorrento	18.7			√
Treat I	79-370	Eastport	73.2			√
Turnip I	55-427	Harpwell	1.9	√	√	√
Two Bush I	63-901	Matinicus Isle Plt	5.9	√	√	√
Upper Coombs I	55-088	Brunswick	8.6		√	√
Verona I	59-570	Verona	3,977.2			√
Vinalhaven	63-160	Vinalhaven	11,398.2			√
Western I	59-675	Deer Isle	22.0	√	√	√
Wilbur Neck (N)	79-081	Pembroke	69.4			√
Williams I	55-295	Freeport	21.4			√
Wood I	81-015	Biddeford	35.5	√	√	√
Wooden Ball I	63-917	Matinicus Isle Plt	138.2	√	√	√
Yellow Head I	79-290	Machias	15.8			√
<b>Total Acres</b>			<b>119,752.6</b>	881.8	2,314.40	119,752.60

\* "Nationally significant islands" are islands that meet criteria established by the Maine Coastal Nesting Islands Project partnership, a partnership among Federal and State agencies, non-governmental conservation organizations, and private landowners. These islands are critically important seabird and bald eagle nesting islands. "Not permanently protected" refers to islands that are not owned in fee, or do not have a conservation easement, by State or Federal agencies such that long-term or permanent protection of nesting sites is not guaranteed. 377 islands are nationally significant; 151 of these are not permanently protected. Of the unprotected islands, Alternative A proposes the Service acquire 30 islands, Alternative B proposes 87 islands, and Alternative C proposes all, or portions of, the 151 islands. Only portions of larger (>200 acre) islands may be acquired (approximately 125 acres at each site) around bald eagle nesting sites. As such, not all 119,752 acres in Alternative C is proposed, rather, approximately 6,310 acres is targeted

+ CIREG is the coastal island registry number, a unique identifier given islands by the State of Maine Planning Office

# Acres are rounded to the nearest tenth and are approximated from several sources (survey, deed, or GIS map)

\*\* Alternative D does not propose expanding the refuge other than those lands already approved for acquisition

++ Alternative B islands are depicted on maps in Appendix A

Table 2-3 Land acquisition summary by alternative

	Alternative A (Current Management)	Alternative B (Service' Preferred Alternative)	Alternative C	Alternative D
<b><u>Lands to be acquired within the existing, approved Petit Manan Refuge boundary*</u></b>				
Mainland	120 acres	120 acres	120 acres	120 acres
Islands (or parts of)	14 islands** (347 acres)	14 islands** (347 acres)	14 islands** (347 acres)	14 islands** (347 acres)
Corea Heath	400 acres	400 acres	400 acres	400 acres
<b><u>Lands proposed for acquisition which would expand the existing, approved Petit Manan Refuge boundary</u></b>				
Mainland	153 acres	153 acres	153 acres	0
Islands (or parts of)	30 islands (881 acres)	87 islands (2,306 acres)	151 islands (6,310 acres)	0
<b>Total Acres To Be Acquired (by alternative)</b>	<b>1,901 acres</b>	<b>3,326 acres</b>	<b>7,330 acres</b>	<b>867 acres</b>

\* All lands acquired will become part of Petit Manan Refuge; also, acquisition has been on-going during development of the CCP. Contact Refuge Headquarters for latest information.

\*\* Six of these islands are already part-owned by the Service; or in the process of Service acquisition.





*Lighthouse on Petit Manan Island*  
USFWS photo

## Description of the Affected Environment

- Part One: The Refuge Landscape
- Part Two: Refuge Island Resources
- Part Three: Refuge Mainland Resources

## Part One: The Refuge Landscape

### Landscape-level Features

#### Gulf of Maine Ecosystem

Since our project area spans the entire Maine coast, our description of the Refuge landscape focuses on the coastline, its resources and influences.

This ecosystem is defined by the Gulf of Maine watershed; that is, the geographic area from which all water drains into the Gulf. It is an immense area, extending from eastern Quebec to Cape Cod, Massachusetts, with a land base of 69,115 square miles and a water surface of 33,054 miles. Maine is the only state located entirely within the boundary.

The Gulf of Maine is considered one of the world's most biologically productive environments. Its marine waters and shoreline habitats host about 2,000 species of plants and animals. The strategic location of underwater geologic features, such as Brown's Bank, allow nutrient-rich water from the deep ocean to flow upward over their edges, capturing phytoplankton in sunlit, shallow waters. Phytoplankton flourish here and are the basis of the gulf's food web. The riverine and upland habitats in the ecosystem also play an important role in the health and quality of the water flowing in the gulf. Many northern species (e.g. Atlantic puffin and razor-bills) find their southern limit in the Gulf of Maine, while the gulf represents the northern extreme for several southern species such as laughing gulls and roseate terns (Conkling 1995).

### Physical Characteristics of Coastal Maine

Maine has more miles of coastline than any other state in the continental United States. A straight line measures the Maine coast as being less than 250 miles from border to border. Actually, there are 7,039 miles of coastline when the shores of its many bays and headlands are considered (Conkling 1999). Elevations range up to 178 feet above mean sea level. Topography along the Coast of Maine is a mix of gradual slopes to rocky shorelines and abrupt cliffs as high as 100 feet to the oceans below. Approximately 4,617 islands and major ledges lie along the coast (Conkling 1999).

### Geology

The Maine coast has a long and complicated geologic history. The bedrock of the region was formed largely through igneous, volcanic and metamorphic processes during Paleozoic times. It has been affected by a variety of geologic events, including mountain building, erosion, sedimentation and glaciation (Griffith 1976).

The indented character of the Maine coast is typical of shorelines of recent submergence. Before Pleistocene glaciation, the Maine shoreline was several hundred miles further south. The mile-high sheet of ice (7 million tons/acre) that subsequently formed across the state warped the crust

downward along a tectonically weak zone running northeast-southwest that corresponds with the present configuration of the coastline. Later, enormous volumes of water released by glacial meltwaters contributed to a worldwide rise in sea level that inundated what had been coastal lowlands.

Geologically, the Maine coast can be divided into five distinct sections (Conkling 1995). The section from Kittery to Cape Elizabeth represents the northern end of the crystalline rocks characteristic of the Atlantic coast north of Cape Cod. Topographic relief is characteristically slight, and the shoreline straight. Maine's most famous beaches and thousands of acres of salt marsh are characteristic, but relatively few islands are located in this section of the coast.

The coast from Cape Elizabeth to the Penobscot River, including Casco, Sheepscot, Boothbay, John's, Muscongus, and Western Penobscot bays, is characterized by long, narrow arms of the sea which extend far into the coastal lowlands. Islands in this section of the coast are also generally long and narrow, trending just east of north, corresponding to the general trend of the bedrock: quartzites, slates, schists, and granite. The deep, elongated bays in this section represent old stream and river drainage systems that were carved out in the folds of the strata, then scoured by glaciers and later filled by rising seas.

The coast from Vinalhaven to Jonesport is primarily the realm of white and pink granites. This section includes the broad and wide East Penobscot, Jericho, Blue Hill, Frenchman's, Pleasant, and Eastern and Western Bays. There are more islands in this section than in any other; most are forested with spruce. In contrast to the long, narrow islands to the west, islands in this section, whether large or small, are mostly rounded and dome-like, owing to the manner in which the once liquid granite was emplaced and cooled amid overlying rocks. This section also includes the highest coastal mountains, and the only fjord-like feature (Somes Sound) on the U.S. Atlantic coast. To many, this section is the most spectacular scenic area on the coast.

East of the Roque Island archipelago, the bays broaden and shorten as more ancient volcanic rocks and volcanic breccia (consolidated debris from volcanic eruptions) dominate the landscape. East of Cape Wash, bays and islands disappear altogether until Cobscook Bay. Huge tides (20 feet at West Quoddy Head), increased fog, and rugged gray and dark-green cliffs, sea stacks, fewer people, and rare seabirds at the southern end of their breeding range characterize this section "way Downeast."

### **Soils and Hydrology**

Soils were mainly deposited as the last glacier retreated some 13 to 15,000 years ago, leaving a soil cover mixture of sand, gravel, silt, and clay (Conkling 1995). Hydrology consists of bedrock aquifers underlying the

mainland portion of the state. “Sole source aquifer” is a designation given for every island off the coast and both tidal and non-tidal surface waters (Conkling 1995). Tidal waters include ponds, salt marshes, creeks, coves, and mud flats. The mean tidal range within the region tends to increase as one moves northeast along the coast. It ranges from 8.8 feet in Muscongus Bay to 10.2 feet at Southwest Harbor on Mount Desert Island (TRIGOM - PARC, 1974).

The non-tidal waters include marshes, bogs, ponds, creeks, artificial impoundments, and seasonally flooded forests. Non-tidal waters are mainly fed from annual precipitation or natural springs.

### Climate

Maine’s weather is highly variable, and may vary on any given day from place to place. Large ranges in temperature are common, both daily and annually. In general, summers are cool and relatively dry, and winters are cold and wet. Maine has four distinct seasons. The climate of coastal Maine is strongly affected by maritime influences. In general, average coastal temperatures are cooler in the summer and warmer in the winter than in the interior of the state. The average annual temperature varies along the coast. For example, in southern Maine, the average temperature is 45 degrees, along the mid-coast, it is 44 degrees, and in the north, the average temperature is 40 degrees. The coastal region has the longest growing season in the state, averaging from 140 to 160 days per year.

The average annual precipitation in Maine is 42 inches. Along the coast, summer thunderstorm activity is suppressed somewhat by the cooling effect of the ocean, while winter precipitation is increased by the occurrence of coastal storms blowing from the northeast, or “nor’easters.” They often bring with them strong winds and heavy precipitation occurring either as snow, rain, or freezing rain. The result is greater precipitation in winter than in summer. Winter precipitation falls mainly as rain or wet snow along the coast, which is also subject to occasional ice storms that cover every exposed surface with a sheet of ice. At times, nor’easters produce unusually high wind-driven tides that can seriously affect coastal beaches and settlements. Fog is particularly frequent in downeast Maine, generally diminishing in frequency and duration in an inland direction and to the south.

On a yearly basis, the wind direction is generally from the west. In winter, winds typically originate from the northwest or north, and in



*The Gulf of Maine is the southern limit of the Atlantic puffin's range*  
USFWS photo

summer, from the southwest or south. In spring and summer, the sea breeze is an important factor along the coast. Cool breezes off the ocean tend to retard spring plant growth and moderate summer temperatures. In winter, sea breezes moderate temperatures on land.

### **Air Quality**

Both State and Federal agencies monitor air quality in response to State and Federal requirements to determine whether the air we breathe is maintaining ambient air quality standards designed to protect the health and welfare of the public. In addition to human health, good air quality is essential to sustaining healthy ecosystems. Healthy and productive vegetation, wildlife, water, and soils, and the protection of visibility, and geological, archeological, historical, and cultural resources are all values associated with clean air.

According to the State of Maine DEP, the state exceeds acceptable levels for particulates, sulfur dioxide, and carbon monoxide (ME DEP; [www.state.me.us/DEP/pubs/environment](http://www.state.me.us/DEP/pubs/environment) 2002). The primary concern is ground ozone levels in southern counties. A particular health hazard with ozone is the fact it aggravates asthma and other chronic lung diseases. The precursors to ozone are emitted in automobile exhaust, gasoline, and oil storage and transfer, and from common use of paint solvents, degreasing agents, cleaning fluids and similar materials. Unfortunately, some of these compounds are generated in western regions of the country and are carried to Maine by prevailing wind patterns, so efforts to reduce levels are challenging.

Ozone formation is temperature dependent and is more likely to form in the warmer summer temperatures. In 1989, there were 12 days when Maine exceeded the Federal standards for acceptable 8-hour ozone level days. This has been declining, and in 2001, there were 7 days in which the 8-hour levels were exceeded.

Air toxics are another serious concern in Maine. Benzene concentrations are used as an indicator for other hazardous air pollutants. One of the primary sources for these chemicals is car exhaust and evaporation of gasoline during refueling. Over the past 8 years, benzene concentrations were highest in 1994 at 0.9 ppb, decreased to 0.4 ppb in 2000, but then increased to 0.7 in 2001 (ME DEP; [www.state.me.us/DEP/pubs/environment](http://www.state.me.us/DEP/pubs/environment) 2002).

We do not have air quality monitoring stations on the Refuge, so we have limited local information. Instead, we look to air quality monitoring conducted on Moosehorn Refuge, located in Barre, Maine. In 1978, Congress designated the 7,000 acre Moosehorn Refuge Wilderness Area a Class 1 air quality area. Class 1 areas receive the highest levels of protection under the Clean Air Act. Our National Air Quality Program has an

established air quality monitoring station to measure compliance with Federal standards.

Most of the air pollutants affecting Moosehorn Refuge would likely also occur at the Refuge (Porter, pers com, 2002). Pollution sources include power plants, industry (such as pulp mills), and automobiles. Pollutant haze often reduces visibility in the wilderness area. Occasionally, smoke plumes from nearby industry drift into the area. The area receives acid rain (and acid snow, fog, and dryfall), with a pH of about 4.6. Acid rain is the broad term used to describe several ways that a weak solution of inorganic acids, such as nitric and sulfuric acid falls out of the atmosphere as rain, snow, mist or fog. Sulfur dioxide and oxides of nitrogen are the primary causes of acid rain. Most of this comes from electric-power generation that relies on burning fossil fuels, such as coal. Acidification in surface water is an increasing concern.

In addition, it is likely that mercury deposition from the atmosphere and bioaccumulation is occurring in the area at a rate similar to that demonstrated in Acadia National Park and the Penobscot River valley. Mercury becomes airborne through burning coal, oil, wood, or natural gas, incinerating mercury-containing garbage, and through industrial processes that use



*Short-billed dowitchers*  
Photo by Craig Snapp

mercury. Contaminant research has documented increasing concentrations of mercury in various species of wildlife as you move eastward across the country, with the highest documented levels recorded in Maine (Evers pers. comm.). Mercury bioaccumulation in fish has prompted the State of Maine to advise certain at-risk persons not to eat fish from lakes and ponds in the state.

The monitoring at Moosehorn Refuge includes documenting the cumulative effects of these air pollutants and their injury to vegetation, wildlife, soils, water quality, visibility, odor, and cultural and archeological resources. Surveys in the wilderness area in 1998 to 2001 documented symptoms of ozone injury, such as stippling and chlorosis, on several plant species. Vegetation such as black cherry, milkweed, and wild grape are all readily subject to such injury.

Acadia National Park also has two air quality monitoring sites at McFarland Hill and Cadillac Mountain. Pollutants monitored include: ozone, nitrogen oxides, fine particulates, visibility, mercury, acid deposition, UV-b radiation, precipitation and other meteorological parameters. In 2001, the park recorded 10 days when the air was unhealthy to breathe due to ground-level ozone levels. Park studies have shown numerous plant species harmed by ozone exposure including black cherry, quaking aspen, and decreased growth rates in eastern white pine.

The estimated annual average visibility at the park is 110 miles. Air pollution reduces visibility during the summer months to approximately 33 miles, dropping to only a few miles on the haziest summer days. Sulfur dioxide and nitrogen oxide are affecting surface waters of the park. Its rocky soils give streams and lakes little protection from acid rain. The average pH of precipitation measured has ranged from 4.4 to 4.6. This value is ten times the acidity of natural rainfall. Park staff have measured acid fog with a pH of 3.0, comparable to grapefruit juice. Fish with high levels of mercury have been documented in its lakes since the early 1990's. Mercury concentrations in some species of warm water fish, such as bass, perch, and pickerel, are among the highest ever recorded in the U.S. ([www.npca.org](http://www.npca.org))

### **Water Quality**

Assessments of estuarine, riverine, lakes, and coastal water quality is done primarily by two state agencies: the Department of Marine Resources (DMR) and the Department of Environmental Protection (DEP). The DMR conducts an extensive program to monitor pathogen indicators and phytotoxins. The purpose of this program is to manage the risk of human illness due to consumption of contaminated fish or shellfish. The DEP's Marine Environmental Monitoring Program monitors and researches other water quality issues within the 7,039 miles of shoreline and near-coastal waters. Three other coastal projects also collect water quality information

on a site-specific or project-specific basis. The Casco Bay Estuary Project has supported several monitoring projects within Casco Bay. Maine's Shore Stewards Program supports a diverse array of volunteer monitoring groups that operate in specific embayments and estuaries. The Gulf of Maine Council's Gulfwatch Project surveys toxic contamination in coastal waters from Cape Cod to Yarmouth, Nova Scotia.

Both point and nonpoint source pollution affect the quality of Maine's waters. Point source pollution occurs from a single discharge point; nonpoint pollution sources are those that can come from numerous sources in the watershed, typically as runoff from the land. Point source pollution include sewer overflows, sewage pipes leading directly to the water, and industrial discharges from paper mills and other manufacturers. Nonpoint source pollution includes nutrients, bacteria, sediment, oil, and heavy metals that are transported to water bodies from different sources by runoff from storms. This threat is much harder to manage and control, and is exacerbated by development and increased impervious and polluted surfaces.

No water quality monitoring is occurring on the Refuge, so we are unsure how directly our waters are affected by these pollutants.

#### Estuaries

An indicator of the water quality in Maine's estuaries used by ME DEP is the amount of area closed to shellfish harvesting in a given year. As of June 2001, 156,758 acres of flats and waters were closed to shellfishing, a slight decrease from the 166,555 acres closed in October 2000 (ME Development Foundation, January 2002; [www.smartgrowth.org](http://www.smartgrowth.org)). Sewage discharges from malfunctioning septic systems, straight discharge pipes, and non-point source pollution are responsible for closing the shellfishing areas (ME DEP; [www.state.me.us/DEP/pubs/environment](http://www.state.me.us/DEP/pubs/environment) (2002.pdf).

#### Rivers, Streams and Brooks

An indicator of the water quality in Maine's rivers, streams and brooks used by ME DEP is the number of miles that were not able to support one or more of their designated uses, including fishing, aquatic life, and swimming, and were not in attainment of water quality standards in sections 305(b) of the Federal Water Pollution Control Act. In 2000, 749 miles of the estimated 31,752 total miles of rivers, stream, and brooks, were estimated to not fully support one or more of their designated uses. Of those, 427 miles of river did not support fishing, 331 miles were unfit to support aquatic life, and 176 miles could not support swimming. Several rivers were unable to support more than one type of use (ME Development Foundation, January 2002; [www.smartgrowth.org](http://www.smartgrowth.org)). Fortunately, since 1994, sewage effluent discharged into Maine rivers has decreased by 20%.



### Lakes

There are 5,788 lakes in Maine, and 2,314 are deemed significant by ME DEP. Using suitability for swimming as an indicator, only 3.8% of the significant lakes were deemed unsuitable for swimming in 2000, according to ME DEP. This is an improvement over 1998 figures, when 5.3% of significant lakes were not swimmable. More detailed water quality monitoring has occurred in 224 Maine lakes for the last eight years. Data shows that 67% of those lakes have a stable water quality; an additional 25% are improving; and 8% are declining.

### Groundwater

Groundwater is Maine's primary source of drinking water and protecting its quality is critically important to the health of Maine's citizens. Groundwater is defined as water contained in open spaces in the soil, sand, and gravel within rock fractures. The water comes from rain or melting snow that seeps into the ground and is stored in geologic structures. In most cases, groundwater is polluted through non-point sources, namely contaminated snowmelt or rain. While these waters are filtered through the soils before reaching the aquifer, it is often not enough to remove contaminants such as salt, oil, gas, and lead from roads, pesticides and fertilizers from home gardens and landscaping, effluent from septic systems, and substances disposed of on the ground by homeowners. Point sources, such as those from development near primary aquifers, or petroleum leaks at gas stations and homes, are also important threats. In 1994, 54 public and private wells were replaced due to petroleum contamination of their water source. Since that peak, the number has declined, with only 35 wells needing replacement in 1999 due to contamination (ME Development Foundation, January 2002; [www.smartgrowth.org](http://www.smartgrowth.org))

### Socio-economic Characteristics of Coastal Maine

It is said that Maine's seacoast is the backbone of the State's economy. This is not surprising as coastal Maine's southern and mid-coast regions are growing at almost twice the rate than the state as a whole during 1990-1996. The majority of the State's residents live in coastal counties. It is the natural beauty and rich resources of the shore and ocean that draw people to the coast.

### Demographics

The population of Maine is estimated at 1,274,923 with an average density of 41.3 persons/ square mile (U.S. Census, 2000; <http://quickfacts.census.gov/qfd/states/23000.html>). The top three counties with highest population densities are: Cumberland (318 persons/square mile), Androscoggin (221 persons/square mile), and York (188 persons/square mile). All are located in southern and mid-coast Maine. The eight coastal Maine counties and their populations are depicted in Table 3-1.

**Table 3-1 Populations of Eight Coastal Maine Counties  
(U.S.Census 2000)**

<b>Coastal Maine Counties</b>	<b>Population</b>
Cumberland County	265,612
Hancock County	51,791
Knox County	39,618
Lincoln County	33,616
Waldo County	36,280
Washington County	33,941
Sagadahoc County	35,214
York County	186,742

A Brookings Institution report in July 2001 listed Portland as the 9<sup>th</sup> fastest growing metropolitan area in the nation. Between 1982 and 1997, its population increased by 17%. Between 1990 and 2000 the state population increased by only 3.8%. Other populated cities and towns along the coast are Kittery, York, Wells, Kennebunkport, Biddeford, Saco, Yarmouth, Freeport, Brunswick, Bath, Boothbay Harbor, Damariscotta, Rockland, Camden, Belfast, Bucksport, Ellsworth, Bar Harbor, Machias, and Calais.

The State Planning Office estimates that between 1970 and 1990, land development in Maine occurred at four times the rate that the population increased. People are moving away from villages and city centers into the countryside. This situation creates sprawl, which is characterized by low-density development that is center-less and sporadic, strip malls, and traffic congestion. If unchecked and unplanned, sprawl impacts our health, our environment, our communities, and our productive agricultural and natural areas. The city of Portland serves as a prime example. During 1982 and 1997, when Portland's population increased by 17%, the amount of farmland and forestland converted to urban uses increased by 108%.

According to the 2000 U.S. Census, the majority of people are employed in the fields of "management/professional/and related occupations," followed by "sales and office occupations." The mean household income, including benefits, in the state is approximately \$47,000. Approximately 95% of the population is white and retirees are disproportionately concentrated in the southern coastal towns.

### **Industries of Coastal Maine: An Overview**

According to the 2000 U.S. Census, the top three industries in Maine are, in order: 1) "education/health/and social services;" 2) "retail;" and 3) "manufacturing." Many of the State's top three industries are dependent on natural resources. A comprehensive bibliography on how natural resources contribute to Maine's economy is provided in Maine Audubon Society's publication: *Valuing the Nature of Maine, May 1996*.

In northern and eastern Maine, industry output is dominated by the pulp and paper industry. Along with wood products, it represents the major industry exporting products outside the area. After pulp and paper, the primary industries in eastern Maine are retail trade, construction, and health services (www.emdc.org.CEDS2000). Unfortunately, only the pulp, paper and wood industries consistently pay the state’s “livable wage,” and these industries are in a difficult investment climate.

A few prominent natural resource-based industries with ties to the Refuge are presented below.

**Aquaculture and other commercial fisheries**

The Maine aquaculture industry is very diverse and has grown significantly over the past decade. It consists of businesses involved in raising and selling salmon, trout, oysters, mussels, and baitfish. According to a recent report by Planning Decisions Inc., all Maine aquaculture activities account for \$130 million in total, annual economic activity in Maine (O’Hara et. al., 2003). Two major subsectors exist in the industry: finfish, primarily salmon, is generally undertaken east of Penobscot Bay, while shellfish culture, is generally located in or near the Damariscotta River. In 2000, the salmon aquaculture industry produced a total of 36 million pounds of salmon, with a total landed value of \$78.9 million (Colgan 2002). This was the peak year for the decade. In 2002, there was a slight decline, when 15 million whole pounds of salmon were produced. In addition to direct salmon production, there is additional value added and higher than state-average paid employment in processing facilities, hatcheries for salmon smolt at various inland lake locations around the state, grow-out operations, fish health companies.

Aquaculture operations require a permit from the Army Corps of Engineers and a lease from the State of Maine. As of June 2004, a total of 150 sites were under lease. Table 3-2 shows the distribution of these sites (source: ME DMR, 2005)

**Table 3-2 Aquaculture operations in Maine under lease as of June 2004**

Product	Number of leases	Acres under lease
finfish	40	740.0
shellfish	63	570.0
limited purpose	31	0.3
experimental	16	29.0

State records do not indicate which of these leases are currently active. As such, not all of this leased acreage may be in active production.

The industry has faced many challenges in recent years. The amount of active acreage has been affected by Infectious Salmon Anemia (ISA), a

highly contagious disease which resulted in the destruction of over 1.1 million pounds of salmon in order to control the spread of the disease, primarily in the Cobscook Bay area (Colgan 2002). Other declines in production from 2000 to 2002 were due to health and environmental problems (O'Hara et al. 2003). In addition, the listing of the wild Atlantic salmon as an endangered species in the rivers of eastern Maine may have effects on the cultured salmon industry from restricted production or increased costs.

Salmon aquaculture is a highly competitive industry in which foreign producers play a major role. Competition from Chile and Norway has been found by the U.S. International Trade Commission to have materially harmed the U.S. industry, including producers from Maine (Colgan 2002). Finally, aquaculture leases are difficult to obtain from the State of Maine, in part because of frequent local opposition to the issuance of new leases, and in part, because of a lengthy lease application process. A bill to place a moratorium on aquaculture leases for two years was considered by the Maine Legislature in 2002.

Lobstering is the principle fishing activity associated in the vicinity of coastal islands. Lobsters are caught year-round in Maine, but during the summer, lobsters migrate inshore to molt and are caught near shore, including around islands. Depending on water depth and bottom type, lobster traps may be placed quite close to shore, but this varies. Lobsters are the single most valuable fish species caught in Maine. Both total landings and the landed value of lobsters have grown significantly over the past 15 years. In 2001, over 48 million pounds of lobster were harvested with a market value of \$151.9 million.

The remaining top 10 economically important fisheries in the state include Atlantic salmon, sea urchin, soft clam, cod, flounder, sea scallop, bluefin tuna, shrimp, and witch flounder. All fishery species harvested in Maine in 2001 totaled \$241,287,429 in value and 236,268,682 pounds ([www.st.nmfs.gov](http://www.st.nmfs.gov)).

### Tourism

Tourism is significant to the Maine economy. In 2000, nonresident visitors to Maine directly and indirectly generated: \$8.8 billion in sales of goods and services; over 116,000 jobs; and, \$2.5 billion in total payroll (Maine Office of Tourism, [www.visitmaine.com](http://www.visitmaine.com)). This represents 44.0 million trips to Maine, predominantly to coastal areas and mostly during the summer months. Reportedly, overnight visitors come to tour the state (41%), enjoy the outdoors (20%), attend a special event (10%), and for a beach vacation (9%).



*Commercial wildlife watching tour boat*  
USFWS photo

Many people come to the state or travel within the state to engage in wildlife watching. This would include activities such as observing, identifying, photographing, or feeding wildlife. The total number of wildlife watching participants nationally was 66,105,000 in 2001, a 13% decrease from 1991 figures (USFWS 2002). Maine ranks fourth among U.S. states for having the highest percentage of its population engage in wildlife watching; 52% participates. Wildlife watching trip related expenditures in Maine amounted to \$64,202,000 in 2001. The national average for wildlife watching expenditures per trip was \$448 (USFWS 2002).

### Seabird Viewing

Commercial seabird viewing is one wildlife watching activity that warrants a detailed discussion because of its connection with the Refuge. Petit Manan and Machias Seal islands serve as premier seabird viewing destinations for several commercial tour boat operators.

The abundance of seabirds along the Maine coast, coupled with the large number of summer visitors has created a substantial opportunity for firms to provide a variety of services to view seabirds. In order for us to assess the extent of commercial seabird viewing in Maine, and understand the importance of the Refuge to this opportunity, we enlisted the University of Southern Maine for help. Dr. Colgan and students conducted a series of interviews with seabird viewing firms in Maine during the summer of 2001. The results of his work follows.

One hundred and thirty eight companies were identified as providing services potentially involving seabird viewing as a recreational activity. The companies were identified from tourism reference sources, chambers of commerce, and other sources, and were contacted by phone to inquire about the number of customers, average prices, and extent to which seabird viewing was considered a part of the recreational experience. Of these, 120 provided services in coastal waters. The firms are located throughout the coast (Table 3.3), with about two thirds located in the Penobscot Bay area or to the east.

**Table 3-3 Distribution of coastal excursion companies. Source: USM Survey**

Maine Coastal Counties	Percent Distribution
Cumberland	4.3%
Hancock	21.5%
Knox	36.6%
Lincoln	21.5%
Sagadahoc	1.1%
Washington	6.5%
Waldo	1.1%
York	7.5%

The companies provide a wide variety of services, from multi-day trips on schooners to 2-6 hour guided sea kayak tours. There are also various types of nature watching services. The most common are whale-watching tours, which often include seabird viewing. There are also dedicated seabird viewing excursions. Prices average about \$60 for a full day excursion, \$36.00 for an excursion that last one to four hours, and \$425 for multi-day excursions.

Firms that were willing to provide figures on total number of visitors taking their excursions reported a total of 156,000 trips per year. Of these, 2,700 trips were on excursions where the primary purpose was seabird viewing, while 127,000 took trips whose secondary purpose was seabird viewing. Adjusting from the sample to the total population implies 5,000 to 7,500 trips primarily for seabird viewing and 350,000 to 450,000 trips with seabird viewing as a secondary purpose.

Based on information provided by the companies, 10-15% of the companies offer services that are predominantly focused on seabirds, 25-30% indicate that seabird viewing is an important part of their services, and the remainder indicate that seabird viewing is incidental to other experiences. More than 95% of the trips taken are of less than one day's duration.

Total spending by visitors on coastal excursions in which seabird viewing plays some role is estimated at \$6.24 million in 1990 among survey respondents. The response rate for the surveys was about 33%, which imply

total spending of \$15-25 million a year taking into account sample size. However, as noted seabird viewing is only part of the recreational experience, so these figures need to be adjusted downward to reflect the proportion of activity related to seabirds as reported by survey respondents. When this is done, the sample estimated \$2.3 million in spending, resulting in a total estimate of \$5-10 million in seabird related spending in 2001.

The economic values associated with recreational seabird viewing not tied to commercial trips is also very significant. People who regularly view seabirds as either part of their coastal recreation or as a primary element in their personal recreation activity constitute a significant population. Since this group does not pay a per-trip fee to enjoy seabirds, other means are employed to assess the economic value associated with this recreation. A means employed to assess values from recreational seabird viewing for our project is described below, with a detailed description of the overall economic impact presented in Chapter 4.

In 1996, Dr. Colgan was enlisted by the Service to conduct a mail survey to develop information about the scope of this recreational activity. The survey was sent to members of the MITA and Maine Audubon Society who had actively participated in bird watching activities or who had indicated particular interest in bird watching as a recreation activity. The survey results showed that those engaged directly and indirectly in coastal seabird viewing come from a wide geographic area. Forty-five percent of respondents were from outside Maine, with more than 30 states and one Canadian province represented. Appendix H provides a summary of the data collected.

A total of more than 10,500 annual trips for seabird viewing was reported in the survey, although this number is somewhat difficult to estimate since many of the respondents live on the Maine coast and report that bird watching is part of their daily routine as opposed to a specific recreational activity.<sup>1</sup> However, it is important to note that, while Maine residents were naturally the most frequent visitors to the coast for bird-watching, non-residents also reported frequent visits.

The Maine Audubon Society portion of the survey was addressed to members who had a specific interest in bird watching, so their reported visits were directly related to recreation involving coastal birds. Members of the MITA, on the other hand, engage in a variety of recreation activities along the coast, includ-



*Pied-billed grebe*  
USFWS photo

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<sup>1</sup> Year-round residents were counted as 200 visits for purposes of the analysis.

ing kayaking, sailing, and, camping. A specific question was addressed to MITA members about the extent to which bird-watching was part of their island-related recreation activities. Over 90% of the respondents from MITA considered bird-watching either a regular or an occasional part of their recreation activity.

The survey also asked respondents which of six areas along the coast they most frequently visited for bird-watching. The responses indicated that the area between Portland and Penobscot Bay is the most popular area, although activity is spread throughout the coast.

### Forestry

Timber is an important economic crop along coastal Maine and is also important to the state's cultural identity. While acres in timberland across the state have remained fairly stable, the amount that can be used for timber harvesting has declined due to sprawl. The forest and paper industry's existence depends on maintaining both ownership and access to timberland; both of which are compromised with sprawl. The biggest loss of timberlands is occurring in southern counties such as Cumberland and York. Between 1989 and 1995, the amount of timberland in these counties had declined by over 13% (Maine Development Foundation; [www.smartgrowth.org](http://www.smartgrowth.org)). While the vast majority of timber activities occurs on the mainland, some also takes place on the coastal islands. On islands, trees are harvested for firewood or other small woodlot management needs, or to open small fields for agriculture.

### Blueberry Production

Similar to timber, blueberries are an important economic crop in Maine with deep cultural roots; in fact, blueberries are one of Maine's chief

export products. Sixty thousand acres in Maine are covered by wild blueberry production. Maine is the largest producer of wild blueberries in the world, and accounts for 25% of all blueberry production in North America. Maine's 2003 wild blueberry crop totaled 80.2 million pounds, an increase of 29% from 2002. The total processing value was \$27.9 million (NASS, 2004). Management of blueberry fields often includes burning to enhance production, and pesticide and herbicide application to control pest species. In Washington County, where the Refuge Headquarters is located, approximately 10,000 acres are burned each spring.



*Blueberry field on Petit Manan Point*  
USFWS photo



### Hunting and Fishing

Hunting and fishing activities generate a sizeable income to the economy of Maine. A study by the University of Maine describes a \$329.9 million and \$196.2 million economic output for hunting and inland fishing, respectively, in Maine in 1996 (Teisl and Boyle 1998). Both of these activities provide wage and employment benefits across many sectors of Maine's economy. While fishing is significant elsewhere in the state, the Refuge has very limited opportunities for this activity, and therefore, we do not further describe this activity below.

Maine ranks third in the U.S. in having the highest percentage of in-state, big game hunters (USFWS 2002). In 2001, there were 164,000 total hunters in Maine; 95% were hunting big game, 39% were hunting small game, and the number for migratory birds was negligible. Trip-related expenditures for Maine hunters amounted to \$53,779,000; a 17% increase in expenditures compared to 1991. These expenditures include food, lodging, transportation, and other trip costs such as equipment rentals, land use fees, etc. The 2001 national averages for expenditures by a hunter per trip were \$327 for big game, \$167 for small game, and \$222 for migratory birds.

### Environmental Education

Environmental education is virtually an industry unto itself in coastal Maine. Programs are sponsored through a variety of Federal and State agencies, private businesses, media outlets, and non-profit organizations. These groups provide a range of opportunities to learn about coastal Maine's environmental resources through written materials, educational programs in classrooms and in the field, and public forums. Target audiences for environmental educational are as varied as the environmental organizations themselves. Land-use decision-makers, lawmakers, land trusts, other conservation groups, outdoor users, instructors, schoolchildren, college students, state residents, and vacationing visitors are all potential audiences for Maine's environmental education initiatives.

According to a comprehensive survey completed in *The Wild Gulf Almanac* in 1995, Maine hosts the following range of organizations and land bases that support or engage directly in environmental education:

- 29 educational organizations and programs
- 29 governmental organizations involved in environmental protection
- 10 museums and aquariums
- 21 non-profit conservation groups
- 1 National Park

- 1 National Estuarine Research Reserve
- 2 National Fish Hatcheries
- 1 International Park
- 1 Wilderness Waterway
- 9 National Wildlife Refuges
- 28 state parks and 12 state historic sites
- many nature preserves managed by non-profit conservation groups

In addition, there are 70 land trusts, approximately 20 water quality monitoring groups, and numerous environmentally-based tourism industries.

Environmental education is incorporated, to varying degrees, in the curriculums of Maine's public and private schools. Some school programs are self-managed while others rely on the assistance of the entities noted above. Interestingly, the many environmental organizations vary widely in their offering of educational opportunities. Some, like The Chewonki Foundation and Maine Audubon Society, have a broad diversity of environmental education programs, accommodating many subject areas. Others, like Acadia National Park, are focused on coastal resource protection and recreational opportunities. Some, like the Natural Resources Council of Maine, Conservation Law Foundation, and RESTORE, focus on environmental advocacy, but support environmental education as a critical component of successful advocacy. Groups like Maine Island Trail Association and some private ecotourism businesses, promote educational programs that encourage appropriate use, enjoyment, and stewardship of coastal environments. Finally, groups like The Nature Conservancy and Maine Coast Heritage Trust direct their energies to land protection, but support education that leads to public understanding, appreciation, and ultimately, long-term protection of coastal resources.

#### Real Estate and Land Development

As discussed above, land development has increased in many areas, especially along Maine's coastal areas. Historically, when the economy in nearby urban areas, such as Boston and New York is doing well, there is tremendous pressure for second home development on both the mainland and islands in Maine. The economic boom of the 1990's has resulted in healthy real estate sales in coastal areas. While environmental issues with sprawl are noted above, a healthy real estate market also results in increased property values and increased property tax revenues to towns.

Average property tax values per acre along coastal Maine range between a low of \$122 and a high of \$28,400, with a mean value of \$4,300 per acre. In general, property values are higher in southern coastal areas than in downeast coastal areas.

On coastal islands, several factors influence opportunities for development. The major factor is cost, including the current market value for islands, the location of and access to the island, the topography of the island for building, protection of the island from storm events, access to water, availability of sewage disposal facilities, and other costs such as taxes.

### Recreational Uses on Coastal Islands

Most of what is described above relates to the mainland. However, it is important to recognize there is a large seasonal demand for access to Maine coastal islands because they offer a unique experience. There are many ways for the public to access islands in Maine, depending on the ownership. The Maine Island Trail Association (MITA) maintains the Maine Island Trail, a 325 mile waterway extending from Casco Bay on the west to Machias Bay on the east. This trail includes 104 public and private islands open to visitors; some are day use only, others are open to day use and camping. Two Refuge islands are part of the MITA trail and open to overnight camping: Bois Bubert and Halifax islands. Other details on access to specific Refuge islands are described in Part Two of this chapter.

Other public and private islands are also open to the general public. Acadia National Park allows access to several of the park's islands; access is primarily by private boat. All of the islands owned by the State of Maine are open to the public, accessed by private boat. Some of these islands are State parks; others were acquired to protect habitat for nesting seabirds. The nesting islands are closed to the public during the nesting season. The coastal islands owned by The Nature Conservancy are open to the public. They may offer occasional trips and tours, but generally visitors access these islands using private boats.



*Aerial view of Halifax Island*  
USFWS photo

There are many commercial companies offering trips to visit coastal islands in Maine. These include bird viewing tours, kayak tours, windjammer cruises, lobster tours, and others. People also use mail boats and ferries to access islands.

Maine islands have historically been used for such non-consumptive recreational uses as picnicking, hiking, wildlife observation, photography, and camping. Consumptive uses include berry picking, fishing and shellfishing, and sport hunting for waterfowl (including eiders), upland game birds, and deer.

## Refuge Administration

### Administrative Organization

As described in Chapter 1, the Maine Coastal Islands Refuge includes five individual refuges. A sixth refuge, Sunkhaze Meadows, is administratively grouped with the Refuge, but will not be evaluated in this document. A separate CCP effort is planned for approximately 2010 for this refuge. Resources shared with Sunkhaze Meadows Refuge include supervision, administrative support services, and field biological staff. A brief description of the resources on Sunkhaze Meadows Refuge is provided below.

### Sunkhaze Meadows Refuge

Sunkhaze Meadows Refuge is approximately 10,300 acres, located in the Town of Milford, Penobscot County, Maine, approximately fourteen miles north of Bangor. The refuge is the second-largest and most unique peatland in Maine, and also contains a portion of Sunkhaze stream and extensive streamside wetlands. The refuge is open to big game hunting, upland game hunting, and waterfowl hunting. Sunkhaze stream is a very popular trout fishing stream. Nonconsumptive uses occurring on the refuge include canoeing, cross-country skiing, environmental education and interpretation, wildlife observation and photography, research, and snowmobiling. Carlton Pond Waterfowl Production Area is also managed by the refuge. It is a 1,068-acre marsh located in the town of Troy in Waldo County. In the early 1990's, the Benton and Sandy Stream Divisions were added to the Refuge under the auspices of the 1990 Farm Bill. Located in the towns of Benton and Unity, both are managed for grassland nesting birds.

### Refuge Offices

We have two Government Services Administration-leased office buildings in the Towns of Milbridge and Rockport. Our Milbridge office, established in 1997, is considered the Refuge Headquarters and consists of 5,250 square feet of space, 50% of which is dedicated to boat storage and maintenance operations. The office portion provides adequate space for the current four permanent employees, but lacks storage and filing space, and does not provide office space for additional staff. We rent commercial storage space to meet these needs.

Our Rockport office was opened in 1999 and consists of 2,250 square feet of space; approximately 50% is administrative office and 50% is boat and other equipment storage. The office currently meets the needs of two permanent employees and an office for the Refuge Friends Group, Friends of Maine Seabird Islands.

We have been evaluating moving the Refuge Headquarters to mid-coast Maine in conjunction with a proposal to develop a mid-coast environmental education center. The Milbridge office would then become the downeast satellite office. In May 2001, we convened a team of people



Rockport Office  
USFWS photo

representing the Service, Maine Bureau of Parks and Lands, Maine Audubon Society, Maine Island Trail Association, Coastal Mountains Land Trust, Maine Coast Heritage Trust, and Tanglewood 4H Camp to discuss a proposal for a new facility. The team developed three purposes for the facility: 1) to provide interpretive and educational programming and exhibits; 2) to facilitate administration of the Refuge; and, 3) to support Refuge operations. We held a public meeting in May 2001 in Rockport to present the proposal, and Congressional representatives were briefed at this time. There was unanimous support for the concept.

A mid-coast location, between Brunswick and Searsport, is recommended because it would provide a central location for management of the Refuge's offshore islands in this region. In addition, this location would be more accessible to the millions of seasonal visitors to Maine's coast, closer to resident Maine population centers, in proximity to major ferry and seabird-viewing tour boat ports, and closer to offices of key partner organizations such as Maine Coast Heritage Trust, National Audubon Society, and the Service's Gulf of Maine Program. Criteria for a site include, but are not limited to, the following:

- within ½ mile of coastal U.S. Route 1 between Brunswick and Searsport;
- on the waterfront, or with an unobstructed view of the water, and/or with foot access to the water;
- no changes in zoning are required, or changes would not result in a protracted conflict with the local authority;
- is consistent with the neighborhood, e.g. would have limited impact on neighbors;
- has good accessibility to utilities which do not require costly upgrades;
- has good access to emergency services;
- has minimal to no hazardous materials or contaminants;
- has safe ingress and egress, or development of such is reasonable;
- can accommodate a handicapped-accessible building(s) for Service staff, Friends Group, and partners, as well as an educational and interpretive facility, storage space for boats and maintenance equipment, and parking for cars and buses;
- can accommodate anticipated visitation with minimal adverse impact;



*Decommissioned lighthouse on Matinicus Rock*  
USFWS photo

- is readily accessible to an outdoor environment for educational and interpretive programs;
- is already Service-owned, or a willing seller is available and property is available at fair market value or less;
- facility and site construction environmental impacts would be minimal;
- costs of developing site are reasonable; and,
- can support construction of a facility modeled on the principles of sustainable design, including such things as active and passive solar, and a state-of-the-art septic system and well.

Once there are specific sites to evaluate, a separate review and NEPA compliance document will be necessary prior to a final decision for a new facility. The criteria would be reviewed and refined during that process. We are currently exploring partnership opportunities to develop and occupy the future education center/office complex.

### Staffing and Budgets

The current staff consists of six permanent employees: a Refuge Manager, a Deputy Refuge Manager, two Wildlife Biologists, a Small Watercraft Operator, and an Administrative Assistant.

Permanent staff, operations and maintenance budgets over the last six years are included in Table 3-4. Operations funding (1261) includes those funds used for such things as salaries, new purchases, contracts, and new construction. Maintenance funding (1262) is used for maintaining the existing infrastructure.

The specific maintenance funding related to the lighthouses is worthy of mention. Due to the complicated logistics of maintaining offshore island lighthouses and associated buildings, and the national historic preservation standards required for Petit Manan, Matinicus Rock, Libby and Egg Rock lighthouses or associated buildings, the costs are very high. Repairs to the towers, former keeper’s houses, sheds and other outbuildings, boat ramps, generators, and debris removal have all been part of these projects. The following costs have been incurred over the last five years:

Petit Manan Light Station:	\$742,000
Matinicus Rock Light Station:	\$250,000
Egg Rock Light:	\$350,000

Table 3-4 Refuge budgets from 1998 to 2004

Year	Permanent Staff <sup>A</sup>	Funding	
		1261 Funds	1262 Funds
1998	6	\$398,000	\$50,000
1999	6.6	\$519,800	\$646,700 <sup>B</sup>
2000	8.7	\$647,800	\$208,000 <sup>C</sup>
2001	8.9	\$632,500	\$29,000
2002	7.7	\$598,700	\$16,800
2003	6.4	\$504,283	\$89,958
2004	6.0	\$493,222	\$34,100

<sup>A</sup> Decimal reflects personnel who worked less than one full year

<sup>B</sup> Structural repairs to Matinicus Rock light station totaled \$250,000. Structural repairs to Egg Rock light station totaled \$350,000.

<sup>C</sup> Structural repairs to historic light house keepers home on Petit Manan Island totaled \$127,000. An additional \$35,000 was utilized to purchase a new vehicle for the Refuge.

### Refuge Revenue Sharing Payments to Towns

The Refuge contributes directly to the economies of several towns in coastal Maine. Since 1935, the Service has made Refuge Revenue Sharing payments to counties or towns for refuge land under its administration. Lands acquired by the Service are removed from the tax rolls; however, under provisions of the Revenue Sharing Act, as amended, the county or other local unit of government receives an annual revenue sharing payment which often equals or exceeds the amount that would have been collected from property taxes if in private ownership. Table 3-5 below portrays payments made to towns during our fiscal year 2002.

Table 3-5 Refuge Revenue Sharing Payments in Fiscal Year 2002.

Town/County	Amount of Payment
Addison	\$895.00
Boothbay	\$2,958.00
Camden	\$86.00
Cutler	\$8,505.00
Friendship	\$545.00
Gouldsboro	\$3,219.00
Jonesport	\$1,409.00
Knox County	\$2,511.00
Land Use Regulatory Com.	\$966.00
Machiasport	\$619.00
Milbridge	\$14,505.00
Phippsburg	\$292.00
South Bristol	\$350.00
Steuben	\$20,964.00
Swans Island	\$1,041.00
Tremont	\$1,047.00
Roque Bluffs	\$646.00
Vinalhaven	\$234.00
Winter Harbor	\$413.00
<b>Total</b>	<b>\$61,205.00</b>

### Refuge Step-Down Plans

Over 25 step-down plans are required by the Service's Refuge Manual, although not all are relevant to every refuge. The following is a summary of the status of step-down plans relevant to this Refuge:

*These plans are completed:*

- Fire Management Plan, 2002 (includes annual prescribed burn plan update and wildfire prescriptions)
- Continuity of Operations Plan, 1999
- Safety Program and Operations Plan, 2000
- Hunt Plan, 2001 (includes annual hunt program update)
- Land Protection Plan (Appendix A, pending approval of CCP)

*These plans are now in draft form or being prepared:*

- Inventory and Monitoring Plan
- Habitat Management Plan

*These plans need to be completed:*

- Visitor Services Plan
- Law Enforcement Plan
- Invasive Species Management Plan
- Cultural Resources Management Plan

### Volunteer/Friends Groups (status, activities)

We are very proud of our volunteer program. Recently we have had 25 volunteers annually contribute 2,892 hours performing administrative, public use, and biological duties. Included in these figures are research volunteers who assist with the seabird restoration on refuge islands.

We are pleased that a Friends of Maine Seabird Islands group was formed in 2002. This Friends group has established a board of directors, secured grant funding, and sponsored a very successful Seabird Symposium. The group is committed to supporting our seabird conservation work through increasing public awareness, building broad-based community support, and by advocating for additional island protection. They will utilize outreach, education and partnerships to achieve their goals.



*Killdeer*  
Photo by Bill Buchanan



### **Research and Special Uses**

Our review of Refuge special use permits issued between 1981 and 2004 reveals that there have been 21 different types of uses permitted. We average 12 permits per year. Most of these allow access to Refuge lands for environmental education, scientific sampling, flora and fauna research collections, and commercial tours to islands for wildlife observation. A complete listing of these permits is available from Refuge Headquarters.

### **Community Outreach**

We are involved in community outreach in several ways. We issue periodic news releases regarding Refuge events to the local news media.

Our participation in community events is also an important part of outreach. We staff informational booths at the Sportman's Show in Orono, Lobster Festival in Rockland, and the Common Ground Fair in Unity. Our staff also give presentations about the Refuge to local civic organizations, schools and universities.

Our web site (<http://petitmanan.fws.gov/>) provides additional information about Refuge resources and management activities.

### **Partnerships**

Our partnerships have been instrumental in accomplishing management goals and objectives. These partnerships include universities and colleges, conservation organizations, several Federal, State and local agencies, land trusts, historic preservation groups, and adjacent landowners. The partnerships have resulted in biological research, cooperative seabird restoration and management, management of other Federal trust resources, land protection, and environmental education and interpretive programs. A summary of some of our partners follows.

#### **Maine Department of Inland Fisheries and Wildlife**

Staff from this state agency (MDIFW) served on the planning team for this project. The mission of MDIFW is to ensure that all species of wildlife and aquatic resources in Maine are maintained and perpetuated for their intrinsic and ecological values, for their economic contribution, and for their recreational, scientific, and educational use by the people of Maine. With regards to the coastal environment, this agency owns, holds conservation easements, or manages through agreements with the Bureau of Public Lands, 301 islands and ledges. This includes 88 nationally significant coastal nesting islands. MDIFW works with seabird researchers on issues of management concern. In addition, they conduct recovery work for the State's other threatened and endangered species. They advise private landowners interested in wildlife and habitat protection, and administer the State's hunting, fishing and trapping programs.

### The Gulf of Maine Coastal Program

Working in partnership with Federal, State, local, and non-governmental partners, the Service's Gulf of Maine Coastal Program (GOMP) helps identify, protect, and restore significant fish and wildlife habitat. Using existing natural resource data along with biological expertise and state-of-the-art computer mapping and database management capabilities, biologists identify important fish and wildlife habitat. In addition, GOMP directs outreach services and technical assistance to interested organizations, including national wildlife refuges, State agencies, statewide conservation groups, and land trusts.

Since 1994, GOMP has played a key role in protecting more than 9,600 acres of important fish and wildlife habitat, restoring 1,300 acres of coastal wetlands, reopening and restoring fish passage on 670 miles of Atlantic salmon rivers, and leveraging more than \$13 million from private, State, and Federal sources. GOMP has helped identify and protect 22 coastal islands through fee title acquisition or the use of conservation easements, and has supported seabird restoration projects on 12 islands.

### Gulf of Maine Council on the Marine Environment

The Gulf of Maine Council on the Marine Environment was established in 1989 by the governments of Nova Scotia, New Brunswick, Maine, New Hampshire, and Massachusetts to foster cooperative actions within the Gulf watershed. Its mission is to maintain and enhance environmental quality in the Gulf of Maine to allow for sustained resource use by existing and future generations. The Council's Public Education and Participation Committee publishes *The Gulf of Maine Times*, which emphasizes articles to highlight or promote cooperation "to maintain and enhance environmental quality in the Gulf of Maine."

### Maine Anadromous Fish Coordination Office

The Maine Anadromous Fish Coordination Office is co-located at the Craig Brook National Fish Hatchery in East Orland, Maine. Its work entails rehabilitation of imperiled Atlantic salmon stocks through stock enhancement, stock assessment, habitat evaluation, protection, and monitoring, inventory and removal of obstructions to migration, characterizing generic composition of stocks, and outreach and education related to Atlantic salmon conservation. It also works on other interjurisdictional fish species like American shad, river herring, striped bass, rainbow smelt, Atlantic and shortnose sturgeon, and their respective habitats.

### Canadian Wildlife Service

The management of wildlife in Canada is a shared responsibility between Federal, provincial, and territorial governments. The Canadian Wildlife Service of Environment Canada (CWS) handles wildlife matters that are the responsibility of the Federal government. These include protection and

management of migratory birds as well as nationally significant wildlife habitat. Other responsibilities are endangered species, control of international trade in endangered species, research on wildlife issues, and international wildlife treaties and issues. CWS also consults with provinces and territories on determining migratory game bird hunting regulations. As a member of the Gulf of Maine Seabird Working Group, CWS participates in seabird management discussions and planning at annually scheduled meetings held in both the U.S. and Canada.

For the past several years, CWS biologists have coordinated with both Refuge and Regional Office staff on Machias Seal Island issues. Sovereignty aside, from Canada's standpoint, CWS is responsible for seabird management on the island. The United States' viewpoint supports the Service's responsibility for managing the same resources on the island. At the field level, both CWS and our staff work together on biological and public access issues. Canadian and U.S. biologists meet annually to discuss seabirds, tour boat issues and landing schedules.

#### Maine Coast Heritage Trust

The mission of Maine Coast Heritage Trust (MCHT) is to conserve coastal and other lands that define Maine's distinct landscape, protect its environment, sustain its outdoor traditions, and promote the well-being of its people. MCHT has helped landowners, communities, government agencies, and local land trusts for more than 30 years to conserve more than 112,000 acres, including vital wetlands, valuable farm and forest land, hundreds of miles of shoreline, and over 260 entire islands. It now owns only 48 properties outright, and holds conservation easements on 95 others. This organization is considered a leader in Maine coastal island conservation. On several occasions MCHT has purchased islands and held them until the Service could secure appropriate funds for the property.

#### Other Land Trusts

Land trusts are a variety of private, non-profit organizations that protect land for its natural, recreational, scenic, historical, educational, or productive values. The 90 land trusts in the state play an essential role in Maine's conservation community. Due to inconsistent funding of State and Federal agencies and the development interests of some landowners, conservation land trusts are often the only alternative for preserving threatened lands. Conservation easement, land donation, and fee purchase are their primary methods of land protection. There are 45 land trusts established along the coast of Maine, many of them actively working to protect coastal nesting islands.

#### The Nature Conservancy, Maine Chapter

The Maine Chapter of The Nature Conservancy protects plants, animals, and natural communities representing the diversity of life in Maine. His-

torically, the chapter has played a lead role in protecting island habitats along the Maine coast. Since 1956, the chapter has helped protect 117 coastal islands as habitat for seabirds, waterfowl, shorebirds, eagles, and rare plant and marine communities. Twenty-two of these islands are nationally significant coastal nesting islands. The chapter, supported by over 12,000 member families, owns and manages approximately 40 mainland preserves and 50 coastal islands.

#### Private Island Owners

Individual landowners in Maine have owned coastal nesting islands for many generations. They have protected the islands and their biological values by conserving the islands' resources and limiting development. Unfortunately, raising tax costs may prohibit some families from retaining ownership of these undeveloped properties.

#### National Audubon Society

The National Audubon Society (NAS) promotes wise use of Maine's environment through research, education, and advocacy. NAS works cooperatively with the Refuge and the MDIFW on seabird management and restoration projects on several Maine islands. Its current programs include the ongoing protection of seabirds, and informational programs to support threatened and endangered seabirds and seabird habitat restoration. NAS also holds fee title and conservation easements on seven nationally significant coastal nesting islands.

#### Maine Audubon Society

The Maine Audubon Society promotes wise use of Maine's environment through research, education, and advocacy. Its current programs include protection and information to support threatened and endangered shorebirds, shorebird habitat restoration, loon restoration, and the "loon count." This society also offers field trips on natural history and ecology of coastal waters, and maintains a staff of wildlife biologists who support active field work, education, and a limited advocacy program. It also holds conservation easements on several coastal nesting islands.

#### State Planning Office–Maine Coastal Program

State Coastal Program staff work on a variety of issues relating to water quality, stewardship, and economic development, and provide technical assistance to municipalities. They work to ensure the continuation of working waterfronts and public shore access points, and support the Maine Coast Week, the Shore Stewards Partnership, and the Penobscot Bay Marine Volunteers.

#### Island Institute

The Island Institute is a non-profit organization that serves as a voice for the balanced future of the islands and waters of the Gulf of Maine. They are guided by an island ethic that recognizes the strength and fragility of Maine's island communities and the finite nature of the Gulf of Maine ecosystems. Along the Maine coast, the Island Institute seeks to support the islands' year-round communities; conserve Maine's island and marine biodiversity for future generations; develop model solutions that balance the needs of the coast's cultural and natural communities; provide opportunities for discussion over responsible use of finite resources, and provide information to assist competing interests in arriving at constructive solutions. The Institute also works with local non-profit, State, and Federal partners to ensure long-term protection of nesting islands.

#### Maine Island Trail Association

The Maine Island Trail Association's (MITA) mission is to "...establish a model of thoughtful use and volunteer stewardship for the Maine islands that will assure their conservation in a natural state while providing an exceptional recreational asset that is maintained and cared for by the people who use it." MITA encourages a philosophy of low-impact use and active stewardship among its members. It also strives to educate island visitors about natural history, and the ecological sensitivity of the islands. Member-volunteers are encouraged to participate in their island monitoring and Adopt-An-Island programs. Members receive a very popular guidebook to the Maine Islands Trail, along with their *Island Trail* newsletter, and educational information regarding low-impact camping.

#### Hurricane Island Outward Bound School

Hurricane Island Outward Bound School (HIOBS) is a non-profit educational institution dedicated to outdoor experiential education. It has been using Cross Island since 1969 as a base for both solo and group camping programs. On a 20 acre inholding on the northeast end of Cross Island, the school owns and maintains the former U.S. Coast Guard lifesaving station and boathouse, now known as the Cabot Biological Station. HIOBS is headquartered in Rockland, Maine.

#### The Chewonki Foundation

The Chewonki Foundation is a non-profit educational institution organized in 1963 to assume ownership and leadership for Camp Chewonki. The Foundation's programs encourage participants to develop their personal potential, gain a sense of community, and heighten their interest in and understanding of the natural world. We grant limited overnight camping on the Refuge's Halifax and Cross Islands for use as part of their educational programs. They are based in Wiscasset, Maine.

### **Wilderness Management**

In 2001, our team began a wilderness review of all current Refuge lands. This review is our formal process to identify and recommend Refuge System lands and waters that merit inclusion in the National Wilderness Preservation System. Wilderness reviews are required in CCPs, and we conduct them in accordance with the refuge planning process outlined in the Service Manual (602 FW 1 and 3), including public involvement and NEPA compliance.

The wilderness review process is conducted in three phases: 1) inventory, 2) study, and 3) recommendation. In the inventory phase, we identify lands and waters that meet the minimum criteria for wilderness. Those lands that meet the minimum criteria are called wilderness study areas (WSAs). Appendix D presents the results of our inventory for the Refuge. We identified 13 islands that meet the minimum criteria, which we then grouped into 8 WSAs.

In the study phase, we evaluate WSAs to determine if they are suitable for wilderness designation. As presented in Chapter 2, our study phase findings are different among the 4 management alternatives depending on the alternative's respective objectives and strategies. During this phase, we considered whether we can effectively manage a respective WSA to preserve its wilderness values and character over the long-term consistent with each alternative's other management priorities. Chapter 4, Environmental Consequences, addresses the benefits and impacts to wilderness values and other resources under each of the management alternatives.

Our final CCP will identify WSAs we have determined suitable for wilderness designation. It will outline specific management direction to maintain the area's wilderness character. This is considered a preliminary administrative determination until reviewed and approved by the Service's Director.

In the recommendation phase, the Director forwards or reports any wilderness recommendations through the Secretary and the President to Congress in a wilderness study report. Congress has reserved the authority to make final decisions on wilderness designation. We will manage areas suitable for wilderness designation pursuant to the final CCP until such a time as Congress makes a decision on the areas, or the CCP is amended to modify or remove the recommendation.

### **Cultural and Historic Resources**

As is generally the case in coastal settings, the project area is especially rich in archaeological resources, though few have been reported on current Refuge lands. The majority of prehistoric archaeological sites in the area date from the Ceramic Period (ca. 1000 B.C. to A.D. 1600). This probably reflects population density to some extent, but is also a reflection of the instability of coastal environments during preceding periods. Pottery (e.g. ceramic) appears in this period, and daily life appears to have consisted of a mix of hunting and gathering of upland, estuarine, and marine resources, especially soft shell clam (*Mya arenaria*).

Unlike most of the eastern U.S., prehistoric agriculture was only significant in southwestern Maine because of the short growing season. Sites on islands were generally seasonally occupied, presumably as bases to exploit marine resources. A similar pattern of occupation followed European contact, with the important addition of fur trapping for the European market. Some places may have become regular trading locations when European ships arrived in the summer. Summer use of some islands as European cod fishing stations also began in the 17th century. Today, coastal erosion is a severe threat to many prehistoric and 17th century archaeological sites in the study area, especially on the more exposed islands.

Only six prehistoric archaeological sites are recorded within current Refuge property, none of which has been thoroughly examined by Service archaeologists. All are in severely eroded shoreline locations on islands. Most appear to be shell middens dating from ca. 2000 years ago to shortly before European contact. A human burial was reported from one of these sites in the 1950s, and stone tools and pottery have been reported from others, indicating that these sites had considerable potential to add to our knowledge of regional prehistory prior to their damage by erosion. Some may still have research potential, while others may have been completely destroyed by erosion since their discovery.

Extensive permanent settlement of the area by Euro-Americans was hindered by repeated wars with the Native Americans and their French allies until the mid-18th century. Many towns were established in the latter part of the century, with population and economic activity generally concentrated around major estuaries. Some larger islands were settled as fishing and farming communities, although most were only used seasonally for livestock pasture or as seasonal fishing station sites. Lighthouses and lifesaving stations were built by the Federal Government on several islands in the project area during the 19th century. Recreational camps, ranging from single room shacks to elegant mansions, also began to be built on some islands in the latter part of the 19th century.

Recorded historic period archaeological sites on the Refuge are generally set back from the shoreline, with the majority being mainland farm sites. One eroding island historic site has been identified, which appears to have been the foundation of a building dating to circa 1800. Place names such as Stage Island (referring to fish drying racks, or “stages”) indicate that similar sites probably exist on other islands from periods spanning European contact to the present. Most island historic sites probably relate to 18th and 19th century maritime activities or livestock raising. In sheltered areas, these may include tidal zone features, such as remains of piers or vessels. Unrecorded historic sites within the Refuge are likely to also include seasonal shore fishing stations and trading locations dating from the earliest periods of European contact and settlement. Few of these locations

have been successfully located within New England, and even fewer studied through archaeological excavation. Such sites are likely to be among the most significant historic archaeological sites in the nation, and the threat of loss by erosion makes their discovery, study, and protection increasingly urgent.

### Lighthouses and Other Historic Structures

On Petit Manan Island, Refuge structures currently listed on the National Register of Historic Places include a light keepers dwelling and outbuildings built in the late 19th century for the Petit Manan Light Station. The dwelling and outbuildings are now used as a research base for the extensive seabird restoration project on the island. These buildings require regular maintenance and have received major repairs in recent years, but further repairs are still needed. Recent funding has addressed significant maintenance needs on the two story dwelling and rain shed. The boathouse

was also replaced in 1994. The U.S. Coast Guard retains ownership and responsibility for maintaining the functioning light tower. The Service cooperates with the Coast Guard on all islands with functioning lighthouses to provide access for emergency and scheduled maintenance of structures and aids to navigation.

Three of the four lighthouse islands transferred to the Service under the Maine Lights Bill of 1996 are listed on the National Register of Historic Places. It is the responsibility of the Service to maintain the structures on three of these islands to historic preservation standards: Libby Island, Matinicus Rock, and Egg Rock lighthouses. The oldest is Libby Island Light Station, with a granite tower built in 1822 and a brick fog signal building built in 1884. Both are in fairly good condition, but do need some repairs, and will require regular maintenance in the future.

Matinicus Rock Light Station, the most famous of the three, includes an 1848 granite dwelling, an 1890 boathouse, and twin granite towers built in 1858. This light station is strongly associated with Abbie Burgess, one of the most famous 19th century heroines of American

lighthouse history, who lived in the lighthouse from 1853 to 1875. The north tower at Matinicus Rock is abandoned and in extremely poor condition. With its lantern removed and no door or window glazing, rain and snow infiltration has destroyed much of the mortar in this tower. Recent repairs



*Lighthouse on Libby Island*  
USFWS photo



on the dwelling, boardwalk, boat ramp and boathouse have been completed, however all structures here will need regular maintenance. The National Audubon Society currently uses the dwelling as a seasonal research station.

Egg Rock Light Station consists of a frame dwelling with a lantern on its roof, built in 1875, and a brick fog signal building, built in 1904. The dwelling has received significant repairs in recent years including replacing the roof and windows, and applying new storm shutters. The brick fog signal building is in good condition. Regular maintenance on both buildings will be required.

Two Bush Island, the fourth lighthouse island, transferred in 1996, has a functioning light station. It now consists only of a brick tower built in 1897. It has been determined ineligible for the National Register of Historic Places, due to loss of the dwelling, boathouse, and oil house that were originally part of this station. Its maintenance is not required by the National Historic Preservation Act. A lesser level of maintenance to protect the light so that it can remain operational will be required under the Maine Lights Bill of 1996.

Franklin Island, acquired by the Service in 1973 from a Coast Guard transfer, also has a functioning light station which is owned and maintained by the Coast Guard. The lighthouse is on the National Register of Historic Places.

Pond Island, acquired by the Service in 1973 from a Coast Guard transfer, also has a functioning lighthouse which is owned and maintained by the Coast Guard. This lighthouse is on the National Register of Historic Places.

Nash Island, half of which was acquired by the Service in 1981 from a Coast Guard transfer, has a non-functioning lighthouse located on the Service-owned half of the island. The light, however, was conveyed to a nonprofit corporation under the terms of the Maine Lights Bill of 1996. The Coast Guard holds an access easement to this light. The lighthouse is on the National Register of Historic Places.

A fishing camp on Metinic Island, consisting of a wing of a 19th century house that was moved to its present location in the 1930's, has been determined ineligible for inclusion on the National Register of Historic Places. This building was renovated in 2002 and is currently used as a base camp for researchers.

The collapsing ruin of an 1880's lifesaving station on Cross Island has been determined ineligible for National Register listing due to its extreme deterioration. The facility is no longer standing.

## Part 2: Refuge Island Resources

### Islands Overview

There is an incredible diversity of ecological communities and associated species on the 42 Refuge Islands. The resources protected on these islands are unique to the Refuge System. In the section below, we provide general descriptions on some of the unique Federal trust resources and rare and declining species protected on the islands. This is followed by individual island descriptions and a series of maps with aerial photos of each island. The islands are presented in order from west to east. They are identified by local name and their Coastal Island Registry Number (CIREG); a unique identifier assigned by the State of Maine Planning office. It is important to note that Service island acquisition has been on-going during development of this EIS. The most current list of Refuge islands should be obtained at Refuge Headquarters.

At the end of the chapter, Table 3-42 provides a summary of cover types for the Refuge.

### Threatened and Endangered Species (Federal-listed)

#### Roseate tern

The northeastern population of the roseate tern is Federal- and State-listed as endangered. Together with Arctic and common terns, roseate tern populations were decimated in the Gulf of Maine in the late 1800's due to a combination of shooting and egging for food and bait, and feather collection for the millinery trade (Drury 1973). Conservation legislation passed in the early 1900's provided protection from human persecution, but expanding gull populations soon caused tern numbers to again decrease significantly (Kress 1983).

By 1977, within the entire Gulf of Maine, all three tern populations had decreased to 5,321 total pairs while the number of islands supporting nesting terns had decreased by half. Cooperative efforts by members of the Gulf of Maine Seabird Working Group (GOMSWG) to attract new birds to islands and to control gull predation have reversed this decline and all three species are experiencing population growth. After 15 years of active

management, the roseate tern population in Maine has risen from a low of 76 pairs to a record high of 289 pairs in 2001. This represents a 278% increase in Maine's population. In 2002, 379 pairs of roseate terns nested at six sites in the Gulf of Maine (including Canada).

While the number of breeding pairs has increased in recent years, we continue to be concerned over the poor distribution of nesting pairs across the region. Approximately 87% of the Northeast roseate tern population breeds on three islands: Bird and Ram islands in Massachusetts and Great Gull Island in New York. In Maine, roseate terns only nest on three or four



*Roseate Tern*

Photo courtesy of Gil Lopez-Espina

islands, with 95% of the Maine population on Stratton and Eastern Egg Rock. Petit Manan, Pond, Metinic, and Seal islands support small numbers of nesting roseate tern. Matinicus Rock, Metinic Island, and Egg Rock have had historic nesting, and nesting attempts have been documented on Pond Island. The terns limited nesting distribution significantly increases the potential for a single catastrophic event to affect a major percentage of the population.

Our roseate tern recovery efforts on the Refuge have focused on increasing the number of nesting pairs on islands and maintaining a productivity level of 1.0 fledged chick/nesting pair. We continue to acquire islands with nesting habitat and engage in cooperative seabird restoration efforts to improve the geographic distribution for all three species of nesting terns. The Roseate Tern Recovery Plan (USFWS 1998) goal is to expand the Northeastern U.S. population to over 30 colonies, with six sites supporting at least 200 nesting pairs with high productivity (1.0 fledged chick/pair).

Habitat manipulation is often necessary to enhance or maintain nesting habitat for roseate terns. Available information indicates that these terns generally prefer dense vegetation or some level of overhead cover for nesting (USFWS 2000). This is somewhat contradictory to the more open habitat used by nesting common and Arctic terns. Fortunately, these differences in habitat preference can usually be accommodated on the same island. Interestingly, roseate terns frequently nest within established colonies of common terns (Nisbet 1981). Habitat manipulation includes construction of nest boxes, allowing dense vegetation to develop, control of laughing, herring, and great black-backed gulls, and other predators. We also restrict public access to seabird islands during the nesting season to minimize disturbance. We describe our predator management strategies and public use restrictions in the discussion on common and Arctic tern that follows.

Given the increases in nesting pairs in recent years, and the establishment of several new tern restoration projects, we are optimistic that the population will continue its current growth trend over the next 15 years, resulting in significant progress towards recovery of this species.

### **Bald eagle**

The northern population of the bald eagle is Federal- and State-listed as threatened. Within the Refuge, bald eagles are actively nesting on four islands, and have historically nested on four additional islands. The Gouldsboro Bay Division also contains one active bald eagle nest. Preferred habitat for bald eagles nesting on Maine coastal islands is mature red spruce/ balsam fir forests close to foraging areas. When available, mature hardwood trees are also used. Eagles can be sensitive to disturbance during the nesting season, and will typically nest in areas with little human disturbance. Once disturbed, adult bald eagles may flush from their nest and leave eggs and young chicks exposed to the inclement weather (heat or cold) or susceptible to predation.

Historically, threats to bald eagles have included environmental contaminants, shooting, habitat loss, and human disturbance at nest sites. Extensive public education efforts and Federal and State legislation have significantly reduced many of these threats. The bald eagle population in Maine has responded to this protection, and the population has increased nearly 8% per year for the past 10 years. The state now supports over 290 pairs of eagles (MDIFW 2002). MDIFW has identified permanent protection of eagle nesting areas as the top priority for the future recovery of this species in Maine. In particular, they have specified a recovery objective of at least 50 nesting areas under permanent habitat protection (conservation ownership or easement), with an additional 100 nesting areas under permanent protection or cooperative agreement (MDIFW 2001).

While we monitor nest occupancy and productivity on the Refuge in cooperation with MDIFW, we do not otherwise actively manage these sites. We restrict public access at active nesting sites from February 15 to August 31. At historical nesting sites, we restrict public access from February 15 to May 15 to encourage re-nesting. If birds are not established by May 15, we determine whether or not eagle activity in the area warrants a continued closure through August 31.

## **Seabirds**

In addition to the roseate tern restoration noted above, we are actively managing our Refuge islands for other seabirds of conservation concern. While our management is focused on common and Arctic tern, Atlantic puffin and razorbills, we are also monitoring populations of common eider, laughing gull, common murre, Leach's storm-petrel, and black guillemots.

One management practice we employ for all our seabird species is a restriction on public access to islands during the nesting season. We restrict public access to all our seabird nesting islands from April 1 to August 31 to minimize human disturbance during this sensitive time of year. Seal Island is an exception; it is closed year round due to a safety concern with unexploded ordnance.

### **Common and Arctic tern**

The Arctic tern is State-listed as a threatened species, and the common tern is State-listed as a species of concern due to their small population sizes and limited geographic distribution. Although Arctic and common terns historically nested on over 70 islands, nesting is now limited to less than 30 islands. Unfortunately, due to a combination of habitat loss through development and recreational pressures, and the presence of nesting gulls, the majority of islands used historically are no longer suitable for nesting terns. Of particular concern is the fact that over 60% of common terns and more than 90% of Arctic tern nesting in Maine occur on three Refuge islands: Petit Manan and Seal islands, and Matinicus Rock. Machias Seal Island, which we manage under an MOU with MDIFW, supports 1,349 pairs of common terns and 2,202 pairs of Arctic terns (GOMSWG 2002). When you include

the nesting population on Machias Seal Island, 94% of the Arctic terns nesting in the United States, with the exception of Alaska, nest on four Refuge islands. Our management focus has been on permanent protection of the nesting islands, predator management, vegetation management, and restricted public access. These are described in more detail below.

With regard to predator management, we are trying to provide terns with predator free nesting islands to maximize tern survival and production rates. Methods include: harassment, egg and nest destruction for gulls, trapping of owls and mammals, and shooting predatory owls, herons, and gulls. We have also used an avicide (DCR-1339) to specifically control gulls during the first two to three years of a restoration project on several islands. The use of the avicide is strictly controlled and used only when non-lethal means would not allow us to accomplish our predator control objectives.

The presence of a single predator can have disastrous effects on a nesting colony. Both herring and great black-backed gulls are highly efficient predators of tern eggs, chicks and adults. In addition, they compete with

the terns for nesting sites. Their presence on a nesting island can lead to complete nesting failure or colony abandonment from an island. Mammalian predators, even a single individual, can also have a disastrous effect on a seabird colony. During the 2001 nesting season, a mink swam to Ship Island and preyed on the colony there, resulting in near complete nesting failure; only four common tern chicks were produced from over 300 nests. The effects of predation will vary depending on the type of predator, seabird species, habitat on the island, and time of year predator arrives on the island. We annually monitor the effectiveness of predator control programs and evaluate new and different techniques.

Both common and Arctic tern species tend to nest in areas providing some overhead cover and a mix of vegetation and open space (Cramp 1985, USFWS 2000). The density and height of a particular plant seem to be more significant in determining use by nesting terns than any specific species composition. We are actively managing the vegetation on several of the tern nesting islands to maintain a high quality nesting substrate and to improve nest productivity. We use a variety of techniques to manage rank vegetation including prescribed burning, sheep grazing, mowing and herbi-



*Great horned owl*

Photo courtesy of the Cornell Laboratory of Ornithology



*Common tern chick*  
Photo by Stacie Schoppman

cides. Habitat management efforts will be expanded to the other restoration islands if vegetation conditions warrant management.

Historical information indicates that vegetation on many of the seabird nesting islands was kept short by annual burning by lighthouse keepers or grazing by livestock. In fact, sheep have grazed on Maine coastal islands for approximately 400 years, with a peak population of nearly 20,000 sheep (Fallon 1991). Indirectly, these vegetative treatments benefitted nesting terns and several other seabirds. Interestingly, because of this history, on many islands we are not certain what the native, natural vegetation would look like if burning and grazing had not occurred.

We have an active prescribed burn program, particularly on Petit Manan Island where burning

has been very successful at reducing raspberries and other rank vegetation to benefit nesting terns. While burning is a valuable vegetation management tool, its use is limited due to a narrow, optimum burning window where conditions are dry and calm enough to allow access to the island with staff and equipment. Therefore, other tools and techniques are needed as well.

On Metinic Island, we are presently using sheep grazing to manage the vegetation to benefit nesting terns. The family who owns the southern 150 acres of the island maintains a flock of 120 sheep. With the exception of a few small vegetation study plots we maintain, the sheep are generally allowed to graze the entire island. Our plots include two that are permanently fenced, and two reference “unfenced” plots. Several times each season, we record the species composition and plant height in the four plots. Prior to the tern nesting season, we encircle the three acre tern restoration area with electric fence. This practice allows the vegetation to grow to greater heights than if subject to grazing, and provides nesting cover for the terns.

During 1994 and 1995 the Refuge and NAS conducted several vegetation control experiments with sheep and goat grazing on Seal Island (NAS 1994, NAS 1995). As expected, information gathered to date on both Seal and Metinic islands indicates that the sheep are altering the species composition and height of the vegetation. However, it appears that the seasonal fencing of the restoration area on Metinic Island is providing the terns with appropriate nesting cover. At the end of the nesting season, we remove the fence and the sheep may graze the entire island.

Grazing is also occurring on Nash Island. The sheep originate from the contiguous privately owned Big Nash Island and cross at low tide to Nash Island. A small number of terns (2-4 pairs) nest on Nash Island, but we are not actively managing this site. Our concern has been that we have had

little, if any, control over grazing intensity or duration on either Nash or Metinic islands. However, on Metinic Island, the current grazing situation appears to provide terns with suitable nesting habitat, by reducing the rank vegetation. At this point in time, we intend to allow grazing to continue on both islands with continued monitoring. It is clear that without grazing as a vegetation management tool, we would eventually need to employ some other labor intensive and expensive method of vegetation control, similar to the other intensively managed seabird restoration islands.

We have also utilized mowing and rototilling as means of managing vegetation for nesting seabirds. On Ship Island, staff have evaluated a combination of techniques (mowing, rototilling, and landscape fabric) in an effort to create additional nesting habitat for the common terns. In 2000, we established three 20' x 20' plots for treatment and monitoring. Each treatment was replicated, for a total of six treated plots. Two plots were mowed only; two plots had the vegetation mowed and then the soil was rototilled; and, two plots had landscape fabric placed throughout the rototilled area. Substrate suitable as nesting material was placed on top of the landscape fabric. The results proved interesting. Mowing by itself proved to be ineffective. The vegetation responded vigorously to the mowing and within a few weeks reached heights which would exclude nesting by terns. Both the rototilled plots and those with landscape fabric provided suitable tern nesting habitat throughout the nesting season. Efforts were repeated the following season. We are continuing to evaluate the results; however, the presence of mink on the island has eliminated most of the nesting.

### **Atlantic puffin and razorbills**

Atlantic puffin and razorbill are State-listed as threatened due to small population sizes (450 pairs of Atlantic puffin and 350 pairs of razorbill in the State of Maine), and limited geographic distribution (four to five islands). Three islands within the Refuge currently support nesting Atlantic puffins: Matinicus Rock, Seal, and Petit Manan islands. In fact, the first two islands support over 90% of Maine's puffin population. Razorbills also nest on four islands within the Refuge: Seal, Petit Manan, and Old Man islands, and Matinicus Rock, with the latter two islands supporting 85% of Maine's population. Machias Seal Island, which we manage under an MOU with MDIFW, supports an additional 2,800 pairs of Atlantic puffin and 543 pairs of razorbill (GOMSWG 2002). When you include the nesting population on Machias Seal Island, 98% of the Atlantic puffin nesting in the U.S. nests on four Refuge islands.

Razorbills were eliminated from Maine by the late 1800's, and had only recovered to 25 pairs by 1977 (MDIFW 1999). The population has continued to grow, and in 2002 approximately 350 pairs of razorbill were documented in Maine. It is difficult to determine the exact population size of these burrow nesters, as many sites are inaccessible.



*Atlantic puffin*  
USFWS photo

Much of the initial recovery observed in the Maine Atlantic puffin population was due to the extensive efforts of National Audubon Society. Prior to the mid 1970's Atlantic puffin were known only to breed in limited numbers on Matinicus Rock. Between 1973 and 1986, the National Audubon Society translocated 954 puffin chicks from Newfoundland to Eastern Egg Rock, and between 1984-1989, an additional 791 puffin chicks were brought to Seal Island. The translocation effort significantly increased the Gulf of Maine population of puffin in a relatively short period of time.

Habitat for both Atlantic puffins and razorbills appears to be limited on Petit Manan Island. In 1991, 17 artificial burrows of various style were constructed on the island. During that first year, three of the 17 artificial burrows were used by the birds (Lor 1991). Although some of the structures were removed because they did not provide suitable nesting habitat, several of the other structures continue to be used today. A few newly designed structures were placed on the island in 2001, and initial response by the nesting puffins appears promising. Puffins successfully raised chicks in three of the six artificial burrows in 2002. On Petit Manan Island, the number of puffins and razorbills observed on a daily basis and through-

out the season have continued to increase over the 15 years. In 2002, the research crew routinely counted over 80 puffins and had a high count of 180 puffins and 43 razorbills. In recent years the number of puffins nesting on the island has varied between 15-24 and no razorbills nest on the island (Jamieson 2002).

As with common and Arctic tern, these species benefit from our predator management program and the restricted public access during the nesting season.

### Waterfowl

Numerous species of waterfowl utilize the Gulf of Maine as migration and wintering habitat. Midwinter waterfowl surveys are conducted annually to determine the distribution and number of birds utilizing the coast. The most abundant species recorded during these inventories is the common eider, but significant numbers of black ducks, bufflehead, common merganser, and long-tailed ducks are also observed. Surf, common, and white-winged scoters also winter along the coast of Maine. Harlequin ducks travel south from their breeding grounds in Canada to Maine to spend the winters along



the remote rocky shores found along the coast. The Maine population of harlequin ducks is estimated at 1,500 individuals, and half of that population winters on a limited number of islands along the coast of Maine (MDIFW 2002). MDIFW has listed the harlequin duck as a threatened species.

Despite providing extensive habitat for migrating and wintering waterfowl, only the common eider nests in large numbers on the coastal islands. Current information indicates that 29,000 pairs of common eiders nest on 320 islands in Maine (MDIFW 2001). Eiders have a long history of exploitation throughout their range, and the number of eiders harvested annually in Maine surpasses the harvest of all other sea ducks combined (MDIFW 2001). Historically, they were subjected to the same collection and habitat loss pressures as the terns. Great black-backed gull predation continues to be a major source of duckling mortality (MDIFW 1999).

As with the other seabird species, common eider benefit from our predator management programs, and the restricted public access on seabird nesting islands during the nesting season.

#### **Other Resident Wildlife**

With our past survey efforts focusing on bald eagles, colonial nesting seabirds, wading birds, and waterfowl, our information on other wildlife resident to coastal islands is limited. Records indicate that several of the larger forested islands (e.g. Cross and Bois Bubert islands) support or have supported white-tailed deer, moose, black bear, coyote, fox, raccoon, mink, and otter. We will gain new information from our recently initiated small mammal surveys, conducted in conjunction with our botanical inventories. In addition, in 2001 spider, dragonfly and damselfly annual surveys began on several islands and the mainland divisions. We will continue to opportunistically monitor small mammals, invertebrates, and amphibians during other scheduled inventories. However, information gathered to date indicates that abundance and diversity of resident wildlife on offshore islands is lower than the mainland due to harsh winter conditions, lack of food and freshwater resources, or distance from the mainland.

Many of the Refuge islands and surrounding ledges function as haul-out sites for both harbor and gray seals. The seals come ashore, frequently during low tide, to bask, sleep, and nurse pups (Katona et. al. 1993). Their activities are generally limited to the inter-tidal areas on islands not currently managed as restoration sites, or on islands large enough to provide the seals sufficient distance from research crews. Several islands within the Refuge are used as harbor seal pupping areas in May or early June. Gray seals have their pups in January and February and have left the islands long before refuge management activities, such as seabird research and restoration projects, occur for the season. Recent surveys have indicated that Seal Island is currently the largest gray seal pupping area in the state (Gilbert, Univ. of Maine, pers. comm.).

## Island Vegetation

### Rare Plants

Plants (and animals) living in the Gulf of Maine are uniquely adapted to cold water currents, the prevalence of fog in summer, and strong cold winds that typically occur off the Maine coast (Conkling 1999). Along the outer islands, this results in harsh environmental conditions similar to those in more Arctic regions. These conditions, which frequently are too harsh for some plants found on the mainland, may give rise to a group of boreal species of plants that typically exist much farther north (Mittelhauser and Morrison 2000).

To date, botanical surveys have been conducted on Cross, Halifax, Eastern Brothers, Libby, John's, Upper Flag, and Petit Manan islands. Other Refuge islands have had limited botanical inventories conducted, including Outer Double Head Shot, Inner Double Head Shot, Old Man, Seal, and Matinicus Rock islands. On the remaining islands, we have been recording unique plants or plant communities in the course of doing other refuge management activities. Rare plant species listed by The Nature Conservancy or the State of Maine and found on the Refuge are listed in Table 3-6. In addition, plants or plant communities of note are mentioned in the individual island descriptions.

### Invasive and Non-Native Plants

Invasive plants have become increasingly pervasive in the State of Maine, although their abundance and distribution on the Refuge have not been thoroughly researched. The threats associated with invasive species vary significantly among the different species and their preferred habitats. Initial botanical inventories on Refuge islands suggest that non-native species such as timothy, salt spray rose, and raspberry may be common on many of the coastal islands. We currently do not know the significance of these species to the native flora of the coastal islands. However, the aggressive and resilient nature of invasive species such as purple loosestrife requires frequent and thorough treatments. The method of treatment depends on the species targeted, but mechanical, chemical, and biological control treatments have been utilized by a variety of agencies.

## Individual Island Descriptions

In the following discussion, we describe what we know about each of the 42 Refuge islands; its acquisition history, its natural resources, and our management of public use and access. It is important to keep in mind that the biological information, in particular the nesting status, changes frequently which has implications for management. The island acreage given could be either the actual survey acres or, in the event we did not survey the island, it is the deed acres or military transfer agreement acres. However, our estimate of acres in specific cover types (Table 3-42, at the end of the chapter) was determined from aerial photos using a GIS mapping tool. Contact the Refuge Headquarters to verify the source for a particular island and to obtain the latest on nesting status and access restrictions. The islands are listed in geographic order from west to east. In each island's description,

Table 3-6 Rare plants documented on Maine Coastal Islands National Wildlife Refuge

Island	Common Name	Scientific Name	State Listing	State / Global Rarity Rank <sup>1</sup>
Cross	livid sedge	<i>Carex livida</i>	threatened	S2 / G5T5
	coast blite goosefoot	<i>Chenopodium rubrum</i>	threatened	S1 / G5
Libby	salt marsh sedge	<i>Carex recta</i>	endangered	S1 / G4
	bird's eye primrose	<i>Primula laurentiana</i>	special concern	S2 / G5
	northern yarrow	<i>Achillea millefolium</i>	special concern	S1 / G5
Eastern Brothers	northern yarrow	<i>Achillea millefolium</i>	special concern	S1 / G5
	marsh felwort	<i>Lomatogonium rotatum</i>	threatened	S2 / G5
	bird's- eye primrose	<i>Primula laurentia</i>	special concern	S2 / G5
	Blinks	<i>Montia fontana</i>	special concern	S2 / G5
Halifax	northern yarrow	<i>Achillea millefolium</i>	special concern	S1 / G5
Bois Bubert	Nova Scotia false-foxglove	<i>Agalinis neoscotica</i>	threatened	S1 / G2?
	bird's- eye primrose	<i>Primula laurentia</i>	special concern	S2 / G5
Petit Manan	Blinks	<i>Montia fontana</i>	special concern	S2 / G5
	white adder's mouth	<i>Malaxis monophyllos</i>	endangered	S1 / G4
John's	sea-beach sedge	<i>Carex silicea</i>	special concern	S3 / G5
Upper Flag	pitseed goosefoot	<i>Chenopodium berlandier varmacrocalycium</i>	special concern	S1? / G5T?

<sup>1</sup> The definitions for State and Global ranking are as follows:

**State Ranking:** (determined by Maine Natural Areas Program)

S1: Critically imperiled in Maine because of extreme rarity or vulnerability to extirpation

S2: Imperiled in Maine because of rarity (6 - 20 occurrences) or because of other factors making it vulnerable to further decline

S3: Rare in Maine (20 - 100 occurrences)

SH: Occurred historically in Maine

**Special concern:** Rare in Maine based on available information, but not sufficiently rare to be considered threatened or endangered

**Global Ranking:** (determined by The Nature Conservancy)

G2?: Globally imperiled because of rarity (6 -20 occurrences) or because of other factors making it vulnerable to further decline (uncertain)

G4: Apparently secure globally, but with cause for long-term concern.

G5: Demonstrably widespread, abundant, and secure globally

T: Indicates subspecies rank

A: Indicates questionable rank

we also list the Coastal Island Registry (CIREG) number, as well as identify which map at the end of the chapter contains the aerial photo for the island (Refer to Maps 3-1 to 3-25 at end of Part 2).

We also list the surveys and studies that have been conducted on each island, some of which are ongoing. Reports on some studies are available from Refuge Headquarters upon request; however, not all data has been analyzed. On several of the islands, we have very little information to share because they are logistically difficult to visit or because other island surveys have taken precedent with available funding and staff. However, a few studies and reports have applicability across several Refuge islands and are recommended reading, including:

- *The Birds and Plants of Petit Manan NWR* (Widrig 1996);
- An evaluation of livestock grazing and habitat restoration on tern nesting islands (Williamson & Schubel 1995); and
- Annual reports for each of the six seabird restoration island projects

The MDIFW has designated many of the Refuge islands as Significant Wildlife Habitat under the State's Natural Resource Protection Act (NRPA). Any seabird nesting island, located within an organized township, that provides suitable habitat and supports 25 or more nests or seabirds would meet the criteria. The majority of Refuge islands qualify as Significant Wildlife Habitat under NRPA. MDIFW has also designated Essential Habitat for bald eagles and roseate terns. Eight bald eagle nests, and six roseate tern nesting islands, located within the Refuge have been designated as Essential Habitat for these species. Both Significant Wildlife and Essential Habitat designations provide MDIFW with additional management oversight and permit authority over actions proposed for these locations to ensure habitats are not degraded due to human activities.

### **1) Malaga Island (CIREG 81-193; Map 3-1)**

This 2.5 acre island lies in the Town of Kittery, York County. The Service purchased a conservation easement in 2002 to permanently protect the island from development.

The island is non-forested with grasses and low shrubs. No botanical or biological surveys are known to us.

### **2) Smuttynose Island (CIREG 81-182; Map 3-1)**

This 39.9 acre island lies in the Town of Kittery, York County, in the Isle of Shoals. The Service purchased a conservation easement in 2002 to permanently protect from development an active seabird nesting colony on the southern end of the island. A 1995 survey of nesting seabirds recorded 15 eider nests, 1,030 great black-backed gull nests, 387 herring gull nests, and three black guillemot nests. Seabird inventory results are summarized in Table 3-7.

Its habitat consists of 20 acres of shrub lands, and 20 acres of grass, forbs, and shrubs. The shoreline is very rocky. Twenty-four acres of intertidal marine wetlands were also acquired. There are two small structures on its western shore, but their maintenance is not the responsibility of the Service. Public visitation occurs on the island, as tours are conducted by the Starr Island Corporation, located on the adjacent Appledore Island. Seasonal caretakers reside on the northern end of the island.

The seabird nesting area is closed to public access during the seabird nesting season: April 1-August 31. Informational signs alerting visitors to the closure are planned.

**Table 3-7 Nesting seabird species, number of pairs, (and year) observed on Smuttynose Island**

Species	Number of pairs* (and year) observed
black guillemot	3('76), 3('95)
great black-backed gull	931 adults ('76), 912 ('84), 1030 ('95)
herring gull	1651 adults ('76), 1442 ('84), 387 ('95)
common eider	15 adults ('95)

\* Some years, individual adults were counted instead of pairs.

**3) Upper Flag Island (CIREG 55-415; Map 3-2)**

This 30-acre island, located in the Town of Harpswell, Cumberland County, was acquired in fee in 1998. In 2001, a botanical inventory of the island was conducted (Mittelhauser and Morrison 2001). The island is generally flat on the north side with tall cliffs (up to 10 meters) on the southern and western shorelines. The vegetation is composed primarily of dense, low, woody shrubs with scattered patches of trees and low vegetation. The shrub community is dominated by bayberry, winterberry, chokeberry, and choke-cherry. A variety of grasses, including common hairgrass and Rhode Island bentgrass, are common. The island also contains a small sandy beach and a freshwater wetland on the northern end. Pitseed goosefoot, a state species of species concern, was documented during the 2001 botanical inventory of the island.

Table 3-8 presents the results of nesting seabird surveys. In addition to seabirds, its habitats are used by migrating and nesting songbirds, as well as raptor species, including northern harriers. Recent waterbird surveys have been conducted in conjunction with the Service’s Gulf of Maine Project and Harpswell Land Trust.

The island is closed to public access during the seabird nesting season: April 1 to August 31. Information signs alerting visitors to the closure are planned.

This island has been used by recreational beach-goers. Community outreach is planned to raise awareness of seabird nesting activities and of the need for a seasonal closure.

The island is open to waterfowl hunting under State and Refuge regulations.

**Table 3-8 Nesting seabird species, number of pairs, (and year) observed on Upper Flag Island**

Species	Number of pairs (and year) observed
common eider	100 ('76), 350 ('80), 500 ('82), 300 ('84), 25 ('93)
great black-backed gull	10 ('77), 40 ('82), 10 ('84), 0 ('96)
herring gulls	135 ('76), 75 ('77), 80 ('80), 200 ('82), 25 ('84), 0 ('96)

\* Some years individual adults were counted instead of pairs.

#### 4) Ram Island (CIREG 55-605; Map 3-3)

This 10 acre island is located in Harpswell, Cumberland County. It was acquired in fee simple from the private landowner in 1999. The island is unforested and vegetated predominately with grasses and shrubs. Seabird inventories have been conducted and are summarized in Table 3-9.

The island is closed to public access during the seabird nesting season: April 1-August 31. Informational signs alerting visitors to the closure are planned.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-9 Nesting seabird species, number of pairs, (and year) observed on Ram Island**

Species	Number of pairs* (and year) observed
common eider	75 ('76), 60 ('80), 117 ('98)
black-crowned night heron	25 ('89)
herring gull	200 ('76); 70 ('80), 295 ('95), 181 ('98)
great black-backed gull	20 ('76), 10 ('80), 25 ('95), 10 ('98)
common tern	67 ('91), 53 ('92), 0 ('95)
double-crested cormorant	124 ('98)

\* Some years individual adults were counted instead of pairs.

#### 5) Pond Island (CIREG 73-282; Map 3-4)

This 10-acre island is located at the mouth of the Kennebec River, in the Town of Phippsburg, Sagadahoc County. The island was acquired in 1973 by transfer from the U.S. Coast Guard, who maintain a lighthouse and fog signal on the island.

The vegetation is dominated by a variety of mixed grasses. The eastern and northern sides of the island feature steep rock outcroppings, while a small sand beach is also located on the northern end of the island.

Until 1937, Pond Island supported a common tern colony but similar to many other tern colonies, gulls eventually excluded terns from the island. At one point in time, the adjacent North Sugarloaf Island supported the largest roseate tern colony in Maine. In an effort to restore terns to this



*Pond Island Lighthouse*  
USFWS photo

historic nesting area, the Service and National Audubon Society initiated a tern restoration project in 1996. In 1999, Pond Island produced its first tern chick in more than 60 years, when 10 pairs of common tern successfully nested on the island. The Pond Island colony has continued to grow and in 2002, the island supported 109 pairs of common tern nested on the island.

Common eider and Leach’s storm-petrels also nest on the island. Unfortunately, great-horned owl and mammal predation continue to be a management concern on the island. Table 3-10 presents the nesting seabirds known on the island.

The island is managed in cooperation with National Audubon Society, and biological technicians staff the island during the nesting season. The society also maintains positive working relationships with several neighbors and organizations in the area. The beach on Pond Island could potentially provide limited habitat for least terns and piping plovers. The island is also an important staging area for common and roseate terns in August.

**Table 3-10 Nesting seabird species, number of pairs, (and year) observed on Pond Island**

Species	Number of pairs (and year) observed
common eider	50 ('76), 75 ('82), 125 ('92), 40 ('98)
herring gull	225 ('76), 225 ('82), 250 ('92), 186 ('95), 0 ('02)
great black-backed gull	100 ('76), 25 ('82), 100 ('92), 79 ('95), 0 ('02)
common tern	0 ('96), 5 ('97), 33 ('00), 135 ('01), 109 ('02)

\* Some years individual adults were counted instead of pairs.

The island is closed to public access during the seabird nesting season: April 1 to August 31. Informational signs are in place to alert visitors to the closure period.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

Pond Island is located next to a popular beach (Popham Beach) that supports high public use in the summer. Personal watercraft use adjacent to Pond Island may become an issue in the future.

**6) Lower Mark Island (CIREG 65-461; Map 3-5)**

This 9.5-acre island lies in the Town of Southport, Lincoln County. In 1998, the Service purchased a conservation easement from the Boothbay Region Land Trust to permanently protect from development an active great blue heron rookery. The island’s topography is flat to gently rolling, a large stand of dead spruce trees remains and only 30% of the island is vegetated (mixed grasses and forbs). The shoreline of the island is dominated by ledge. Table 3-11 presents the results of nesting seabird surveys.

**Table 3-11 Nesting seabird species, number of pairs, (and year) observed on Lower Mark Island**

Species	Number of pairs (and year) observed
double-crested cormorant	189 ('94)
great blue heron	10 ('94); 15 ('95)

\* Some years individual adults were counted instead of pairs.

The island is closed to public access during the seabird nesting season: April 1 - August 31.

**7) Outer Heron Island (CIREG 65-279; Map 3-6)**

This 66-acre island is located in the Town of Boothbay, Lincoln County, and was acquired in fee in 1999. Outer Heron is one of the larger forested, undeveloped islands in the region. The island is predominately red spruce with mixed hardwoods, and has a rocky coastline. Extensive felling of trees has created a variety of openings within the canopy. Dense raspberry thickets have developed in these openings.

Bald eagles were first observed breeding on Outer Heron in 1999. The pair remains active, and has produced at least one eaglet for the past four years. When available, eagles will readily prey on great blue heron adults and young, and the presence of the eagles is believed to have resulted in the abandonment of the island’s great blue heron rookery. Table 3-12 presents the results of nesting seabird surveys.



*Outer Heron Island*  
USFWS photo

The island is closed to public access during the eagle and seabird nesting season: February 15 to August 31. Information signs alerting visitors to this closure are planned.

The island is open to migratory waterfowl hunting under State and Refuge regulations. Traditional uses on the island have included camping and picnicking.



**Table 3-12 Nesting seabirds species, number of pairs, (and year) observed on Outer Heron Island**

Species	Number of pairs (and year) observed
common eider	35 ('77)
great black-backed gull	5 ('77), 10 ('95)
herring gull	10 ('77), 0 ('95)
great blue heron	75 ('77), 75 ('82), 125 ('83), 80 ('92), 10 ('95), 0 ('02)

\* Some years individual adults were counted instead of pairs.

**8) Outer White Island (CIREG 65-278; Map 3-6)**

This 16-acre island is located in the Town of Boothbay, Lincoln County. The Service acquired the island in fee in May 1995 from the Boothbay

Region Land Trust. The island is treeless, with high cliffs and grassy upland.

The Town of Boothbay has designated Outer White Island as a Resource Protection Area, and the Maine State Planning Office has listed it as a Critical Area because of its importance as an eider nesting area. The Service has a partnership with the Damariscotta River Association and the Boothbay Region Land Trust to monitor seabird and other migratory bird use of the island, as well as public use.

An aerial survey completed in June 2002 recorded 191 harbor seals, including 22 seal pups, on the island (Gilbert, Univ. of Maine, pers. com.). Table 3-13 presents the nesting seabirds documented nesting on the island. It is also reported to be an important spring and fall stopover for a variety of migratory birds.

This island is closed to public access during the seabird nesting season: April 1 to August 31.



*Outer White Island*  
USFWS photo

**Table 3-13 Nesting seabird species, number of pairs, (and year) observed on Outer White Island**

Species	Number of pairs* (and year) observed
common eider	150 ('77), 50 ('95)
black-crowned night heron	6 ('95)
black guillemot	3 ('76), 15 adults ('95)
herring gull	80 ('77), 169 ('96)
great black-backed gull	80 ('77), 65 ('96)
double-crested cormorant	25 ('95)

\* Some years individual adults were counted instead of pairs.

### 9) Inner White Island (CIREG 65-276; Map 3-6)

This 5-acre island lies in the Town of Boothbay, Lincoln County. The Service purchased a conservation easement in 1998 from the Boothbay Region Land Trust to permanently protect the seabird colony from development. The island is sparsely vegetated with grass and forbs, with the majority of the island dominated by bedrock outcropping. Table 3-14 presents the nesting seabirds known on the island.

**Table 3-14 Nesting seabird species, number of pairs, (and year) observed on Inner White Island**

Species	Number of pairs (and year) observed
common eider	50 ('77)
herring gull	25 ('77), 78 ('95)
great black-backed gull	90 ('77), 208 ('84), 177 ('95)
double-crested cormorant	80 ('76), 373 ('77), 558 ('82), 925 ('84), 94 ('94)
black guillemot	2 ('76), 1 ('82), 5 adults ('95)

\* Some years individual adults were counted instead of pairs.

The island is closed to public access during the seabird nesting season: April 1 - August 31.

### 10) Little Thrumcap Island (CIREG 65-267; Map 3-7)

This 8.5-acre island in the Town of South Bristol, Lincoln County, was acquired in fee in July 1995 from the Damariscotta River Association (DRA). The treeless island is dominated by mixed grasses and forbs, with some small stands of shrubs. A small beach is located on the north side of the island.

Historically the island supported a tern colony, including endangered roseate terns. We have a partnership with DRA and the Boothbay Region Land Trust to monitor seabird and other migratory bird use of the island, as well as public use. Biological interns spent two years monitoring seabirds and public use on the island. Recent surveys indicate that the island no longer supports nesting by terns or laughing gulls, and there is only limited nesting by common eiders. We continue to be concerned about the impact of predatory mink and owls on the island. Table 3-15 presents the nesting seabirds known on the island.

DRA developed a “seabird island” outdoor classroom curriculum for use on this island.

Public access is allowed year-round on part of this island. Approximately 40% of the island is closed to public access during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to the closure are in place.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-15 Nesting seabird species, number of pairs, (and year) observed on Little Thrumcap Island**

<b>Species</b>	<b>Number of pairs* (and year) observed</b>
roseate tern	5 ('82), 4 adults ('84), 0 ('95), 0 ('97)
common tern	175 ('82), 200 adults ('84), 0 ('95), 0 ('98)
Arctic tern	30 adults ('84), 0 ('95)
laughing gull	75 ('82), 0 ('95)
herring gull	10 ('82), 0 ('95)
common eider	5 ('76), 1 ('98)

\* Some years individual adults were counted instead of pairs.

### **11) Crane Island (CIREG 63-705; Map 3-8)**

This 11.8-acre island is located in the Town of Friendship, Knox County. The Service purchased a conservation easement in 2001 to permanently protect an active seabird nesting area from development. The island's habitat includes a mixture of grasses, forbs, and shrubs on seven acres, and dispersed spruce forest on five acres. The island supports a diversity of seabirds as noted in Table 3-16.

The island owner retains a cabin on the northern end of the island.

The island is closed to public access during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to the closure is planned.

**Table 3-16 Nesting seabird species, number of pairs, (and year) observed on Crane Island**

<b>Species</b>	<b>Number of pairs (and year) observed</b>
common eider	200 ('76), 150 ('77), 300 ('83)
great black-backed gull	35 ('76), 4 ('95)
herring gull	35 ('76), 12 ('83), 0 ('95)

\* Some years individual adults were counted instead of pairs.

### **12) Franklin Island (CIREG 63-707; Map 3-8)**

This 12-acre island is located in the Town of Friendship, Knox County. The island was acquired in 1973 by transfer from the U.S. Coast Guard, and represents the first island acquired by the Service for the Refuge. Ownership of the lighthouse has been retained by the Coast Guard.

Covered with eight acres of spruce trees and four acres of grasses and raspberry thickets, the island once supported one of the largest common eider colonies in Maine. Unfortunately the eider colony was decimated by avian cholera in the mid 1980's. Osprey, herring, great black-backed gulls, black-crowned night herons, black guillemot, and a small population of eiders continue to nest on the island. Table 3-17 identifies seabird species

and our observations. Leach’s storm-petrel are also nesting on the island, but because of their nocturnal nature, we do not have an accurate count on this island.

Franklin Island is closed to public use during the seabird nesting season: April 1 to August 31. Informational signs alerting people to the closure are in place. Approximately 500 people visit the island each year.

The island is open to waterfowl hunting under State and Refuge regulations.

**Table 3-17 Nesting seabird species, number of pairs, (and year) observed on Franklin Island**

Species	Number of pairs* (and year) observed
common eider	1300 ('76), 1300 ('83)
great black-backed gull	45 ('76), 55 ('96)
herring gulls	12 ('76), 100 ('83), 36 ('96)
black-crowned night heron	50 ('83), 4 ('96)
great blue heron	1 ('81), 0 ('94)
black guillemot	2 ('76), 21 ('77), 19 adults ('95)

\* Some years individual adults were counted instead of pairs.

**13) Metinic Island (CIREG 63-584; Map 3-9)**

This 300-acre island is located seven miles offshore, in the Town of Matinicus Isle Plantation, Knox County. The Service owns approximately 149 acres on the north end of the island, acquired in parcels between May 1994 and August 1996. Private landowners currently own about 120 sheep that graze the entire island.



*Sheep grazing on Metinic Island*  
USFWS photo

Approximately 119 acres of Service-owned property is dominated by various grass and forb species and shrubs. The most common species are chickweed, sheep sorrel, raspberry, and bayberry. Fencing placed around vegetation plots indicates that grazing is significantly altering the species composition and height of the vegetation on the island. For example, Kentucky bluegrass, redtop, and sweet vernal grass are common in fenced areas, while these species are uncommon in grazed areas. Another 30 acres of Service-owned land in the center of the island is dominated by red spruce and balsam fir. A bald eagle pair established a nest here in 2004.

Several hundred pairs of terns, including a small number of roseate terns, nested on Metinic Island in the 1980's. The decline of the Metinic colony coincided with the initiation of predator control efforts on Seal Island. We believe the Metinic Island birds moved over to take advantage of the gull-free island. Arctic and common terns have continued to nest on the south end of the island on private land; however, due to the presence of nesting gulls, the colony produces very few chicks. The Service initiated a tern restoration project on the north end of the island in 1998. Decades of sheep grazing had significantly reduced the vegetation, limiting available nesting habitat for the terns. A five-acre "peninsula" was fenced to allow the vegetation to recover and provide some shelter for the terns. Gull harassment and nest removal are utilized on the northern peninsula of the island in an effort to minimize predation on the terns.

Although terns landed among the decoys and sound system, no nesting occurred within the fenced area during the first year of the social attraction efforts. However, in 1999, one pair of common terns and two pairs of Arctic terns nested adjacent to the decoy area. Later in the season, an additional nine pairs of terns nested near the decoy area. The colony has continued to grow and in 2002, 139 pairs of common tern and 112 pairs of Arctic tern nested on the north end of the island. In addition, 15 pairs of terns nested on private land on the southern end of the island. Unfortunately, we believe gull predation continues to significantly limit the productivity of the birds nesting at the southern end of the island. Black guillemot, common eider, herring gull, great black-backed gull nest on Metinic Island. Leach's storm-petrel also nests on the island, but because of their nocturnal nature, we do not have an accurate count on this island. Table 3-18 presents nesting seabirds known on the island.

Biological technicians are hired seasonally to work on the tern restoration program. The interns census terns, control predators, conduct food habit and productivity studies, and monitor vegetation response to grazing.

The refuge portion of Metinic Island is closed to public use during the seabird and bald eagle nesting seasons: February 15 to August 31. Informational signs alerting visitors to this closure are in place.

**Table 3-18 Nesting seabird species, number of pairs, (and year) observed on the northern end of Metinic Island**

<b>Species</b>	<b>Number of pairs (and year) observed</b>
common tern	180 ('84), 3 ('96), 32 ('01), 139 ('02)
Arctic tern	220 ('84), 25 ('91), 39 ('94), 29 ('96), 79 ('01), 112 ('02)
common eider	1000 entire island ('89), 246 northern end ('01)
herring gull	322 entire island ('95), 220 northern end ('01)
great black-backed gull	117 entire island ('95), 59 northern end ('01)
black guillemot	300 adults ('83), 363 adults ('95), 31 northern end ('01)

\* Some years individual adults were counted instead of pairs.

#### 14) Two Bush Island (CIREG 63-653; Map 3-10)

This 8-acre island is located in the Town of St. George, Knox County, and was transferred to the Service in 1999, under the Maine Lights Bill of 1996. The island is treeless and densely vegetated with grasses and forbs such as timothy, yarrow, nightshade, bayberry, rugosa rose, Scotch lovage, and buttercup. The Service is responsible for the light house structure, however the Coast Guard continues to maintain the navigational aids.

Historically, Two Bush Island supported nesting of common, Arctic, and roseate terns. The Refuge considered the island as a potential restoration project, until the higher priority Metinic Island was acquired. As indicated in Table 3-19, a variety of seabird species nest on the island, however, no terns currently nest here.

The island is closed to public use and access during the seabird nesting season: April 1 to August 31. The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-19 Nesting seabird species, number of pairs, (and year) observed on Two Bush Island**

Species	Number of pairs (and year) observed
common eider	25 ('76), 75 ('83), 66 ('92), 14 ('96), 93 ('01)
double-crested cormorant	27 ('92), 15 ('95), 0 ('96)
great black-backed gull	27 ('92), 11 ('96), 14 ('01)
herring gull	10 ('83), 154 ('92), 83 ('96), 111 ('01)

\* Some years individual adults were counted instead of pairs.

#### 15) Matinicus Rock (CIREG 63-940; Map 3-11)

This 28-acre island lies in outer Penobscot Bay, in the Town of Matinicus Isle Plantation. The Refuge acquired the island in 1999, under the Maine Lights Bill of 1996. The island is dominated with granite out-croppings interspersed with vegetation. Dominant vegetation includes witch grass, timothy, angelica, aster, red fescue, and chickweed. The east side of the island is steep and rocky with large boulders that plunge into the sea. The west side of the island tapers off gradually and contains a gravel beach. Its habitats include approximately 10 acres of grassland and 18 acres of rock ledge. The Service is responsible for the light house structures, however the Coast Guard continues to maintain the navigational aids.

Matinicus Rock was the only Atlantic puffin colony (two pairs) within Maine to have survived the market hunting that decimated most seabird colonies in the late 1800's and early 1900's. Since 1900, the island has been a principal breeding site for Arctic terns on the Maine coast. It continues to be a highly diverse and productive seabird colony. Common and Arctic tern, laughing gulls, Leach's storm-petrels, common eiders, Atlantic puffins,

razorbills, and black guillemots nest on Matinicus Rock. Terns numbers had declined in the 1990's, presumably due to the rapid growth of the nearby Seal Island tern colony. However, in recent years the colony has increased to 1,200 pairs of terns. Matinicus Rock remains home to the largest Atlantic puffin and razorbill colony in Maine.

The laughing gull population continues to increase, and now supports 624 pairs. The most recent alcid survey found over 300 puffin burrows, and 168 razorbill burrows. The island is predominantly an Arctic tern colony (999 pairs), but also supports 198 pairs of common terns. Small numbers of roseate terns have nested on the island, but not in recent years. Common murre continue to visit the social attraction area, but have yet to nest on the island. Table 3-20 presents the nesting seabirds known on the island.

We manage the island in cooperation with National Audubon Society. Biological technicians staff the island, conduct biological surveys (food and productivity studies), annually census the island, control predators, and band terns. We are participating in Arctic tern and Atlantic puffin research projects in cooperation with the University of New Brunswick. Annual survey and study results are available upon request from Refuge Headquarters.

The island also supports a wide variety of migrating songbirds, shorebirds and raptors, and island researchers continue to document the use of the island by these species.

The island is closed to public access during the seabird nesting season: April 1 to August 31. Information signs alerting visitors to this closure are in place. The island is open to waterfowl hunting under State and Refuge regulations.

**Table 3-20 Nesting seabird species, number of pairs, (and year) observed on Matinicus Rock**

<b>Species</b>	<b>Number of pairs (and year) observed</b>
Arctic tern	600 ('76), 651 ('84), 1252 ('90), 990 ('95), 1030 ('00), 999 ('02)
common tern	50 ('84), 25 ('90), 247 ('95), 176 ('00), 198 ('02)
black guillemot	175 ('76), 108 ('95)
Atlantic puffin	75 ('76), 75 ('83), 300+ ('01)
razorbill	12 ('76), 20 ('83), 15 ('91), 47 ('95), 168 ('01)
laughing gull	30 ('76), 114 ('84), 203 ('90), 285 ('95), 355 ('00), 624 ('02)
common eider	30 ('76), 231 ('92), 28 ('94)
herring gull	115 ('76), 4 ('94), 0 ('96)
great black-backed gull	31 ('76), 2 ('94), 0 ('96)
Leach's storm-petrel	550 ('76), 706 ('94)

\* Some years individual adults were counted instead of pairs.

### 16) Seal Island (CIREG 63-923; Map 3-12)

This 65-acre island is located in Vinalhaven, Knox County. The U.S. Navy transferred Seal Island to the Service in 1972. The island was used as a bombing target for the Navy from the 1940's to the early 1960's.

The habitat on Seal Island consists of 35 acres of grasslands and 30 acres of rock ledge. This combination of habitats offers prime seabird nesting sites, with boulder fields and ledges for Atlantic puffins, razorbills, and

black guillemots, grass and ledge areas for terns, raspberry thickets for eiders, and soft peat and glacial till soils for Leach's storm-petrels. A vegetation study was conducted in 1985 by Rappaport and Wesley.

Seal Island was once home to the largest Atlantic puffin colony in the Gulf of Maine. For over 200 years it was also a summer campsite for fisherman harvesting herring, groundfish, and lobster. The fishermen also used their nets to harvest the nesting seabirds, which led to the demise of the colony by 1887. The island was eventually recolonized by cormorants, gulls, and terns. However, by 1953 the growing gull population had completely displaced all nesting terns.



*Seal Island*  
USFWS photo

In 1984, the National Audubon Society, Canadian Wildlife Service and the Refuge began a seabird restoration project on the island. In an effort to re-establish Seal Island as an Atlantic puffin breeding colony, NAS translocated puffin chicks from Newfoundland between 1984-1989. The effort proved highly successful, and for the first time in nearly 100 years, puffins successfully bred on Seal Island in 1992. The puffin colony has continued to grow and in 2002 the island supported 181 pairs of puffins and one pair of razorbills.

Only four other islands support nesting razorbills in the state, so we are hopeful that additional razorbills will initiate nesting on Seal Island. In conjunction with the puffin restoration efforts, social attraction equipment (sound system and decoys) was utilized to attract terns to the island. After six years of effort, 20 pairs of Arctic and common terns nested on the island in 1989. The colony has increased dramatically since that time, with 1,057 pairs of Arctic terns and 1,582 pairs of common terns nesting in 2002. Seal Island is now home to the largest tern colony in Maine.

Leach's storm-petrel, black guillemot, common eider, great cormorant, great black-backed and herring gulls also nest on the island. The island is also only one of ten islands in Maine that hosts nesting great cormorants. Small numbers of roseate terns have also nested on the island in recent years.

We continue to work cooperatively with National Audubon Society on the Seal Island seabird restoration project. Biological technicians staff the



island, conduct biological surveys (food and productivity studies), annually census the island, control predators, and band seabirds. Researchers are currently supporting Arctic tern and Atlantic puffin research projects in cooperation with the University of New Brunswick. Annual survey and study results are available upon request at Refuge Headquarters. Table 3-21 presents the nesting seabirds known on the island.

In 2000, Seal Island was recognized as the largest gray seal pupping island in Maine. In 1999, winter flights were conducted to count seals, and they estimated 400 adults and 150-200 pups were on the island (Gilbert, Univ of Maine, 1999). The island is also used by harbor seals as a pupping island.

Raptor surveys were conducted in 1997 and 1998 (Drury 1997, and Drury and Goodhue 1998). The island is considered an important foraging area for migrating peregrine falcons and other raptors.

The island is closed to public access year round due to the presence of unexploded ordnance. Information signs alerting visitors to the closure are in place.

**Table 3-21 Nesting seabird species, number of pairs, (and year) observed on Seal Island**

Species	Number of pairs (and year) observed
Arctic tern	16 ('89), 180 ('90), 517 ('95), 890 ('00), 1057 ('02)
common tern	1 ('89), 80 ('90), 645 ('95), 1205 ('00), 1582 ('02)
Atlantic puffin	0 ('91), 7 ('92), 26 ('95), 126 ('00), 181 ('02)
common eider	200 ('77), 324 ('86), 285 ('95), 465 ('96)
double-crested cormorant	38 ('76), 35 ('84), 23 ('95), 22 ('96)
great cormorant	4 ('94), 8 ('95), 8 ('96), 12 ('00), 18 ('01), 27 ('02)
Leach's storm-petrel	724 ('94)
great black-backed gull	300 ('76), 221 ('95), 129 ('98)
herring gull	800 ('76), 110 ('95), 90 ('98)

\* Some years individual adults were counted instead of pairs.

### 17) Roberts Island (CIREG 63-174; Map 3-13)

This 10-acre island is located in the Town of Vinalhaven, Knox County. The island was acquired in 1995 as a gift from the Vinalhaven Land Trust.

The vegetation on the island is dominated by mixed grasses and a few stand of shrubs. The north end of the island has a cobble beach, and a portion of the island raises 120' above sea level. In addition to supporting a variety of nesting seabirds, the island supports roosting and feeding bald eagles, feeding harlequin and black ducks, migrating peregrine falcons, harriers, sharp-shinned hawks, merlin, and brant. Mink predation has been a significant problem on the island, and in some years they have eliminated all black guillemot productivity. A contract was awarded to a local trapper for several years in an effort to remove the mink. Although several mink have been removed, additional animals continue to swim to the island from

Vinalhaven. A fall raptor migration study was conducted in 1998 (Drury & Goodhue 1998). Table 3-22 presents nesting seabirds known on the island.

The Maine Department of Inland Fisheries and Wildlife has recognized the island's significance to wildlife in the Penobscot Bay Conservation Plan (Maine State Planning Office, 1987). The island has been included in the State of Maine Natural Areas Program since December 1977.

The island is closed to public access during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to the closure are in place.

**Table 3-22 Nesting seabird species, number of pairs, (and year) observed on Roberts Island**

Species	Number of pairs* (and year) observed
common eider	350 ('77), 700 ('86), 272 ('96)
black guillemot	40 ('86), 103 adults ('94), 7 ('97), 4 ('98), 40-60 adults ('99)
herring gull	100 ('77), 150 ('86), 425 ('96)
great black-backed gull	10 ('77), 50 ('86), 10 ('96)
double-crested cormorant	67 ('86), 80 adults ('94)

\* In some years, individual adults were counted instead of pairs.

### 18) Little Roberts Island (CIREG 63-175; Map 3-13)

This 1-acre island is located in the Town of Vinalhaven, Knox County. The island was acquired as a gift in 1995 from the Vinalhaven Land Trust.

Vegetation on the island is dominated by mixed grasses and ericaceous shrubs. The island is one of ten islands in Maine to support nesting of great cormorant. The island also supports nesting of black guillemot, common eider, great black-backed gull, and herring gull. As with Roberts Island, mink predation continues to be a management concern for this island.

The island is closed to public access during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to the closure are in place.

**Table 3-23 Nesting seabird species (and year) observed on Little Roberts Island**

Species	Number of pairs* (and year) observed
common eider	50 ('77); 100 ('81); 25 ('86)
black guillemot	15 ('77); 110 adults ('95); 62 adults ('95)
herring gull	25 ('77), 10 ('86); 22 ('96)
great black-backed gull	5 ('86); 21 ('96)
double-crested cormorant	148 ('77); 302 ('81), 138 ('86); 7 ('95), 100 ('99)
great cormorant	3 ('94); 6 ('95); 1 ('96); 3 ('97); 30 ('98), 10 ('00); 13 ('01); 21 ('02)

\* In some years, individual adults were counted instead of nesting pairs.

**19) Bar Island (CIREG 59-244; Map 3-16)**

The Refuge acquired 17.2 acres of this island in fee simple from The Nature Conservancy in 1994. It is located in the Town of Tremont, Hancock County. The northern half of the island is privately owned and contains

several seasonal homes. The vegetation on the Service-owned portion of the island is a mix of habitats including grassy meadow with small shrubs and red spruce trees.

The island supported several hundred pairs of common eider in the 1970's and early 1980's, however the population was eliminated by avian cholera in the mid 1980's. Table 3-24 presents the nesting seabirds known on the island.

No public access restrictions are currently being implemented because there has been no recent seabird activity.



Bar Island  
USFWS photo

**Table 3-24 Nesting seabird species, number of pairs, (and year) observed on Bar Island.**

Species	Number of pairs (and year) observed
common eider	700 ('76), 400 ('77), 450 ('81), 20 ('84)
herring gull	2000 ('76), 300 ('77), 20 ('84), 4 ('85)
great black-backed gull	300 ('76), 1 ('85)
double-crested cormorant	15 ('77), 0 ('84)

\* Some years individual adults were counted instead of pairs.

**20 & 21) Eastern and Western Barge islands (CIREG 59-342 and 59-343 respectively; Map 3-16)**

The Service acquired each of these 0.5-acre islands in fee simple from The Nature Conservancy in 1994. They are located in the Town of Tremont, Hancock County. The Barge islands are essentially rock ledges with areas of mixed grasses. The ledges support nesting gulls, common eider, and cormorants, and provide a haul out area for seals. Table 3-25 presents the nesting seabirds known on the island. Surveys completed in 1993 and 2002 recorded over 100 seals on West Barge. Observers recorded 35 seals on East Barge in 1993, and 75 seals in 2002 (Gilbert, Univ. of Maine, pers. com.).

These islands are closed to public access during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to this closure may not be feasible do to the geology of the islands (rock ledge) or necessary, due to the small size and difficulty accessing the islands.

These islands are open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-25 Nesting seabird species, and year (and year) observed on Eastern and Western Barge Islands**

Species	Number of pairs (and year) observed	
	Eastern Barge	Western Barge
common eider	10 ('77), 3 ('84), 2 ('94)	1 ('76), 1('84), 1 ('94)
herring gull	0 ('84), 3 ('89), 1('94)	10 ('93), 0 ('95)
great black-backed gull	20 ('77), 8 ('84), 2 ('89), 12 ('94)	50 ('77), 14 ('84), 22 ('89), 20 ('95)
double-crested cormorant	25 ('76), 115 ('77), 85 ('84), 7 ('92), 27 ('94)	280 ('77), 259 ('79), 5 ('84), 66 ('89), 111 ('94), 104 ('97)

\* Some years individual adults were counted instead of pairs.

## 22) Ship Island (CIREG 59-341; Map 3-16)

The 11.2-acre Ship Island was acquired in fee simple from The Nature Conservancy in 1994. It is located in the Town of Tremont, Hancock County. The adjacent Trumpet Island is accessible at low tide by an intertidal bar. The majority of the vegetation on Ship Island is dominated by grasses and ericaceous shrubs, including rugosa rose, raspberry, elder, and Angelica. A small stand of black cherry is located on the northern end of the island. The western shore of the islands is comprised of an extensive sandy beach, while the remainder of the island is surrounded with cobble.

Historically, Ship Island supported over 300 common tern nests, while an additional 500 pairs nested on Trumpet Island. However, by the 1930's gulls had eliminated all nesting by terns. In 1993, a tern restoration project was initiated on these islands through a cooperative agreement with The Nature Conservancy. Gull control was initiated and continued through 1995. After more than a 50-year absence, terns returned to Ship Island in 1995 with a single nesting pair of common terns. The colony continued to grow and in 1999, 558 pairs of common terns nested. The colony completely abandoned the island during the 2000 nesting season, presumably due to mammalian predators. During the 2001 season, 261 pairs of terns established nests, but abandoned the island after a mink arrived on the island. Terns attempted to nest on the island during



*Ship Island*  
USFWS photo

the 2002 season, but once again abandoned the island early in the nesting season. All efforts to trap predators have been unsuccessful. Table 3-26 presents the nesting seabirds known on the island.

Refuge biological technicians staff Ship Island, conducting biological surveys on the tern colony (food and productivity studies), predator control and banding. Vegetation management to improve and maintain tern nesting habitat is on-going using vegetation mats and mechanical disturbance.

Also of note is the fact that an avian cholera epidemic in the early 1980's significantly reduced the common eider population on Ship Island.

The island is closed to public access during the seabird nesting season: April 1 to August 31. The island has informational signs alerting visitors to this closure.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-26 Nesting seabird species, numbers of pairs, (and year) observed on Ship Island**

Species	Number of nests (and year) observed
common eider	200 ('76), 300 ('77), 25 ('81), 115 ('84), 115 ('92), 71 ('96)
herring gull	250 ('76), 115 ('83), 345 ('89), 87 ('94), 0 ('96), 0 ('02)
great black-backed gull	250 ('76), 131 ('81), 136 ('92), 0 ('96), 0 ('02)
double-crested cormorant	350 ('76), 440 ('77), 442 ('79), 3 ('84), 0 ('94), 0 ('02)

\* Some years individual adults were counted instead of pairs

### 23) Trumpet Island (CIREG 59-340; Map 3-16)

This 3.2-acre island was acquired in fee simple from The Nature Conservancy in 1994. It is located in the Town of Tremont, Hancock County. The adjacent Ship Island is accessible at low tide by an inter-tidal bar. The majority of the vegetation on Trumpet Island is dominated by dense stands of raspberry, rugosa rose, and elder.

Historically, Trumpet Island supported over 500 pairs of common terns, while Ship Island supported an additional 300 pairs of terns. However, by the 1930's gulls had eliminated all nesting by terns. (See Ship Island summary for details of tern restoration effort.) In the late 1980's and early 1990's, hundreds of cormorants were illegally shot and clubbed to death on the island. Table 3-27 presents nesting seabirds known on the island.

As noted for Ship Island, an avian cholera epidemic in the early 1980's significantly reduced the common eider population on adjacent islands. A single pair of American oystercatcher have also nested on the island for the past several years.

The island is closed to public access during the seabird nesting season: April 1 to August 31. Trumpet Island has informational signs alerting visitors to this closure.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-27 Nesting seabird species, number of pairs, (and year) observed on Trumpet Island**

Species	Number of nests (and year) observed
common eider	150 ('77), 164 ('81), 348 ('84), 330 ('89), 200 ('94), 112 ('96)
herring gull	50 ('77), 100 ('82), 74 ('84), 48 ('89), 7 ('94)
great black-backed gull	50 ('77), 25 ('82), 61 ('84), 72 ('89), 43 ('94)
double-crested cormorant	636 ('83), 290 ('89), 487 ('92), 338 ('95), 0 ('96), 0 ('02)

\* Some years individual adults were counted instead of pairs.

#### **24) Little Marshall Island (CIREG 59-470; Map 3-14)**

This 16.5-acre eagle nesting island is located in the Town of Swan's Island, Hancock County. The Service purchased the island in 2000. The island is dominated by mixed hardwoods, red spruce, and balsam fir.

Bald eagles were first observed nesting on the island in 1986. Although the pair has used several different trees for nesting, they have consistently nested on Little Marshall since 1986.

The island is closed to public use during the bald eagle nesting season: February 15 to August 31. Informational signs alerting visitors to this closure period are planned.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

#### **25) John's Island (CIREG 59-483; Map 3-15)**

This 43-acre island, located in the Town of Swan's Island, Hancock County, was acquired in 1998 in fee simple from a private individual. It is vegetated by grasses and herbs, with a few stands of shrubs, including choke cherry, winterberry, and elder. Raspberry dominates much of the vegetated area, with approximately 25% of the island's vegetation comprised by this one species. The perimeter of the island consists of granite ledge, ranging from gradual slope to steep cliff.

This island is a harbor seal pupping ground, and 144 animals were observed in 1997 (Gilbert, Univ. of Maine, pers. comm.). An aerial survey of John's Island completed in June 2002 recorded 169 harbor seals, including 60 seal pups (Gilbert, Univ. of Maine, pers. comm.). It supports common eiders, great and double-crested cormorants, and black-backed and herring

gulls, and is one of only ten islands in Maine with nesting great cormorants. A botanical survey was conducted in 1999 and 2000 by Mittelhauser and Morrison. Of note is the identification of a State-listed Species of Special Concern, seabeach sedge (*Carex silica*). Table 3-28 presents nesting seabirds known on the island.

John’s Island is closed to public use during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to this closure period are planned.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-28 Nesting seabird species, number of pairs, (and year) observed on John's Island**

Species	Number of pairs (and year) observed
black guillemot	300 ('86), 225 ('95), 250 ('00)
common eider	75 ('77), 400 ('86), 1000 ('96); 277 females ('00)
great black-backed gull	150 ('76), 400 ('86), 234 ('95), 78 ('00)
herring gulls	100 ('77), 600 ('86), 288 ('95), 97 ('00)
double-crested cormorant	55 ('76), 182 ('84), 158 ('95), 100 ('96), 35 ('99), 42 ('00)
great cormorant	4 ('93), 20 ('95), 17 ('96); 4 ('98), 1 ('00), 0 ('02)

\* Some years individual adults were counted instead of pairs.

**26) Egg Rock (CIREG 59-301; Map 3-17)**

This 12-acre island was transferred to the Service in 1999 under the Maine Lights Bill of 1996. The island lies at the entrance of Frenchman Bay, in the Town of Winter Harbor, Hancock County. A significant portion of the island is dominated by rock out-croppings, with the remainder of the island dominated by mixed grasses, Angelica, and goldenrod.



Egg Rock lighthouse  
USFWS photo

The Egg Rock lighthouse, owned by the Service, is on the National Historic Register. It has undergone significant renovations in recent years.

The island’s historical significance for colonial nesting seabirds is well documented. Roseate, common, and Arctic terns all nested on Egg Rock after an increasing gull population caused terns to abandon Petit Manan Island in the early 1980’s. In 1981, 300 pairs of common and Arctic terns nested on the island. In 1984, three pairs of endangered roseate terns also nested on Egg Rock. However, when we initiated gull control efforts on Petit Manan Island in 1984, the terns returned to that location abandoning Egg Rock.

Terns have not nested on Egg Rock since 1984. Seabirds and their nesting status on the island are listed in Table 3-29.

In addition to the species noted above, black guillemots and Leach's storm-petrels also nest on the island. Harbor seals use Egg Rock as a haul out area. A survey completed in June 2002 documented 297 seals on Egg Rock, including 75 seal pups (Gilbert, Univ of Maine, pers. com.).

This island is closed to public use during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to this closure period is planned. Local tour boats periodically come close to the island to view the seabirds and seals, and to interpret the lighthouse.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-29 Nesting seabird species, number of pairs, (and year) observed on Egg Rock Island**

Species	Number of pairs* (and year) observed
common terns	300 pairs of common & Arctic terns ('81), 325 ('84)
Arctic terns	60 ('84)
roseate terns	3 ('84)
common eider	15 ('89), 34 ('94), <5 ('99), 20 ('01)
great black-backed gull	56 ('89), 5 ('94), 65 ('95), <10 ('00); 12 ('01)
herring gulls	48 ('89), 241 ('92), >200 ('99); >150 ('00); 414 ('01)
laughing gulls	175 adults ('81)

\* Some years, individual adults were counted instead of pairs.

### 27) Abbott Island (CIREG 79-837; Map 3-19)

This 3.5-acre island is located in Carrying Place Cove, Town of Steuben, Washington County. The Service acquired the island in fee simple from a private party in 1996. It is dominated by conifer forest, with some understory vegetation species that are not found on the adjacent mainland: Indian cucumber root (*Medeola virginiana*), painted trillium (*Trillium undulatum*), bluebead-lily (*Clintonia borealis*), and hobblebush (*Viburnum alnifolium*). Striped maple (*Acer pensylvanicum*) and various orchids are also found here. The mud flats surrounding the island are used by migrating shorebirds and waterfowl, including black duck, mallard, goldeneye, and teal.

It is open to waterfowl hunting under State and Refuge regulations.

### 28) Sally Island (CIREG 79-836; Map 3-19)

This 1-acre island is located in Dyer Bay, Town of Steuben, Washington County. It was acquired in August 1996 by donation from The Conservation



Fund. The island is connected to Petit Manan Point at low tide, and is characterized by a dense spruce stand. Bald eagles were first observed nesting on the island in 1985. The pair experienced alternating years of nest occupancy until they moved to the adjacent island in 2001. No other botanical or biological surveys are known to us.

When occupied by bald eagles, the island is closed to public access during the eagle nesting season: February 15 to August 31. If eagles are not nesting on the island, Sally Island is open to public visitation (day use) after May 15<sup>th</sup>. Informational signs alerting visitors to the closure are planned.

### **29) Petit Manan Island (CIREG 79-933; Map 3-18)**

This 10-acre island lies 2.5 miles south of Petit Manan Point in the Town of Steuben, Washington County. It was acquired in 1974 by transfer from the U.S. Coast Guard. The Coast Guard continues to maintain the 119' lighthouse tower and navigational aids, and the Service maintains several historical structures on the island. Petit Manan has long been considered one of the most important islands in the Gulf of Maine for colonial nesting seabirds.

Botanical inventories, including those for rare plants, were conducted in 1995, 2001, and 2002 (Widrig 1996 and Mittelhauser 2002). Vegetation on the north and east side of the island includes a variety of grasses, Angelica, raspberry, asters, meadowrue, blueberry, and beachpea. The southwestern and central areas of the island are dominated by a dense stand of raspberry which is rapidly expanding each year. Calamagrostis occupies a large portion of the western half of the island. The invasive species dodder established a strong foothold on the northern end of the island in 2000.

Extensive vegetation management occurs, utilizing a variety of techniques such as burning, herbicide, and mechanical treatment to improve nesting seabird habitat. Annual monitoring of this vegetation and its response to treatment dictates what to do in forthcoming years.

Significant numbers of terns had historically nested on the island, including 1,500 nesting pairs observed in 1971. However, when human presence on the island ended with automation of the light station in 1972, the numbers of nesting gulls gradually increased to the point they excluded all nesting terns by 1983. Tern restoration was initiated in 1984 in partnership with the College of the Atlantic. One of the first actions was the



*Dodder, an invasive plant, has established a strong foothold on Petit Manan Island*  
USFWS photo

removal of herring and black-backed gulls. Within one week of the gull control effort, terns returned to nest on Petit Manan Island. The seabird colony has continued to grow, and the island now supports nesting by eight species of seabirds and waterfowl. Razorbill and common murre also routinely visit the island, however no nesting efforts have been documented. Leach's storm-petrels and black guillemots also nest on the island. The island also supports migrating songbirds, shorebirds and raptors. Table 3-30 presents the nesting seabirds known on the island. An annual report is available upon request from Refuge Headquarters.

Biological technicians live on the island each nesting season and conduct biological surveys (food and productivity studies), predator control and banding. Our staff and seasonal technicians conduct a complete census of the island each year; and record observations of all species observed on or adjacent to the island. Habitat restoration work continues as a cooperative endeavor with the Gulf of Maine Seabird Working Group and MDIFW. We are currently participating in Arctic tern and Atlantic puffin metapopulation studies with the University of New Brunswick.

The results of a spider inventory (Jennings 2000) and botanical inventory (Mittlehauser 2000) for this island is also available at Refuge Headquarters .

The island is a popular tour boat destination. Several tour boats per day pause offshore to observe the island's seabirds during June - August. Refuge staff meet annually with the tour boat companies to discuss issues of concern, and we provide them with periodic updates throughout the seabird nesting season.

Petit Manan Island is closed to public access during the seabird nesting season: April 1 to August 31. It is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-30 Nesting seabird species, number of pairs (and year) observed on Petit Manan Island**

<b>Species</b>	<b>Number of pairs (and year) observed</b>
common tern	700 ('76), 6 ('81), 410 ('84), 1093 ('90), 1355 ('95), 990 ('02)
Arctic tern	800 ('76), 450 ('84), 729 ('90), 796 ('95), 671 ('02)
roseate tern	3 ('76), 8 ('84), 48 ('90), 61 ('95), 27 ('02)
Atlantic puffin	0 ('84), 7 ('90), 13 ('95), 20 ('02)
laughing gull	60 ('76), 200 ('84), 300 ('91), 487 ('95), 838 ('02)
common eider	6 ('76), 10 ('84), 20 ('89), 53 ('95), 113 ('02)

\* Some years individual adults were counted instead of pairs.

### 30) Bois Bubert Island (CIREG 79-824; Map 3-20)

The Service owns in fee simple 1,321 acres of this 1,500-acre island in the Town of Milbridge, Washington County. Portions of the island were acquired in 1979 and 1987 by donation and purchase from The Nature Conservancy, and in 1987, 1994, and 1997 by purchase from private parties. The island is located about one mile east of Petit Manan Point, and is characterized by red and white spruce forests, balsam fir, tamarack, and associated hardwoods. Two freshwater wetlands are also located on the island, as well as an extensive area of early successional habitat. A cover type map utilizing national vegetation classification standards was completed in 2002 (Map 3-26).

The island's jack pine woodlands represent two of only eight known stands in Maine, and are considered a rare community type by the Maine Natural Areas Program (MNAP 1983 and Elliott 1999). Although jack pine is occasionally a component of other forest communities, this woodland type is the only community with jack pine as the dominant species. Our long-term goal in maintaining these stands is to continue providing a diversity of habitats within the Refuge, and to contribute to the ecological diversity of coastal Maine.

Other rare plants are present on Bois Bubert as well. The State-listed threatened Nova Scotia false-foxglove (*Agalinis neoscotica*) occurs on the island as does bird's eye primrose (*Primula laurentia*), a State species of special concern (Widrig 1996).

Bald eagles were first observed nesting on the island in 1996, and with the exception of 2000, have produced at least one eaglet per season. The wetland on the southern end of the island and the surrounding inter-tidal

habitat provide extensive stopover habitat for waterfall during fall migration. Limited waterfowl banding has occurred on the island.

The results of a spider inventory for this island are available at Refuge Headquarters (Jennings 2001).

Currently, we are working cooperatively with the Maine Island Trail Association and others to provide low impact educational and recreational opportunities for island users, including overnight camping. The Refuge owns one cabin on the island that can be used to house researchers. Several private inholdings include seasonal homes on the island.



Freshwater pond on Bois Bubert Island  
USFWS photo

One Refuge area on the southern end of the island is closed year-round to protect nesting and roosting birds. Additional informational and regulatory signs are needed to alert visitors to this closure.

Refuge lands on the island are open to deer hunting under State and Refuge regulations.

### 31) Nash Island (CIREG 79-627; Map 3-21)

The Service owns five acres of the 16.7 acre grassland island located in the Town of Addison, Washington County. The Service acquired the property by transfer from the Coast Guard in 1978; the remainder of the island is privately owned. The island supports a variety of nesting seabirds, including a small number of nesting terns, as indicated in Table 3-31.

Sheep grazing occurs on the neighboring Big Nash island. Sheep routinely use an inter-tidal bar to graze on Nash Island.

Nash Island is closed to public access during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to this closure are in place.

**Table 3-31 Nesting seabird species, number of pairs, (and year) observed on Nash Island**

Species	Number of pairs (and year) observed
common eider	20 ('77), 6 ('87), 50 ('89)
common tern	5 ('84), 1 ('98), 4 ('00), 4 ('02)
Arctic tern	20 ('84)
great black-backed gull	50 ('87), 120 ('95)

\* Some years individual adults were counted instead of pairs.

### 32) Inner Sand Island (CIREG 79-614; Map 3-21)

This 17.8-acre island in the Town of Addison, Washington County, was acquired in 1999 in fee simple from a private party. The island is composed of 15 acres of spruce/fir forest and approximately 2.8 acres of upland meadow and shrub.

Although the island has historically supported nesting gulls, none were observed during the 1995 aerial survey of the island. Table 3-32 presents nesting seabirds known on the island.

This island is closed to public use during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to this closure period are planned.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-32 Nesting seabird species, number of pairs, (and year) observed on Inner Sand Island**

Species	Number of pairs* (and year) observed
common eider	125 ('77), 200 ('89)
great black-backed gull	100 adults ('76), 10 ('77), 5 ('89), 0 ('95)
herring gulls	1000 adults ('76), 150 ('77), 20 ('89), 0 ('95)

\* In some years, individual adults were counted instead of pairs.

**33) Schoppee Island (CIREG 79-566; Map 3-22)**

This 16.5-acre island is located in the Town of Roque Bluffs, Washington County. The Service acquired the island in fee simple in 2000. The island is dominated by red spruce with small areas of hardwoods, grasses and shrubs. There is evidence of wind-throw over the years, resulting in a patchwork appearance created by a diversity of age classes and tree height. Hardwood species found on the island include white and yellow birch, mountain ash, and alder.



Schoppee Island  
USFWS photo

Schoppee Island is a historic bald eagle nesting island. Eagles were first observed nesting on the island in 1968, however the site was not monitored during the 1970's. They were again documented nesting on the island in 1980, but that was the last year they nested on the island.

The island is closed to public access during the bald eagle nesting season: February 15 to August 31. If eagles have not initiated nesting on the island by May 15, the island is then open to day use by the public. Informational signs alerting visitors to the closure are planned.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**34) Halifax Island (CIREG 79-570; Map 3-22)**

This 75-acre island is located in the Town of Jonesport, Washington County. The island was acquired in fee simple in June 1995 from The Conservation Fund.

Island vegetation is comprised of 45 acres of wetland and peatland communities, and 30 acres of various ericaceous shrub-dominated communities (huckleberry, sheep laurel, Rhodora, blueberries, crowberries, and small trees). There are also lichen-covered rock outcrops, sparsely vegetated nearshore headlands and cliffs, and beach strand. Several extremely fragile

plant communities can be found here (acidic fen, plateau bog lawn, dwarf shrub bog, moss lawn bog, and acidic shoreline outcrop).

A baseline avian and botanical survey was conducted in 1998 and 1999 (Famous and Spencer-Famous 1999). Of note on the island are:

- maritime slope bog community; a very rare community type
- northern yarrow (*Achillea millefolium* var. *borealis*); a State Species of Special Concern
- pearl-wort (*Sagina nodosa*); a State rare species
- dragon's mouth orchid (*Arethusa bulbosa*); a State rare species
- roseroot stonecrop (*Sedum rosea*), beachhead iris (*Iris hookeri*), and oysterleaf (*Mertensia maritima*)

A nationally significant population of fall migrating whimbrels forages on the crowberries growing on Halifax Island. Black guillemots were recorded nesting on the island during surveys from 1965-73 showing eight nesting pair, and in 1977 when two nesting pair were observed. No sea-birds have been recorded nesting on the island since then.

Historically, sheep were grazed on the island; however, this practice was discontinued in the 1980's. Currently, we are working cooperatively with the Maine Island Trail Association and others to provide low impact educational and recreational opportunities for island users, including overnight camping.

A majority of the island is closed year-round to public access to protect unique botanical features. The western portion of the island is open year round. Informational signs are in place alerting visitors to the closure and the sensitive plant habitat areas.

This island is open to migratory waterfowl hunting under State and Refuge regulations.

### 35) Eastern Brothers Island (CIREG 79-513; Map 3-22)



Eastern and Western Brothers Islands  
USFWS photo

This 17-acre island in the Town of Jonesport, Washington County, is a recognized seabird nesting island and historical nesting area for peregrine falcons. The Service acquired the island in fee simple in May 1997 from a private party. The MDIFW owns Western Brothers Island, which is joined to Eastern Brothers by an intertidal area.

The vegetation on the island is dominated by mixed grasses, raspberries, and other herbaceous species. The perimeter of the island is surrounded by rock ledges of varying height and associated 60- to 70-foot rock cliffs. Sheep

were grazed on the island for over 125 years; however, the practice was discontinued in the late 1990's. A complete avian and botanical inventory was conducted in 1998 and 1999 (Famous and Spencer-Famous 1999). Notable plant species include:

- northern yarrow (*Achillea millefolium*); a State Species of Special Concern
- Arctic blue flag (*Iris setosa*); a State rare species (over 20,000 plants observed on the island)
- dragon's mouth orchid (*Arethusa bulbosa*); a State rare species
- pearl-wort (*Sagina nodosa*); a State rare species
- maritime slope bog; a rare plant community type

This island is a harbor seal pupping ground, and 112 animals were recorded in 1997 (Gilbert, Univ. of Maine, pers. com.). It also provides habitat for a variety of nesting seabirds including common eiders, black guillemots, herring and great black-backed gulls and Leach's storm-petrels as indicated in Table 3-33.

The island is closed to public access during the seabird nesting season: April 1 to August 31. Informational signs are in place to alert visitors to this closure.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-33 Nesting seabird species, number of pairs, (and year) observed on Eastern Brothers Island**

Species	Number of pairs (and year) observed
common eider	75 ('77), 0 ('83), 40 ('95)
great black-backed gull	600 ('91), 1131 ('95)
herring gulls	0 ('95)
black guillemots	150 ('77), 100 ('83), 75 ('95)
Leach's storm-petrel	25 ('77), 8 ('95)

\* Some years individual adults were counted instead of pairs.

### 36) Libby Island (CIREG 79-360; Map 3-23)

Lying at the entrance of Machias Bay, this 43-acre island was transferred to the Service in 1999, under the Maine Light Bill of 1996. It is located in the Town of Machiasport, Washington County. It is also commonly referred to as "Little Libby" Island. The Service owns and is responsible for the maintenance of the lighthouse and associated historical structures. The Coast Guard is responsible for the aids to navigation.

The island contains a variety of habitats including: dense stands of shrubs (Virginia rose, meadowsweet, and black chokeberry), American cranberry, creeping juniper, and beach strand community. Dwarf ericaceous shrubs and mixed grasses dominate the upland. Two wetland communities were

also documented (Bochan and DiGirolamo 1999). Prior botanical inventories had been conducted in the late 1970's and early 1980's (Lewis, Univ. of Maine, pers. com.).

Libby Island is adjacent to the MDIFW-owned Big Libby Island, which has supported over 1,500 pairs of common eiders, 1,100 pairs of great black-backed gulls, and 200 herring gulls. In the late 1800's and early 1900's Big Libby also was an active tern colony. Mink have been observed on Libby, and it is possible they may have limited seabird use of the island in recent years. Table 3-34 presents nesting seabirds known on the island.

Harbor seals use adjacent ledges as pupping and haulout areas.

A 20-acre aquaculture lease has been granted for the waters immediately north of Big and Libby islands. Although the facility was only operational for one year, the lease remains valid and pens could be placed at the site in the future.

This island is closed to public use during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to this closure period are planned.

The island is open to migratory waterfowl hunting under State and Refuge regulations.

**Table 3-34 Nesting seabird species, number of pairs, (and year) observed on Libby Island**

Species	Number of pairs (and year) observed
black guillemot	10 ('76), 5 ('91), 20 ('92), 10 adults ('01)
common eider	0 ('92), 10 ('01)
great black-backed gull	0 ('91), 2 ('01)
herring gull	0 ('91), 40 ('01)

\* Some years individual adults were counted instead of pairs.

**37) Old Man Island (CIREG 79-313; Map 3-24)**



Old Man Island  
USFWS photo

This 6-acre island is part of the Cross Island National Wildlife Refuge complex, located in the Town of Cutler, Washington County. It was acquired in 1980 from a private individual, along with the other five islands in the Cross Island complex .

Vegetation on the island is sparse, with a variety of mixed grasses interspersed with rock outcroppings. Steep cliffs and sea stacks are located along the perimeter of the island. A botanical inventory was conducted on the island during the 1979, 1980, and 1982-84 field seasons (Lewis, Univ. of Maine, pers. com.).



Old Man Island is one of only six nesting sites for razorbills in the Gulf of Maine. Between 130 and 150 adult razorbills were observed annually over a 10-year period. Of historical note, Old Man Island is reported to be the only location within Maine that supported nesting of common eiders in the early 1900's when two nests were observed (Norton 1907). This island also supports other nesting seabird species of interest as noted in Table 3-35.

Although public access on the island will always be limited by the topography of the island, the island is closed to public use during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to this closure period are planned.

**Table 3-35 Nesting Seabird species, number of pairs, (and year) observed on Old Man Island**

<b>Species</b>	<b>Number of pairs* (and year) observed</b>
razorbill	10 ('77), 35 ('91), 130-150 adults ('01)
common eider	100 ('77), 14 ('86), 100 ('91), 100 ('95)
great black-backed gull	100 ('77), 29 ('91), 164 ('95)
herring gull	500 ('77), 26 ('91), 126 ('95)
double-crested cormorant	215 ('77), 306 ('91), 302 ('94)
Leach's storm-petrel	400 ('95)
black guillemot	100 ('77), 55 adults ('91), 125 adults ('95)

\* In some years, individual adults were counted instead of pairs.

**38) Mink Island (CIREG 79-345; Map 3-24)**

This 11-acre island is part of the Cross Island National Wildlife Refuge complex, located in the Town of Cutler, Washington County. It was acquired in 1980 from a private individual, along with the other five islands in the Cross Island complex. The island is completely forested with red spruce and balsam fir.

Bald eagles were first observed nesting on Mink Island in 1996. It is believed that one pair of eagles has moved among Mink, Cross, and Outer Double Head Shot Island in recent years. The Mink Island nest was last occupied in 2002. Occupancy and productivity are monitored on an annual basis by MDIFW.

This island is closed to public access during the bald eagle nesting season February 15 to August 31. Informational signs alerting visitors to this closure are planned.

**39) Outer Double Head Shot Island (CIREG 79-352; Map 3-24)**

This 14-acre island is part of the Cross Island National Wildlife Refuge complex, located in the Town of Cutler, Washington County. It was

acquired in 1980 from a private individual, along with the other five islands in the Cross Island complex.

The vegetation on the northern half of the island is dominated by red spruce and balsam fir, while the southern portion of the island is dominated by mixed grasses. A botanical inventory was conducted on the island between 1979 and 1984 (Lewis, Univ. of Maine, pers. com.).

Bald eagles were first observed nesting on Outer Double Head Shot in 1985. It is believed that one pair of eagles has moved among Outer Double Head Shot, Mink, and Cross Islands in recent years. The Outer Double Head Shot Island nest was last occupied in 2000. Occupancy and productivity are monitored on an annual basis by MDIFW. The island also supports nesting seabird species of interest as noted in Table 3-36.

This island is closed to public access during the bald eagle and seabird nesting season: February 15 to August 31. Informational signs alerting visitors to this closure period are planned.

**Table 3-36 Nesting seabird species, number of pairs, (and year) observed on Outer Double Head Shot Island**

Species	Number of pairs* (and year) observed
common eider	100 ('77), 0 ('91), 100 ('95)
great black-backed gull	10 ('91), 23 ('95)
herring gull	200 ('95), 30 ('91), 25 ('95)
black guillemot	50 ('77), 140 adults ('95)

\* In some years, individual adult birds were counted instead of pairs.

#### **40) Inner Double Head Shot Island (CIREG 79-351; Map 3-24)**

This 8-acre island is part of the Cross Island National Wildlife Refuge complex, located in the Town of Cutler, Washington County. It was acquired in 1980 from a private individual, along with the other five islands in the Cross Island complex.

The vegetation on the northern half of the island is dominated by red spruce and balsam fir, while the southern portion of the island is dominated by mixed grasses. A botanical inventory was conducted on the island between 1979 and 1984 (Lewis, Univ. of Maine, pers. com.). The island supports small nesting populations of black guillemot, herring gulls, and Leach's storm-petrels.

This island is closed to public use during the seabird nesting season: April 1 to August 31. Informational signs alerting visitors to this closure period are in place.



Scotch Island  
USFWS photo

**41) Scotch Island (CIREG 79-350; Map 3-24)**

This 10 acre island is part of the Cross Island National Wildlife Refuge complex, located in the Town of Cutler, Washington County. It was acquired in 1980 from a private individual, along with the other five islands in the complex.

The island is immediately adjacent to the north-east corner of Cross Island. The vegetation on Scotch Island consists of red spruce, balsam fir, and yellow and paper birch.

Scotch Island is open to public access year around (day use only).

**42) Cross Island (CIREG 79-347; Map 3-24)**

Cross Island (1,654 acres) was acquired in 1980 from a private individual, along with the other five islands in the Cross Island National Wildlife Refuge complex. It is located in the Town of Cutler, Washington County. Two private inholdings occur on the island. Outward Bound has a 19-acre inholding, and uses parts of the island for solo wilderness experiences. The Cabott family also owns a 20-acre inholding.

Its varied topography includes hills, bays, inlets, high sea cliffs, and several cobble beaches scattered along all but its rugged south shoreline. A 12-acre tidal pond lies between Northwest Head and the island proper. Cover types on the island include dense stands of red and white spruce, balsam fir, yellow and paper birch, and red and striped maple. Several grassy openings with sedges, cranberry, and blueberry are also found on the shores. Associated wetlands support eel grass and other submerged aquatics, saltmarsh and salt meadow cordgrasses, sea lavender, black rush, and American three-square bulrush. A cover-type map of Cross Island is available.



Cross Island  
USFWS photo

Botanical species of note on the island are livid sedge (*Carex livida*) and coast blite goosefoot (*Chenopodium rubrum*), both State-listed threatened species, and a rare community type called maritime slope bog.

Bald eagles were first observed breeding on Cross Island in 1981. It is believed that one pair of eagles has moved among Cross, Outer Double Head Shot, and Mink Islands in recent years. The Cross Island nest was last occupied in 1994. Occupancy and productivity are monitored on an annual basis by MDIFW.

The island has resident populations of white-tailed deer and furbearers, as well as eagles and osprey. Colonial nesting seabirds include common eider, Leach's storm-petrel, black guillemot, and double-crested cormorants. Migrating black ducks and shorebirds use the island saltmarsh and inter-tidal areas.

The following surveys have been conducted on the island and any published results are available from the Refuge Headquarters upon request:

- Habitat analysis of Cross Island using SPOT imagery (Podolsky & Labaree 1990)
- Deer pellet count (USFWS 1991)
- Neotropical landbird monitoring program (Famous 1993)
- Botanical survey focusing on wetland habitats (Mittelhauser & Morrison 2000)

A 45-acre aquaculture site is located 1/4 mile off Northwest Head. A study to examine the potential effects of aquaculture site development adjacent to the island's nesting birds was conducted in 1991 (Famous 1991). Unfortunately, information was not collected prior to the placement of the aquaculture pens, so comparisons to historic use of the area are not possible.

A Refuge cabin located in Northwest Head is used by researchers under permit.

The island is open to public access year around (day use only). Informational signs are in place alerting visitors.

Outward Bound uses several areas for solo campsites under a special use permit. In addition, Bold Coast Charter, in the Town of Cutler, runs an interpreted tour on the island. Approximately 325 people visit the island annually.

### **Other Islands Affiliated with the Refuge**

#### **Machias Seal Island (Map 3-25)**

This 15-acre island is located at the mouth of the Bay of Fundy, 12 miles south of Grand Manan, New Brunswick, Canada, and 12 miles off the coast from the Town of Cutler, Maine. Claimed by both the United States and Canada, the island hosts abundant populations of Atlantic puffins, Arctic terns, common terns, razorbills, and Leach's storm-petrels. In 1944, Canada designated this island area as a Migratory Bird Sanctuary pursuant to the Canadian Migratory Birds Convention Act, as amended. Table 3-37 presents nesting seabirds known on the island.

The island is a popular destination for birding enthusiasts, who visit it each summer to observe and photograph the birds. There is transportation to the island via three chartered cruises (two United States and one Canadian). The MDIFW has established ownership of the island and, under MOU, has transferred management authority to the Service. Under this authority, the Service (through the Refuge) monitors and regulates U.S. tour boat captains. U.S.-based tours during June and July seabird breeding

seasons are regulated through the issuance of special use permits. At present, no more than 30 people are allowed to visit the island each day for 3 hours during the months of June and July, and they are restricted to well-marked paths and observation blinds.

By verbal agreement with Canada, Canadian biologists manage the wildlife resources on the island. The University of New Brunswick’s Atlantic Co-operative Wildlife Ecology Research Network maintains a research crew on the island. The Service attempts to meet at least annually with Canadian biologists to discuss wildlife issues and exchange information on avian populations, public use, and commercial tourism. An extensive amount of research and survey work has been conducted on the island.

**Table 3-37 Nesting seabird species, numbers of pairs (and years) observed on Machias Seal Island**

<b>Species</b>	<b>Numbers (and year) observed</b>
Atlantic puffin	1,827 ('00), 2,800 ('01)
razorbill	543 ('01)
common tern	325 ('94), 897 ('98), 1,349 ('02)
Arctic tern	2,140 ('94), 2,094 ('98), 2,202 ('02)
roseate tern	1 ('01)
common eider	132 ('98), 106 ('02)
laughing gull	1 ('02)

\* Some years individual adults were counted instead of pairs.



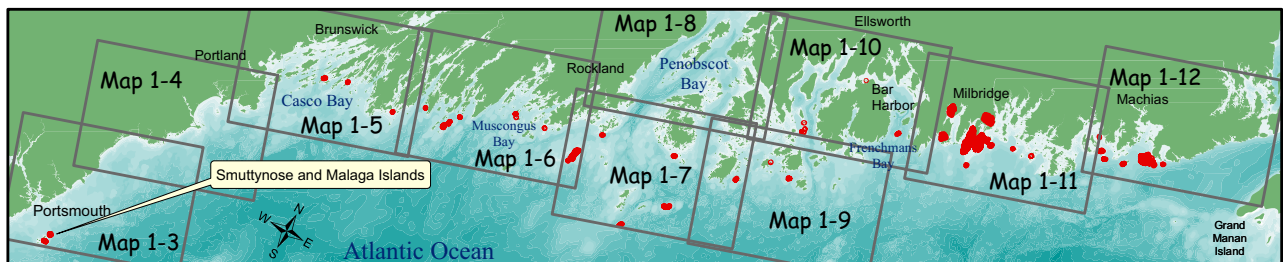
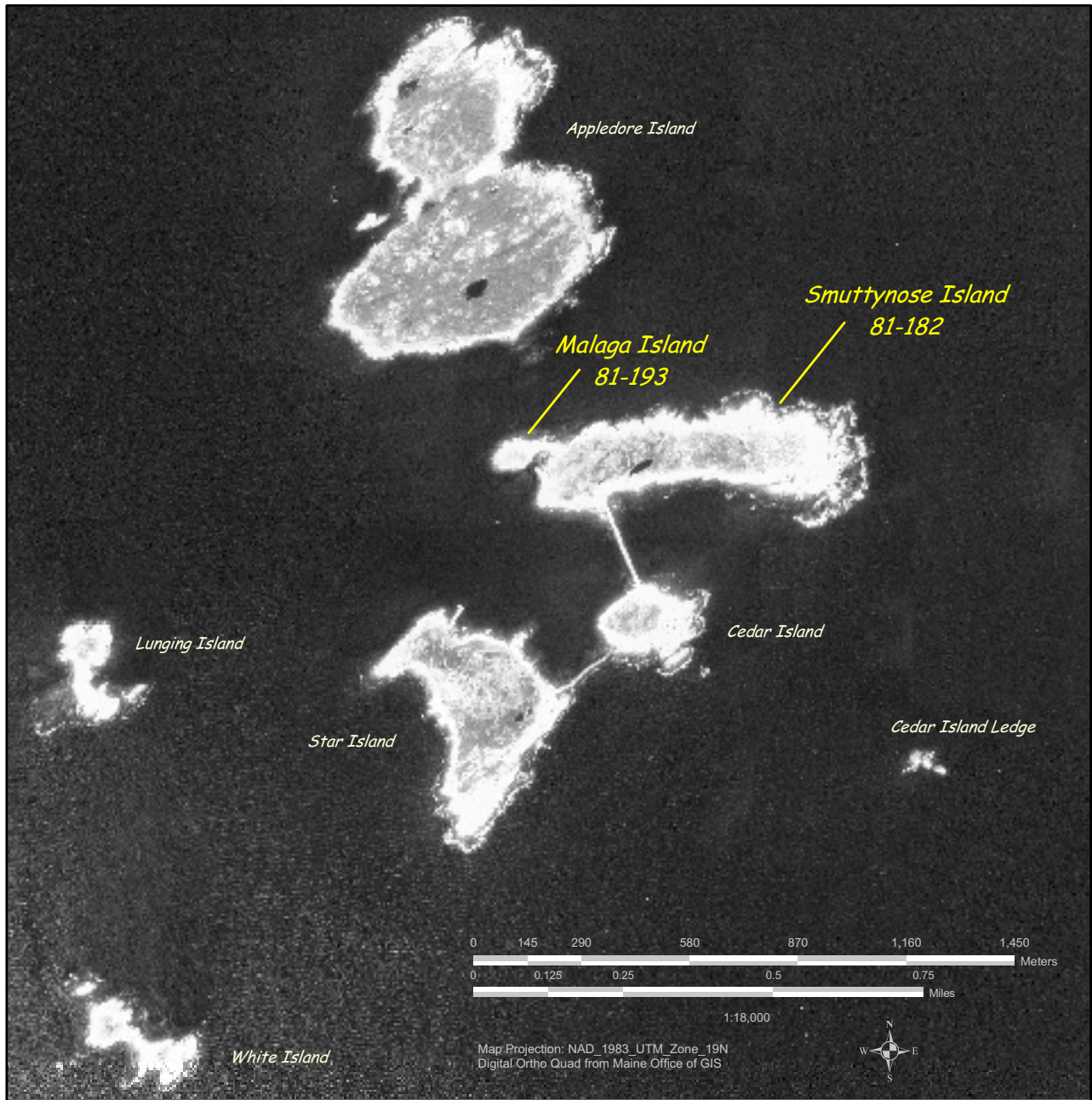
*Banded purple sandpiper*  
USFWS photo



MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT



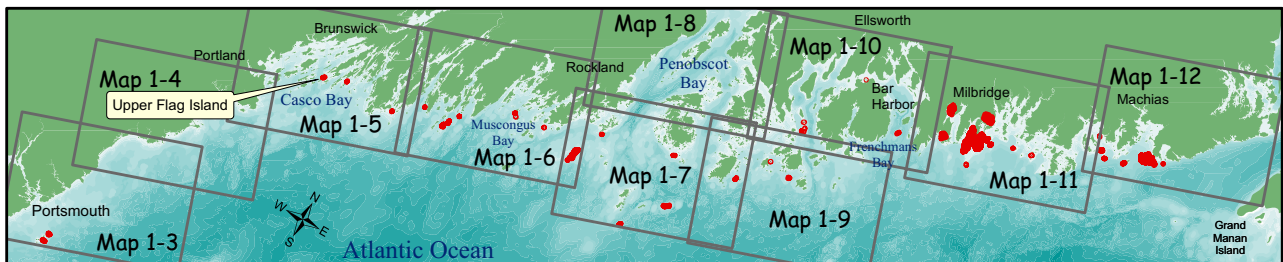
**Smuttynose and Malaga Islands**





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

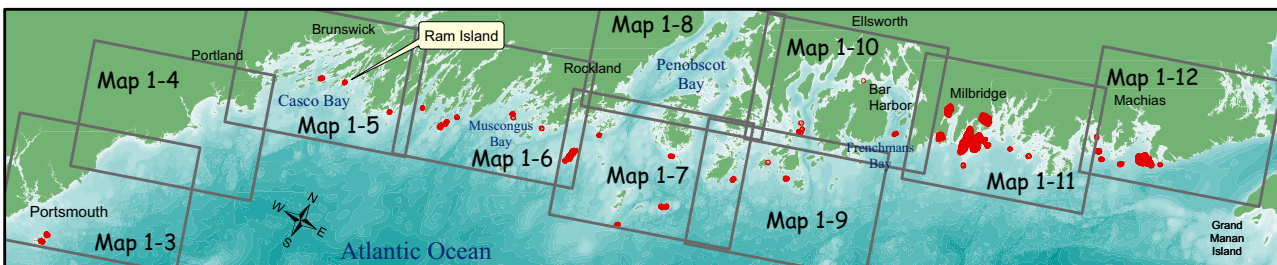
Upper Flag Island





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Ram Island

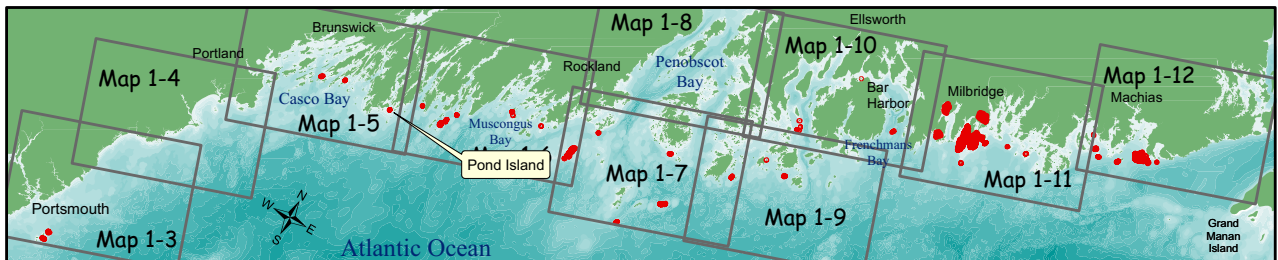






MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

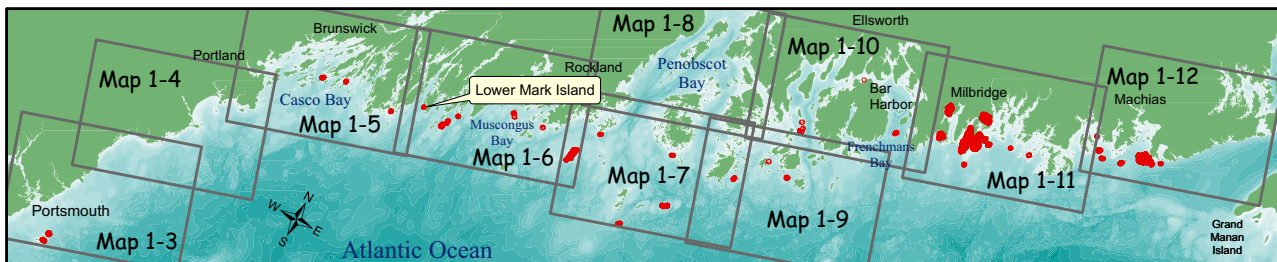
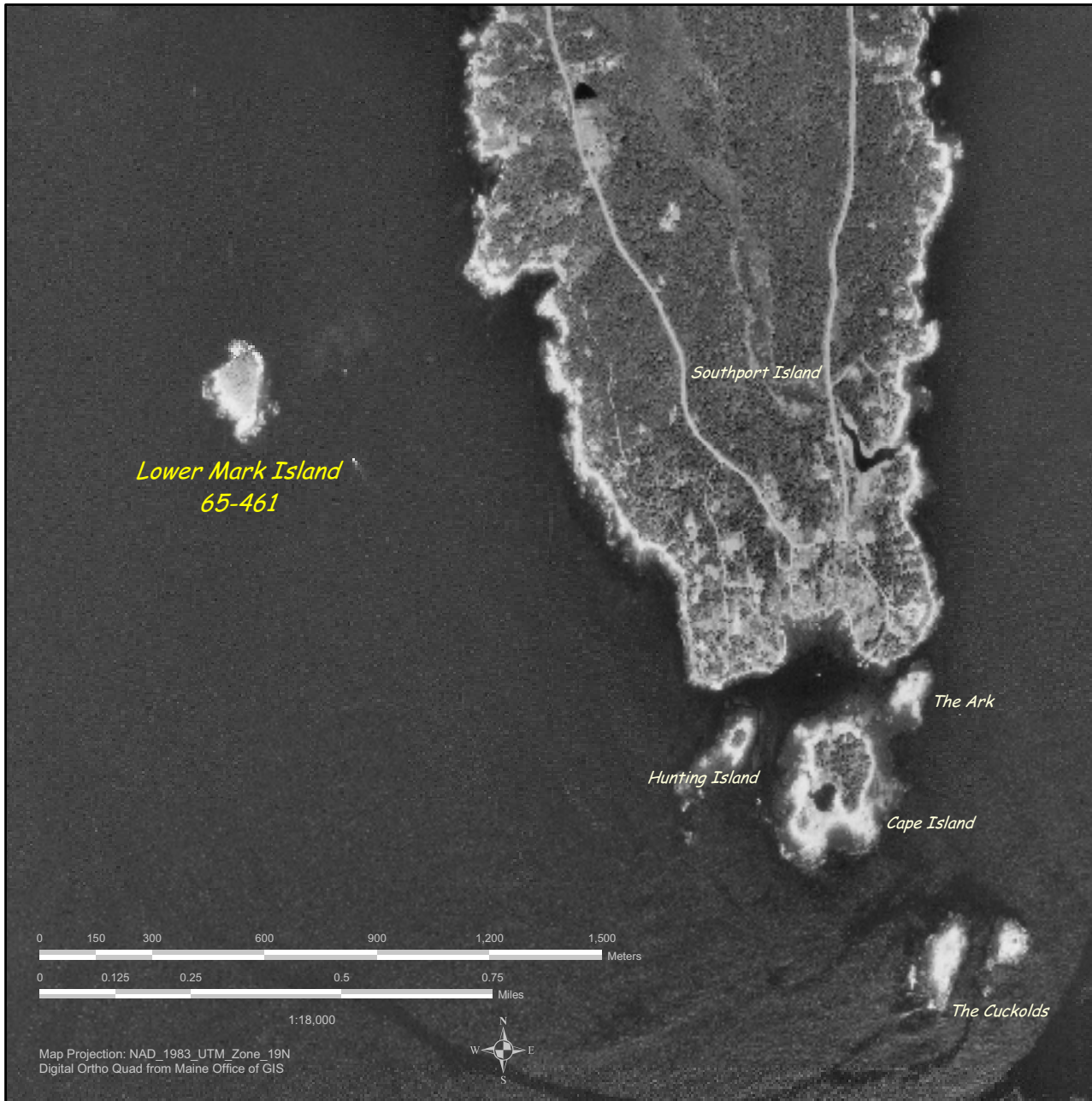
Pond Island National Wildlife Refuge





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

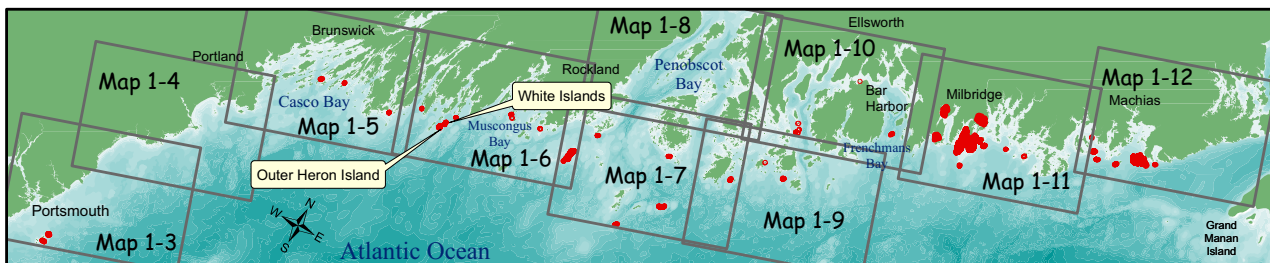
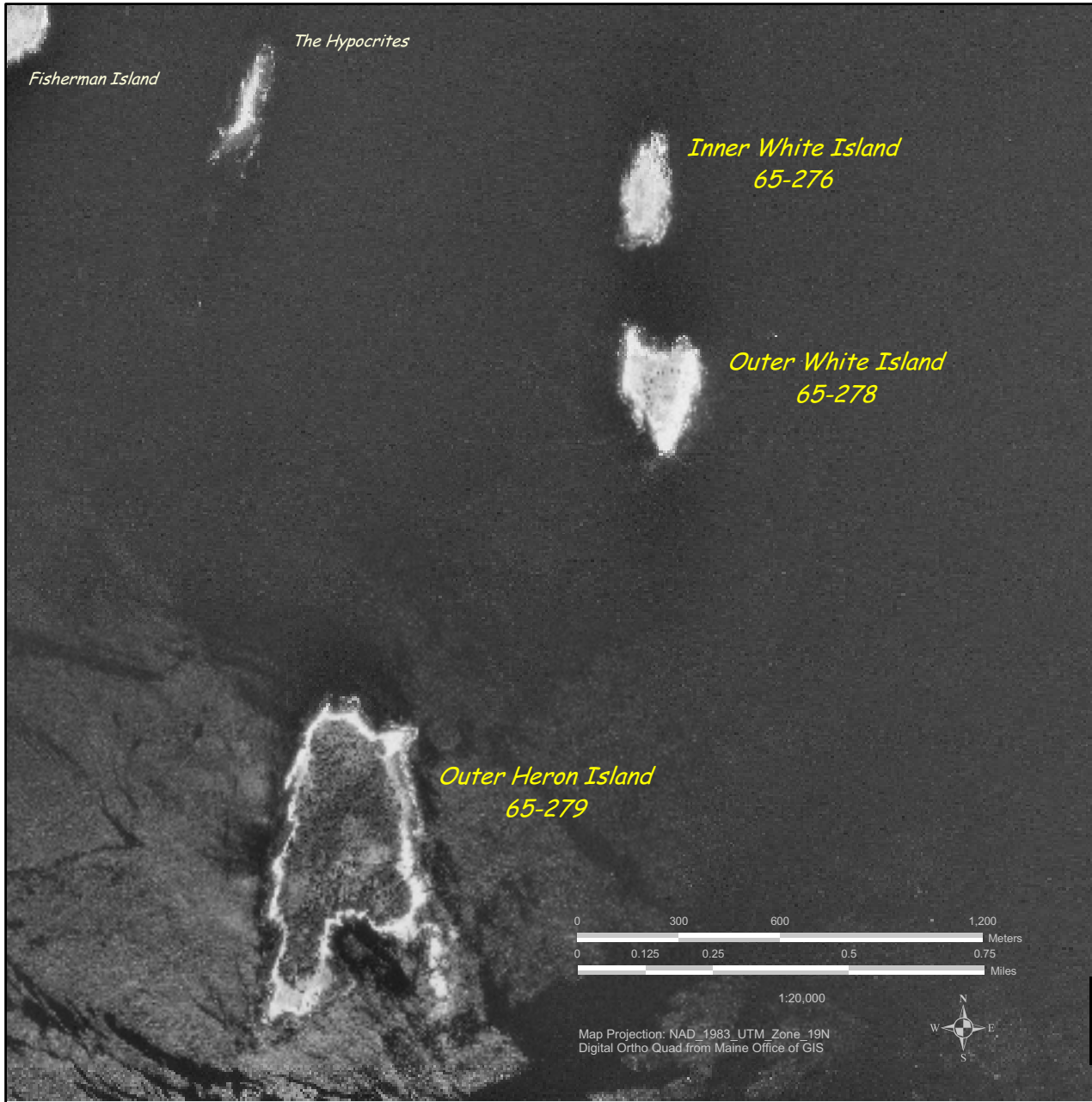
Lower Mark Island





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Outer Heron, Inner White and Outer White Islands

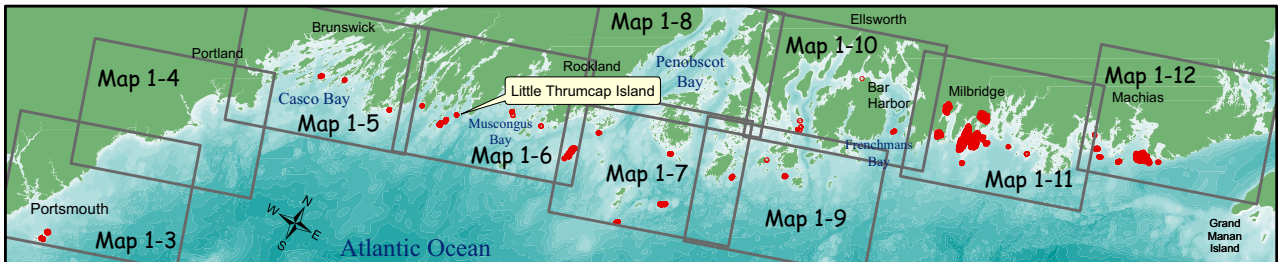
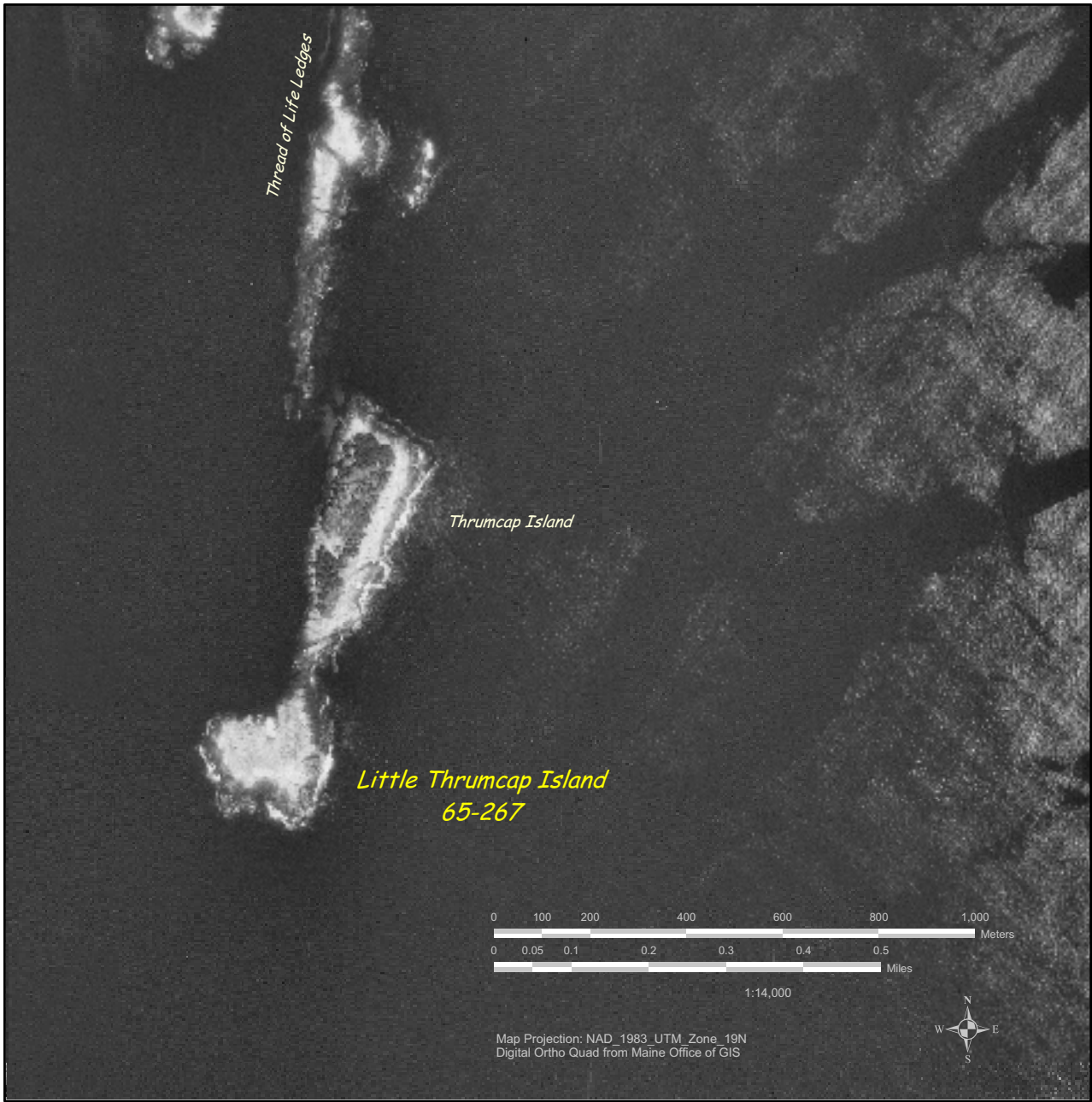




MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT



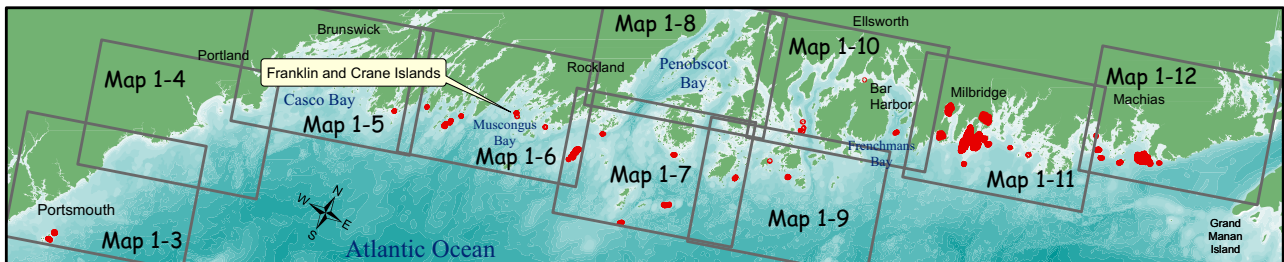
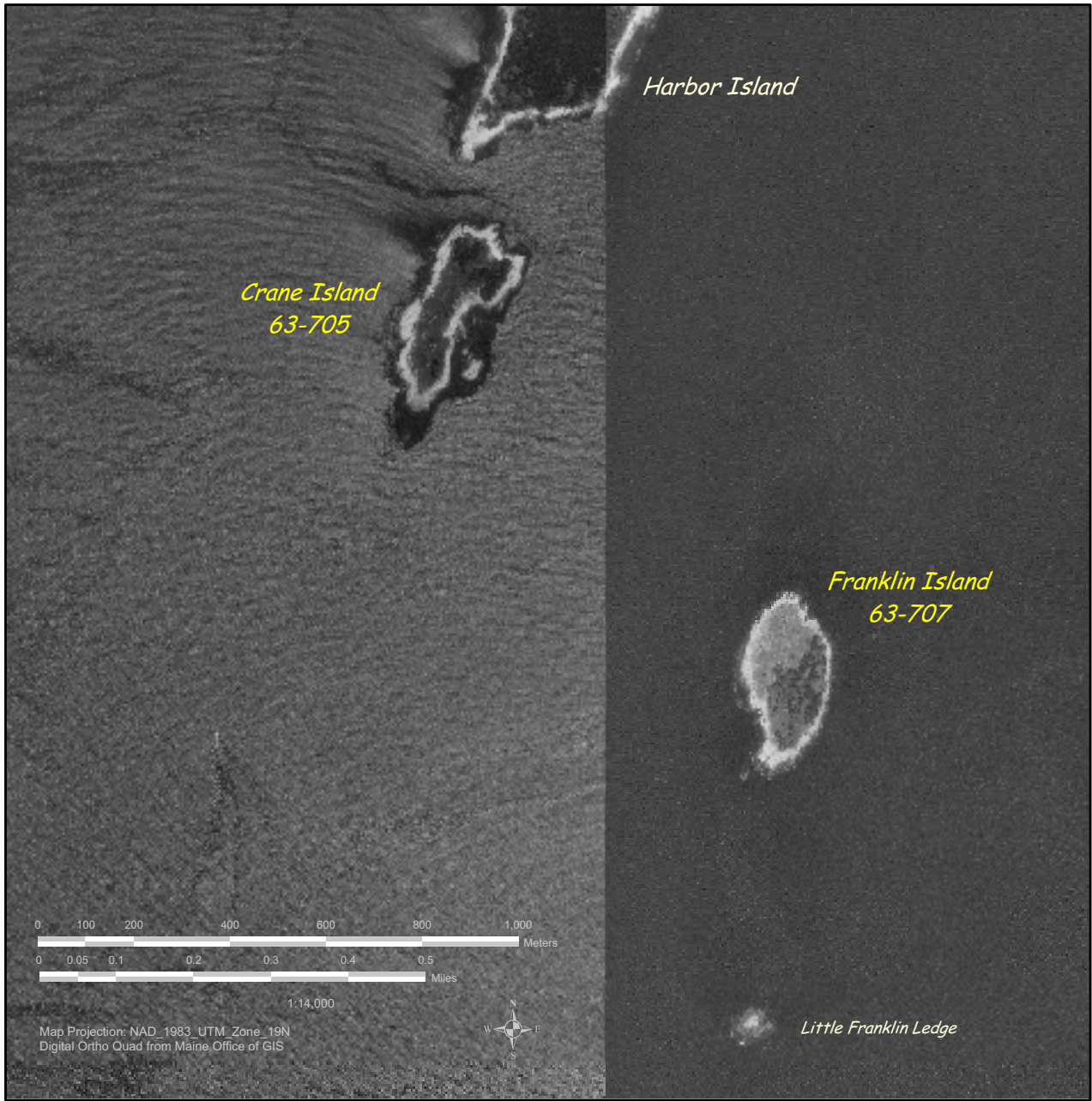
Little Thumcap Island





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

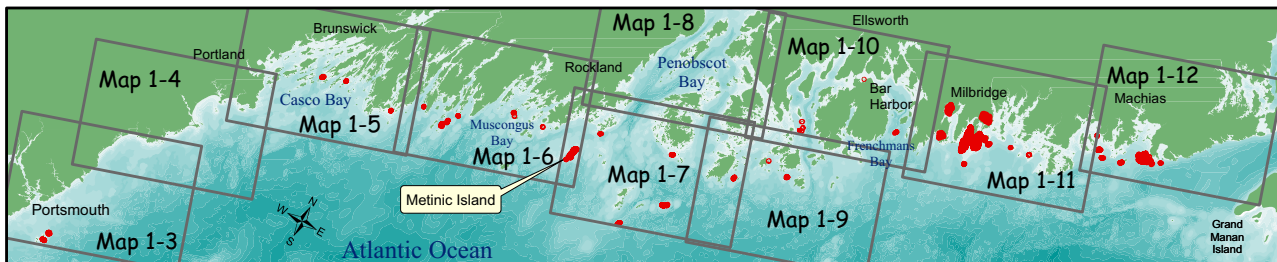
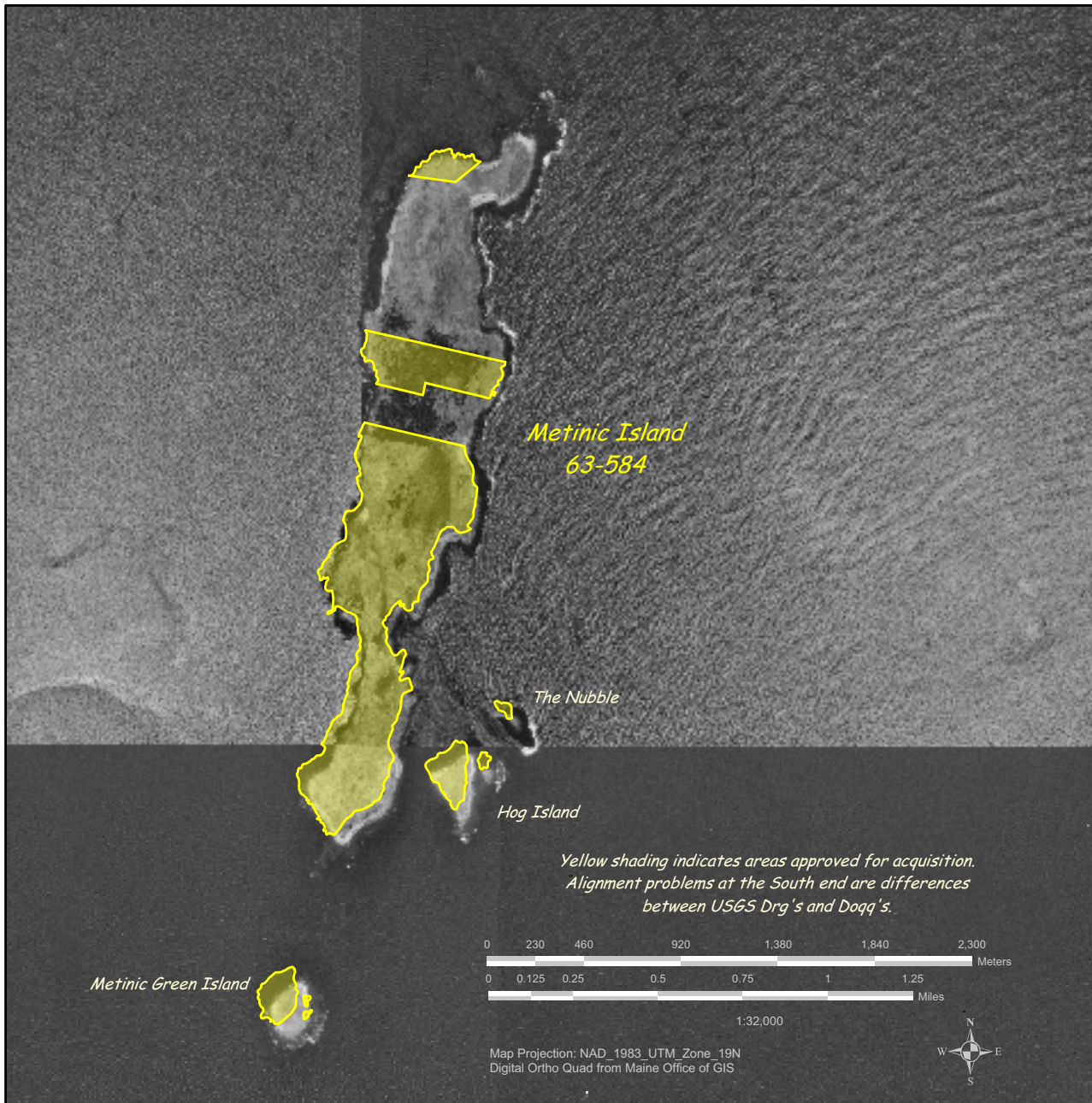
Franklin Island National Wildlife Refuge and Crane Island



MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL ASSESSMENT



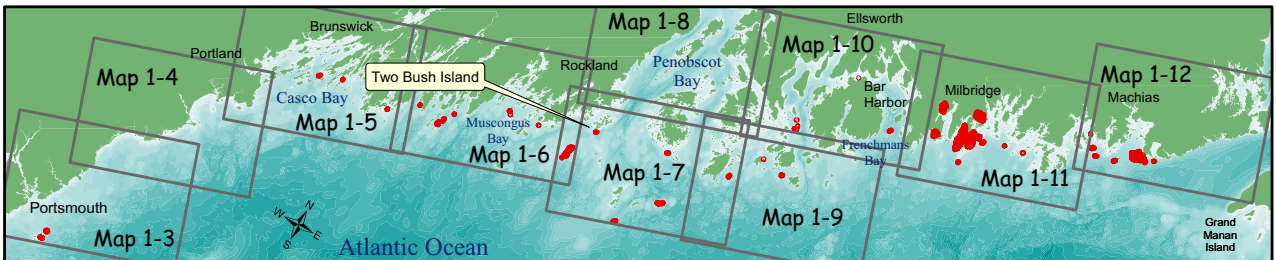
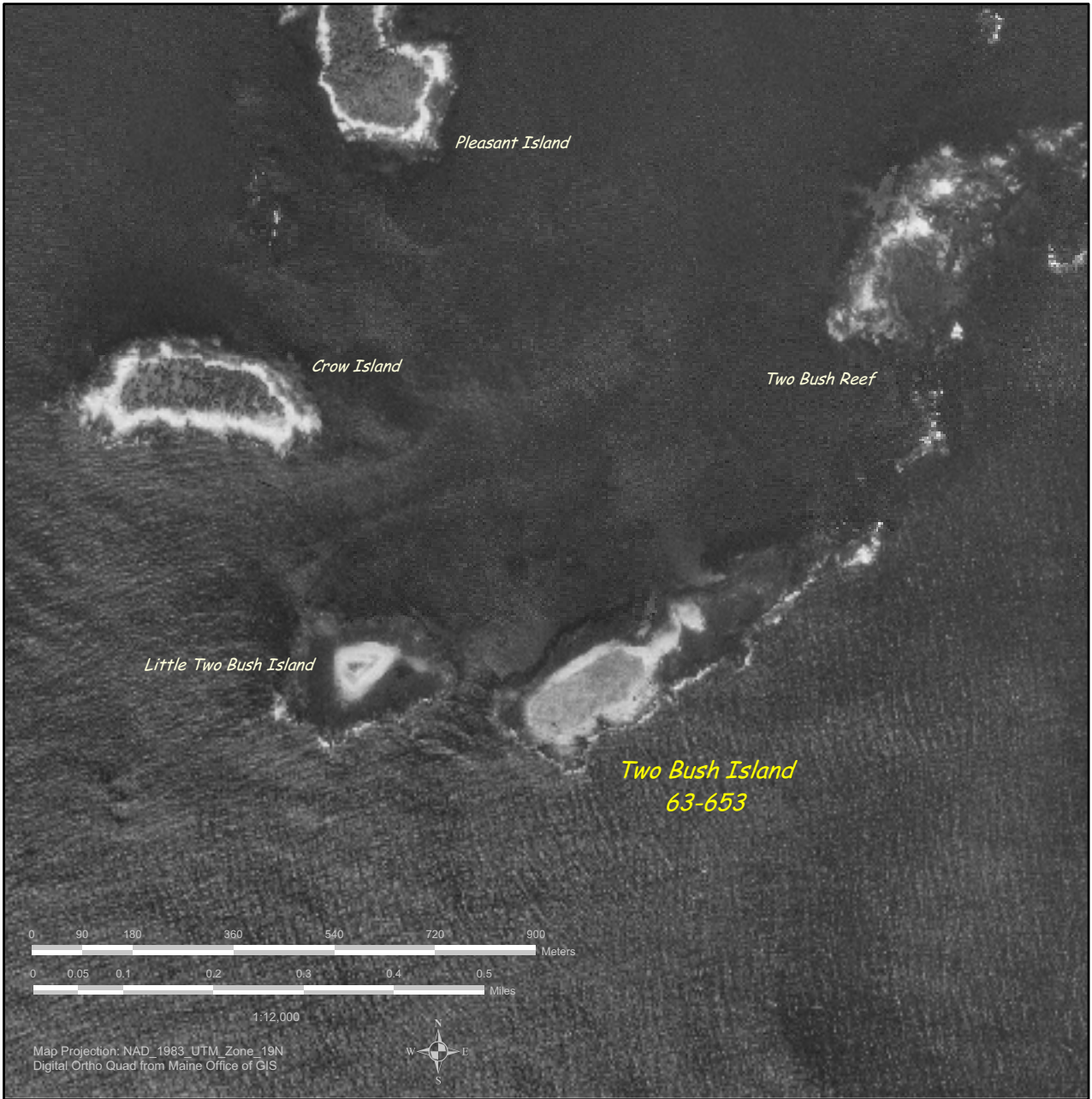
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MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

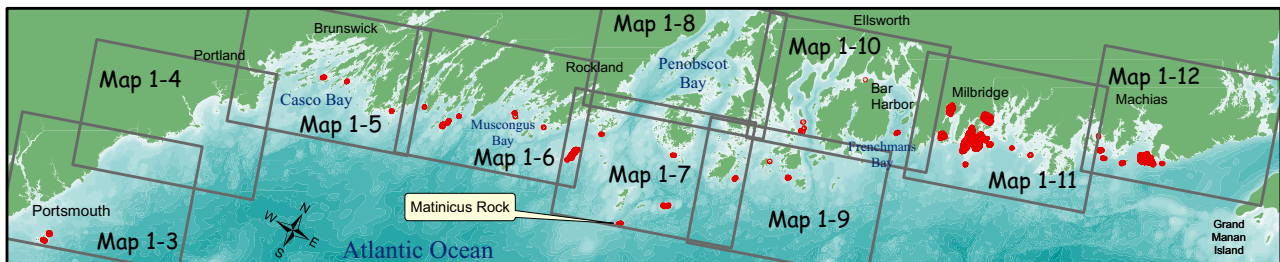
Two Bush Island





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Matinicus Rock

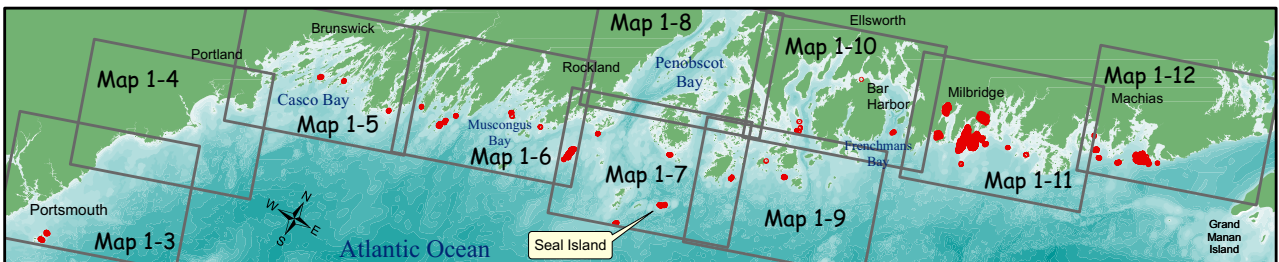
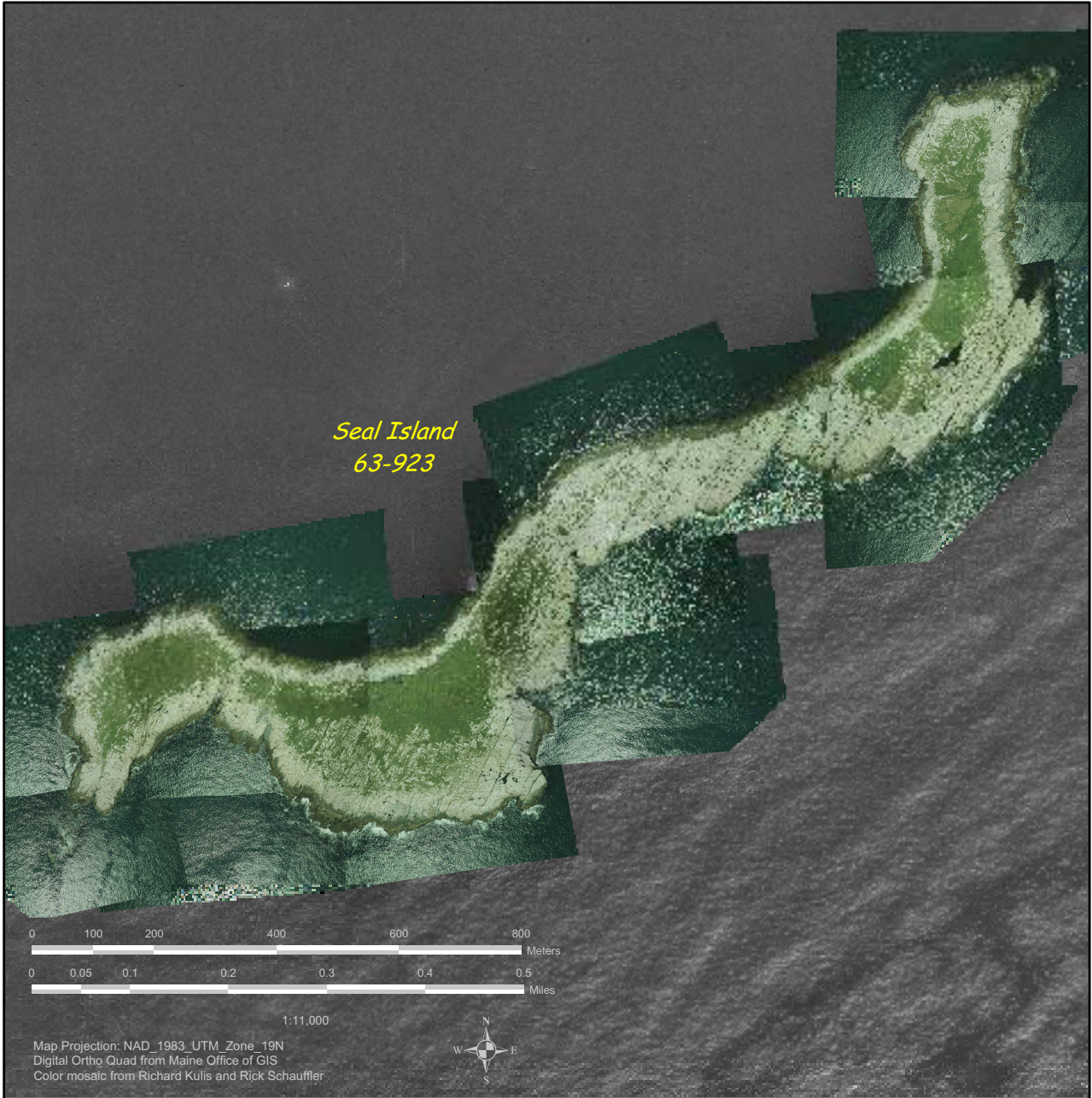






MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Seal Island National Wildlife Refuge

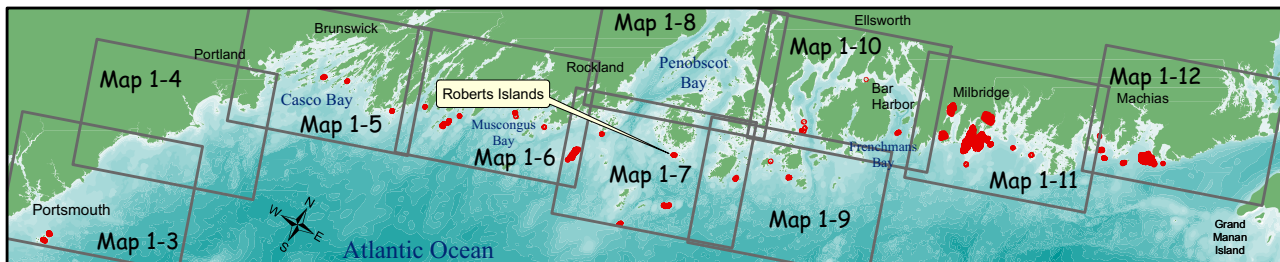
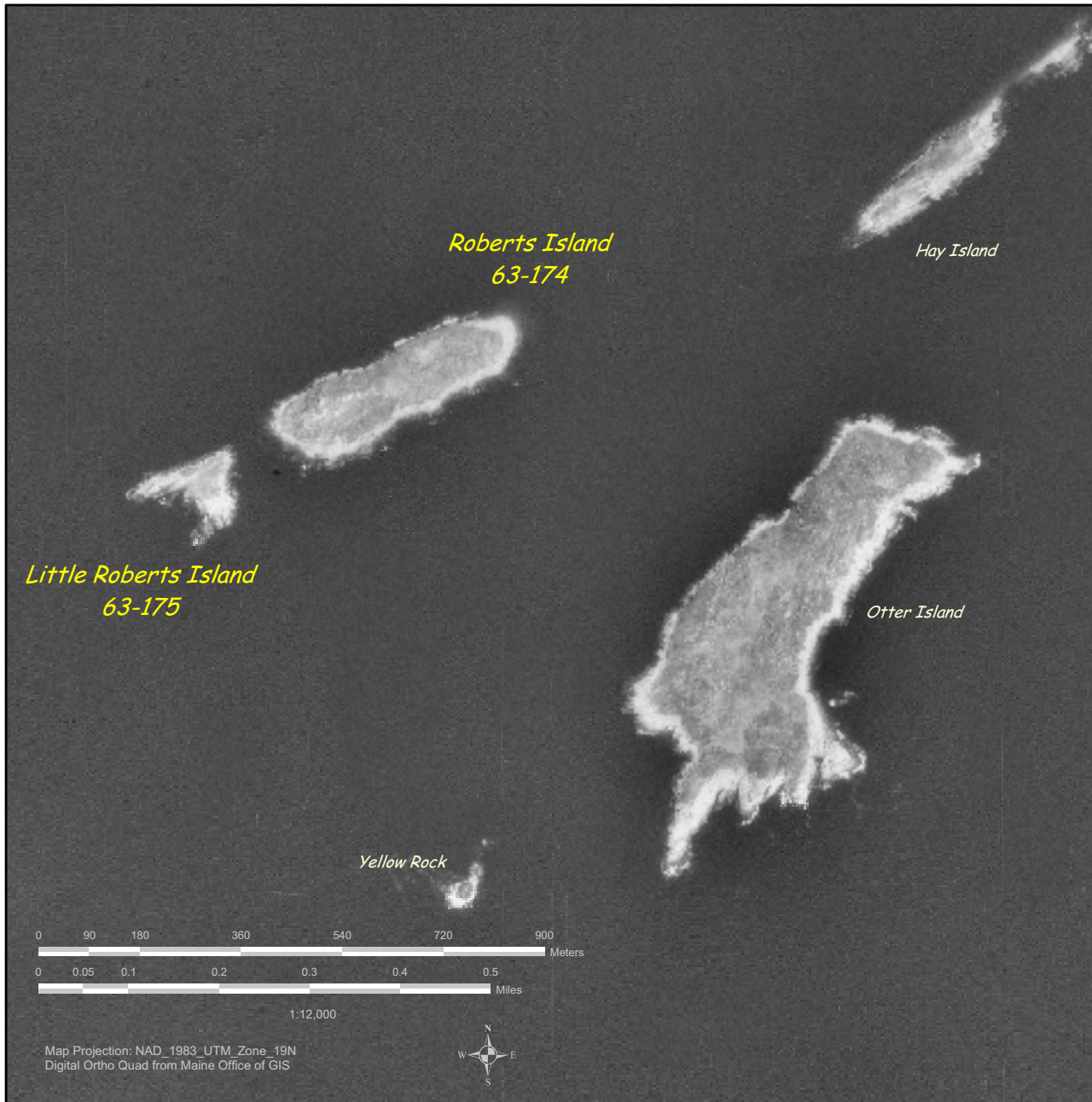




MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT



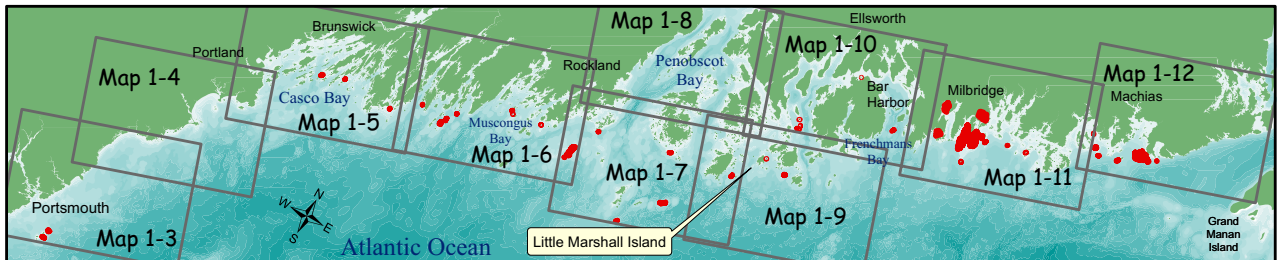
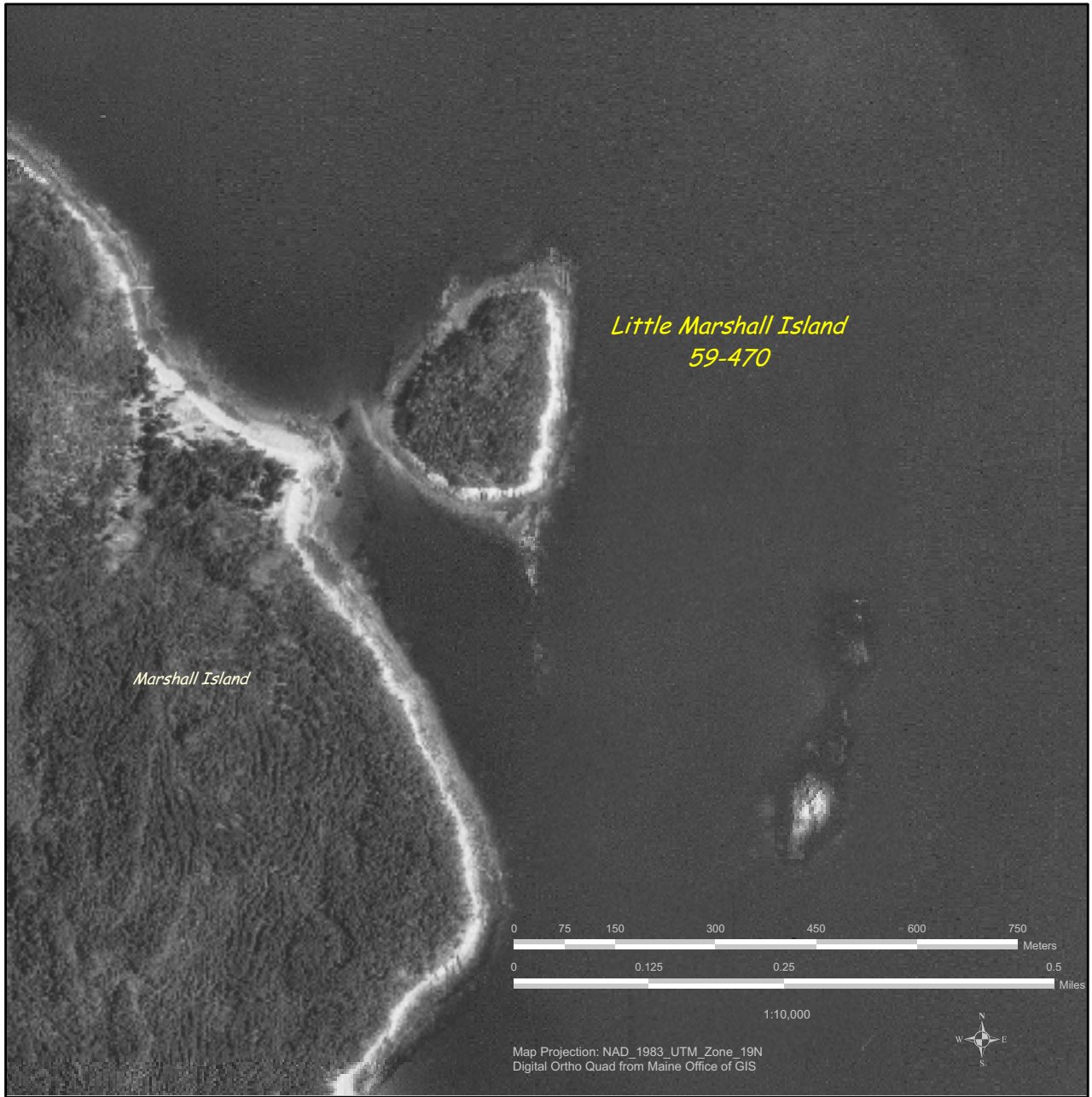
Roberts and Little Roberts Islands





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

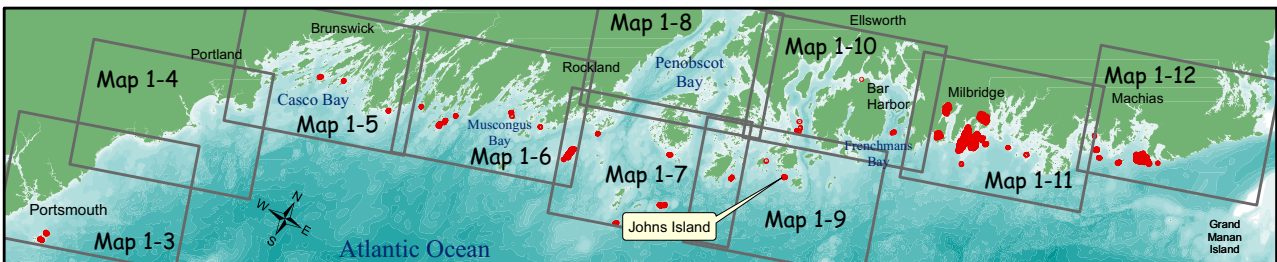
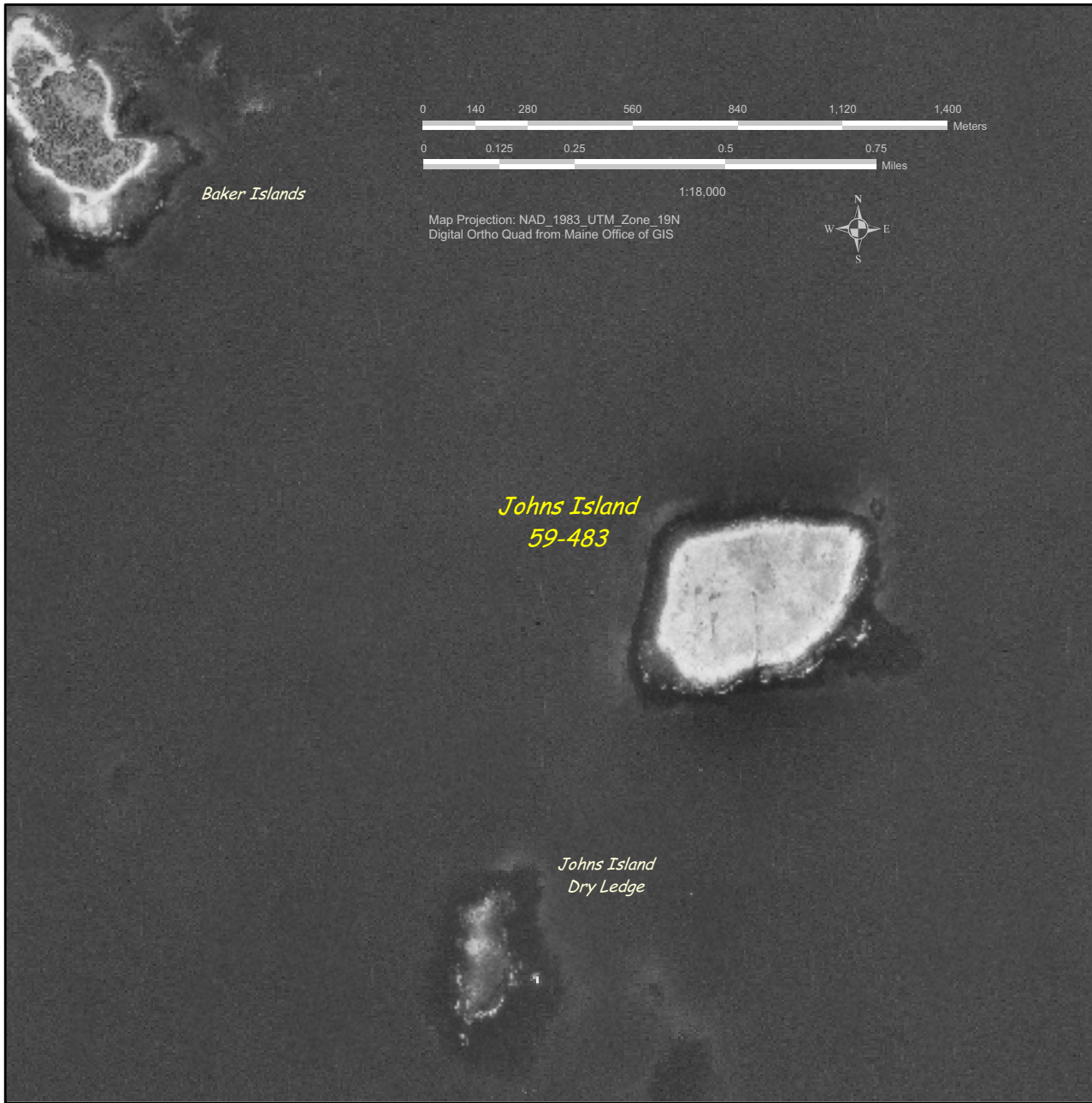
Little Marshall Island





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

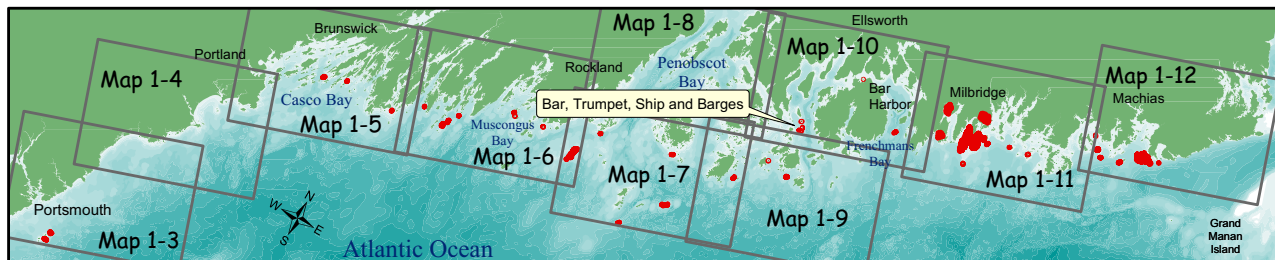
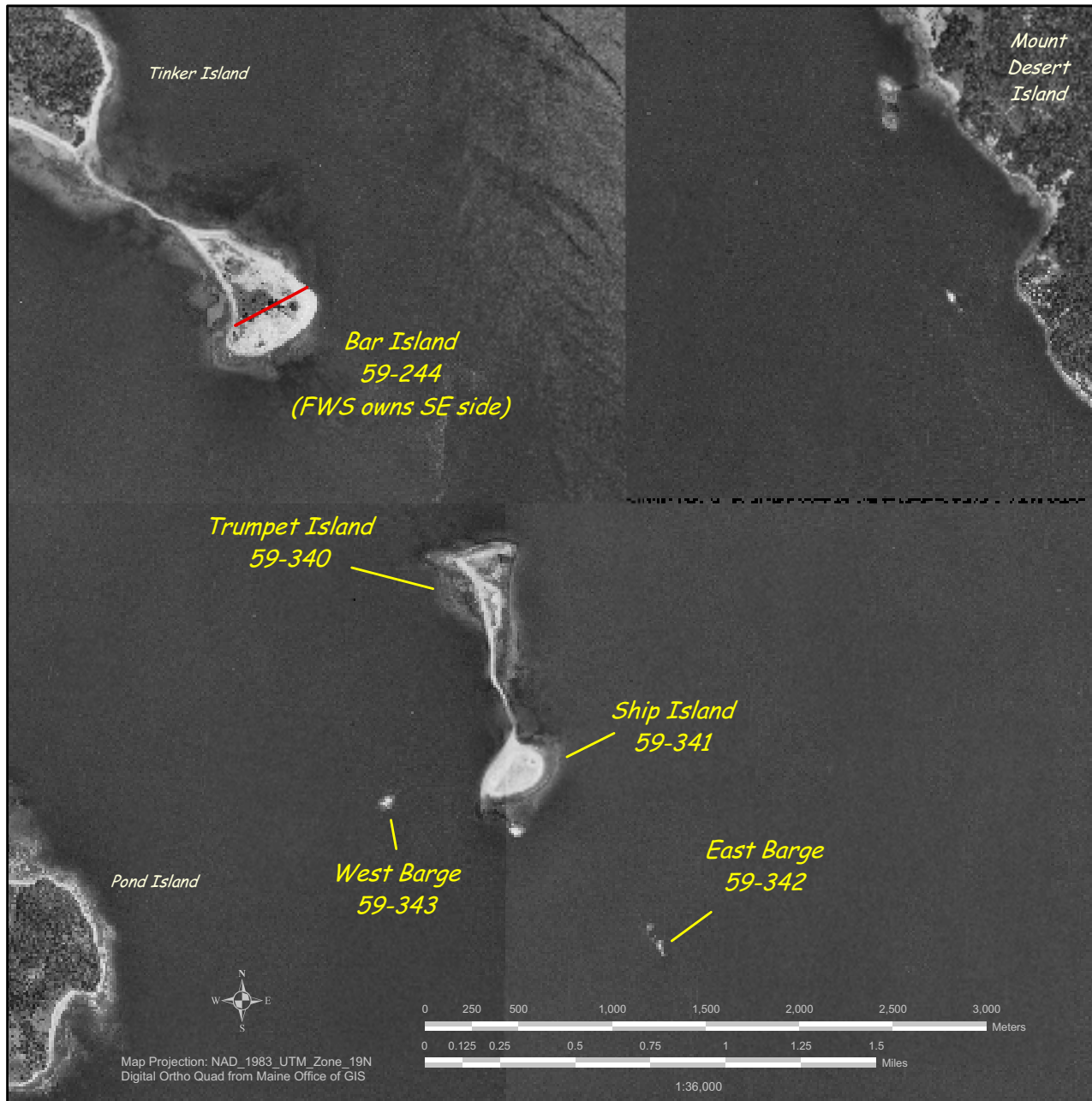
Johns Island





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

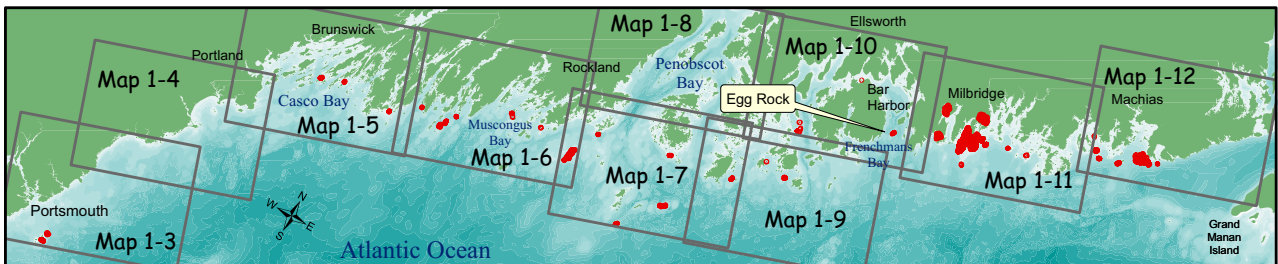
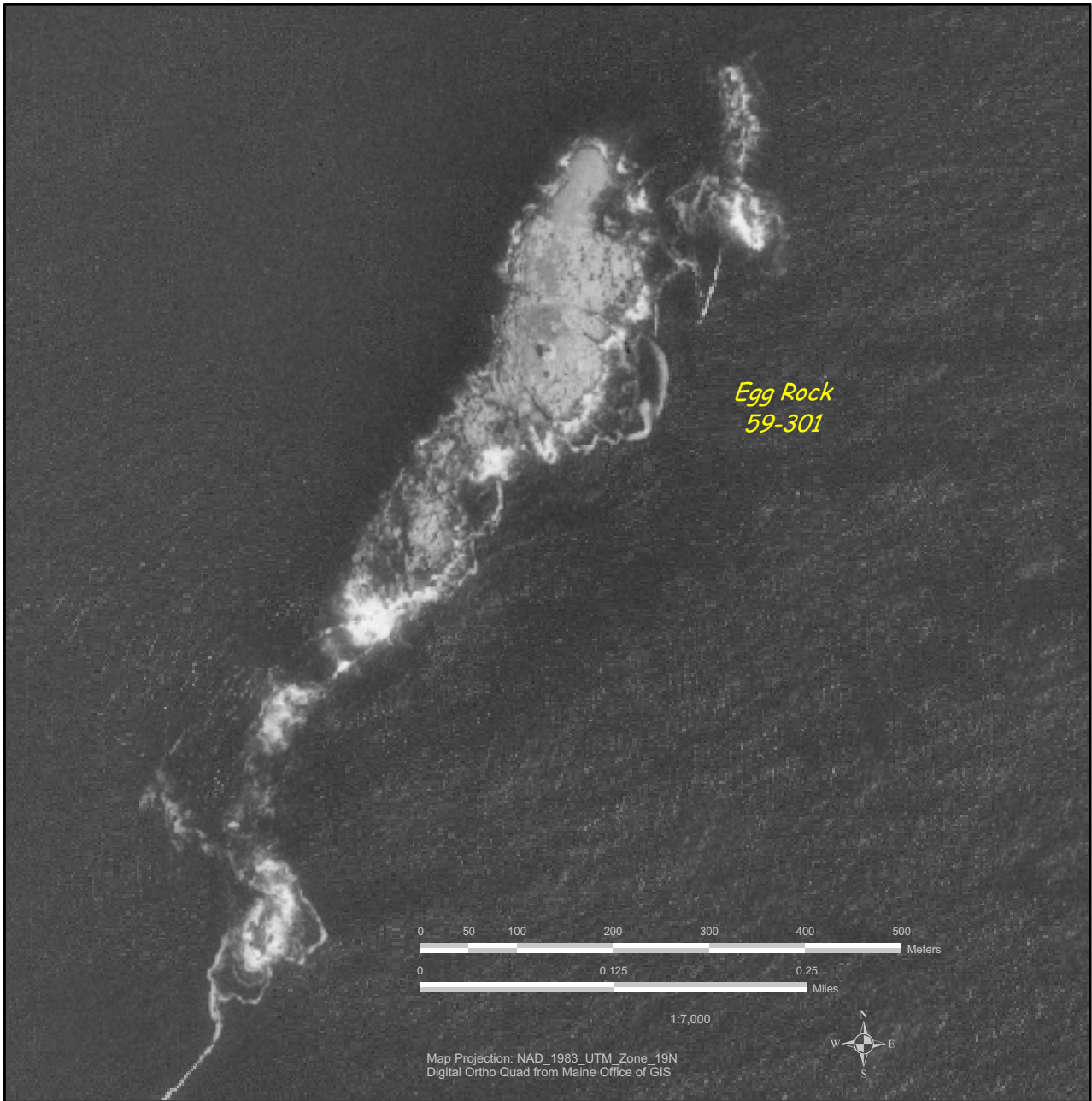
Bar, Ship and Trumpet Islands, East and West Barges





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

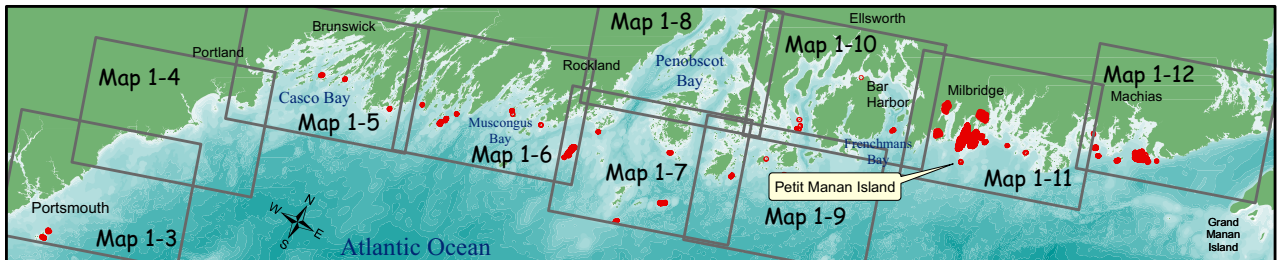
Egg Rock





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

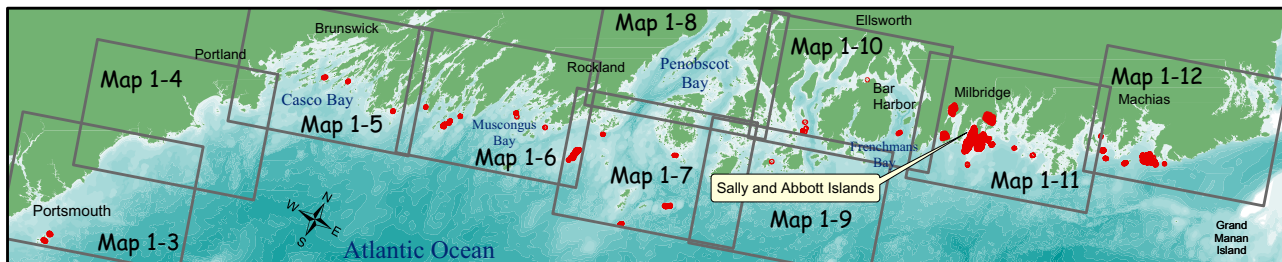
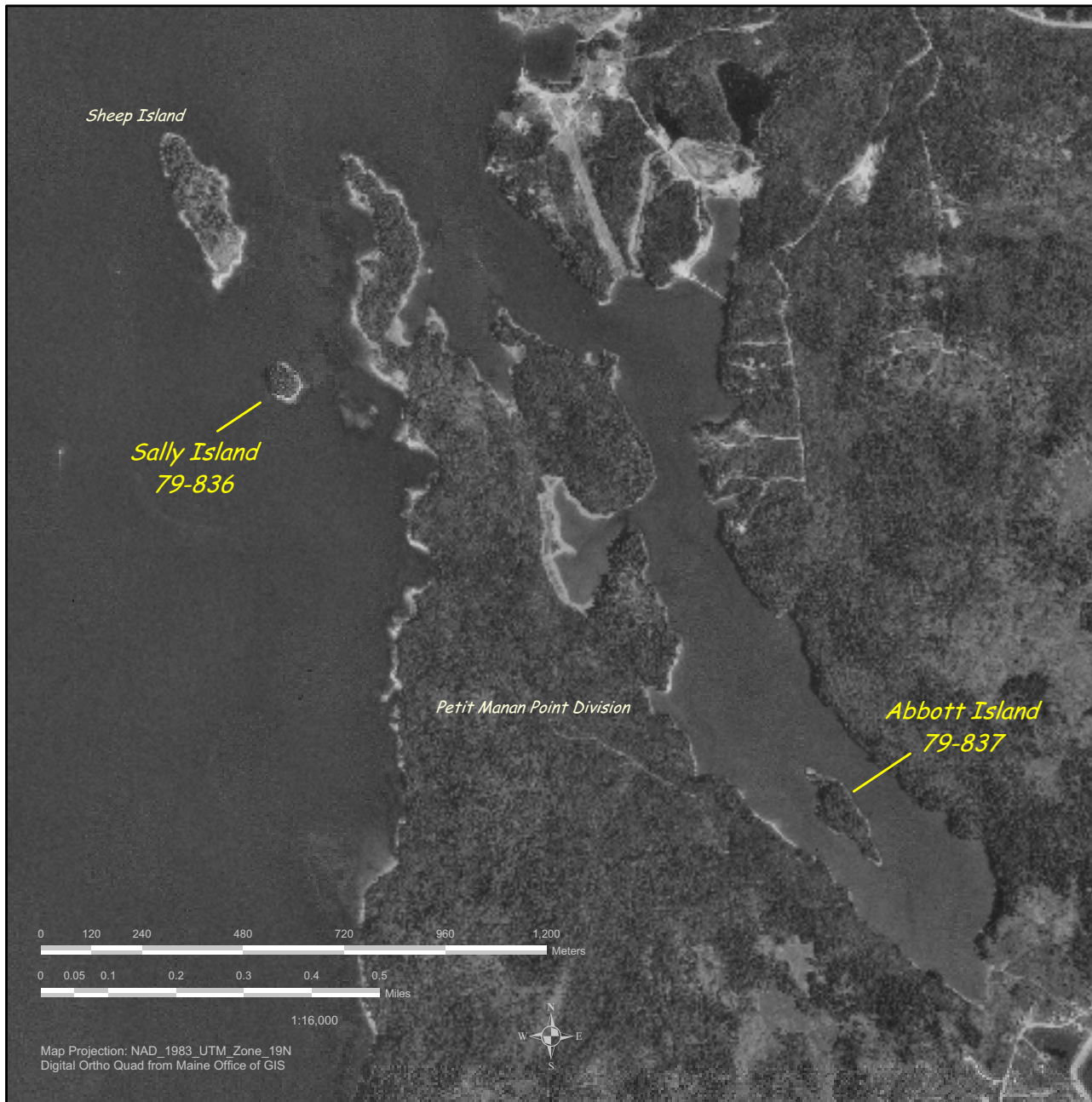
Petit Manan Island





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Sally and Abbott Islands

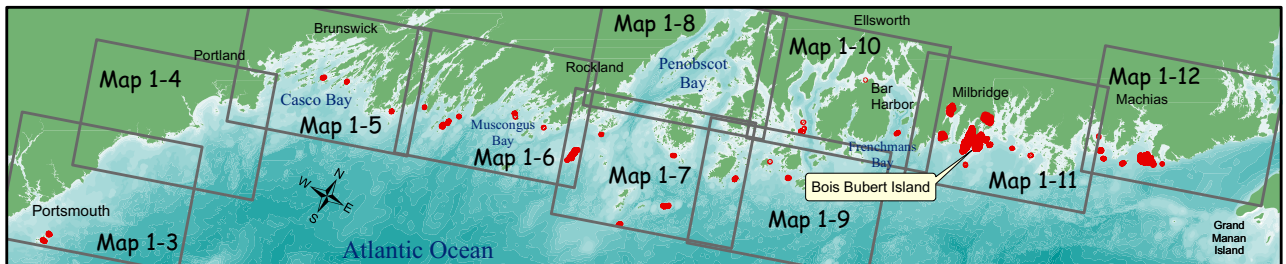
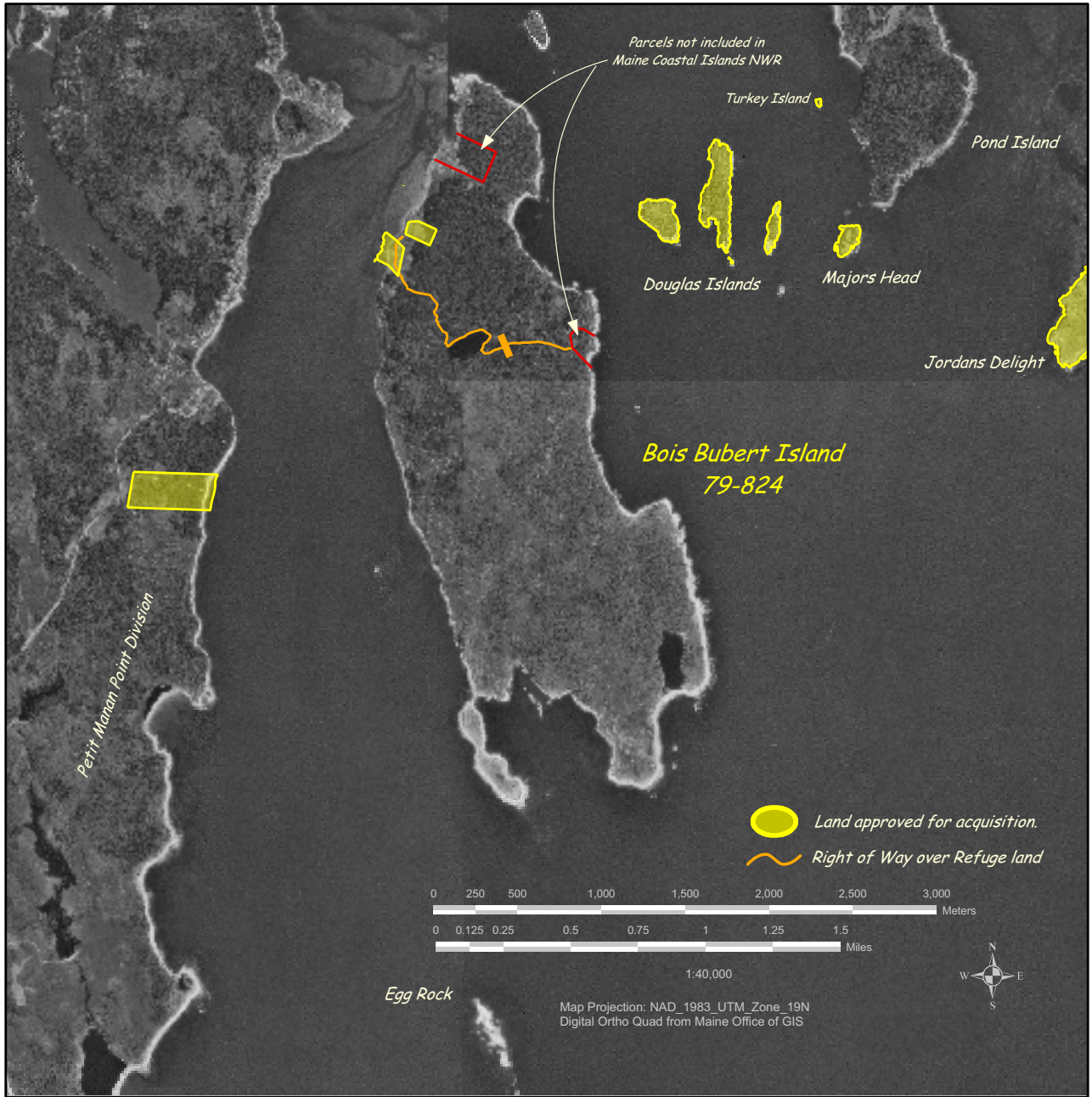






MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Bois Bubert Island

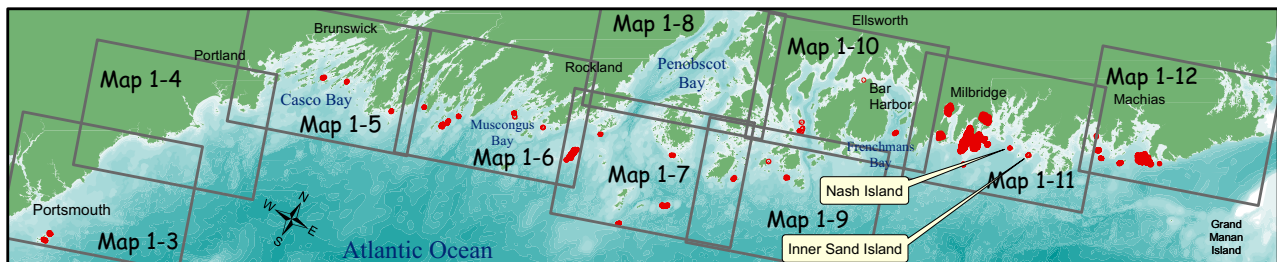
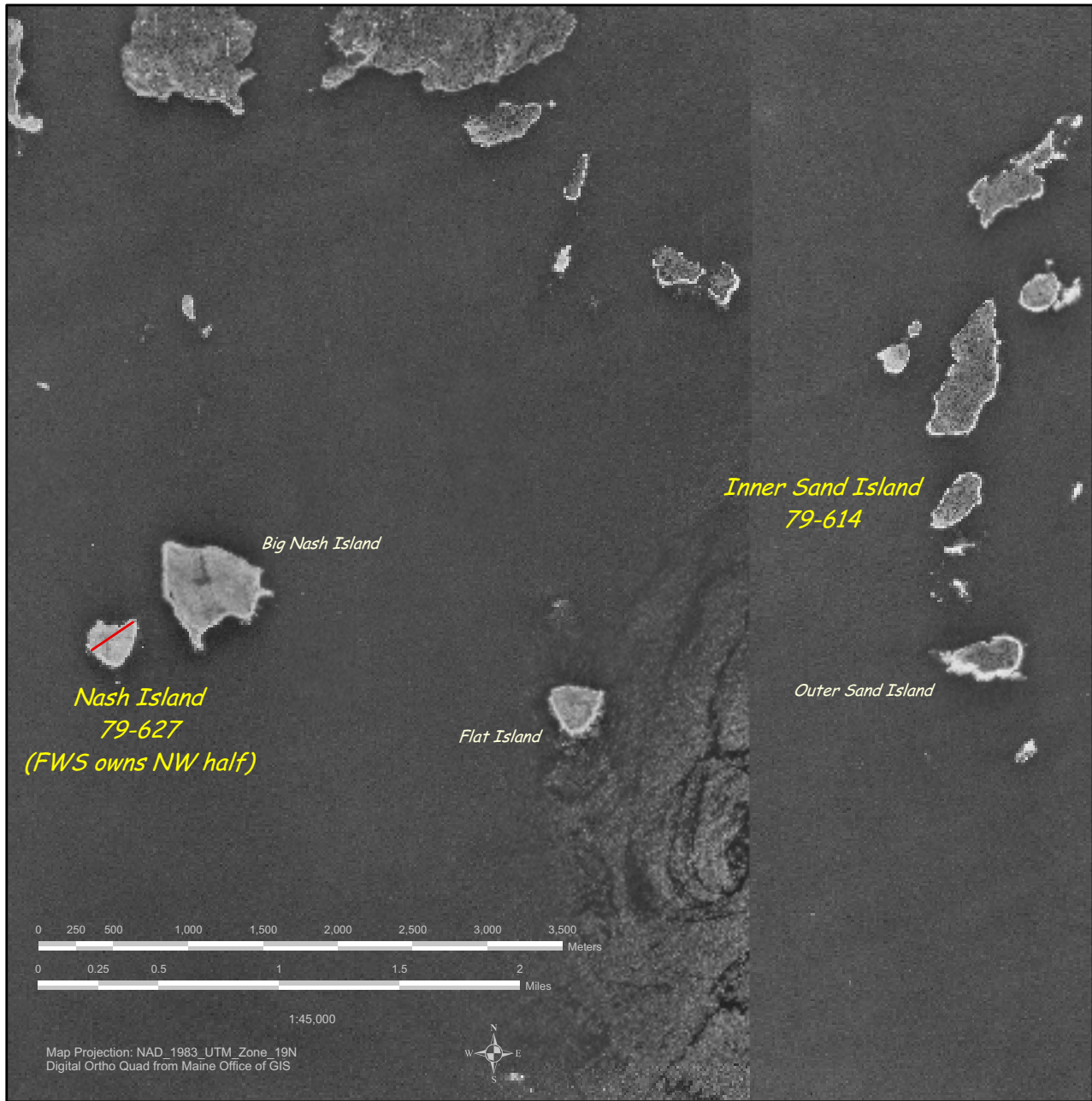




MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT



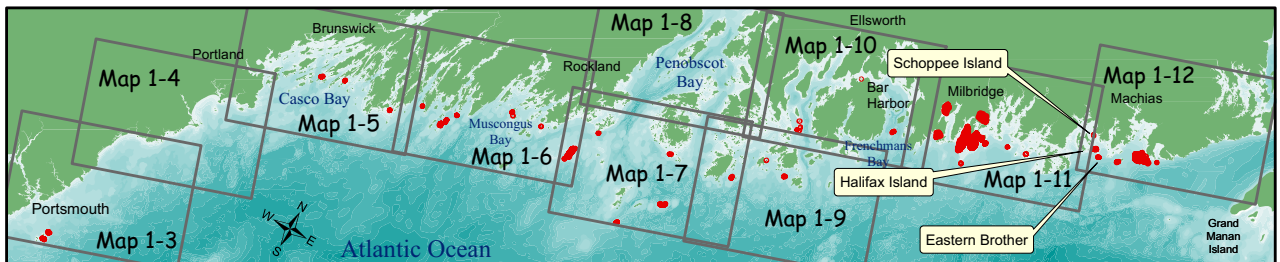
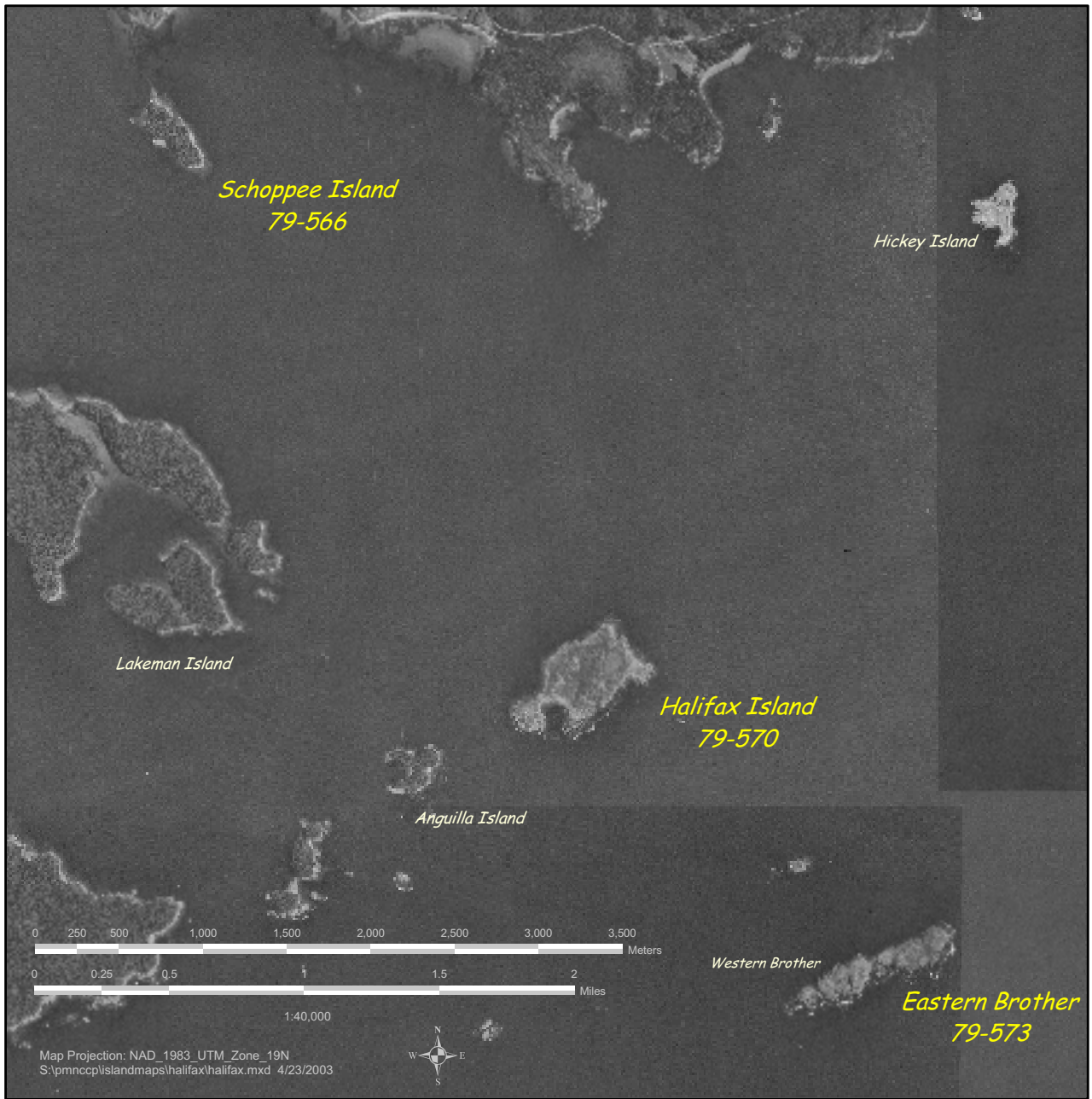
Nash and Inner Sand Islands





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

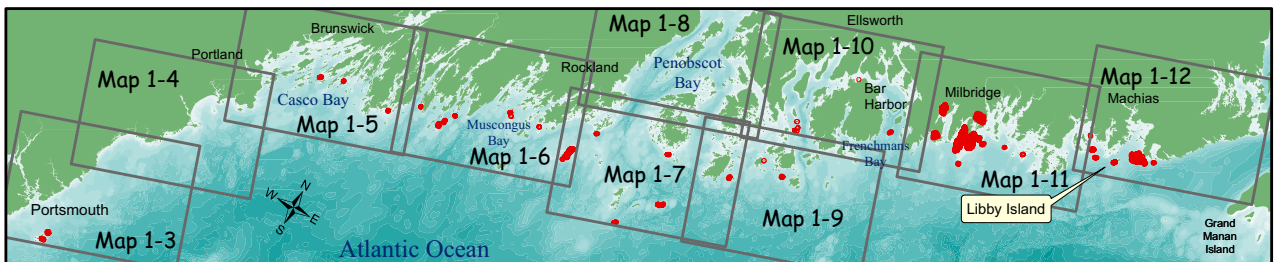
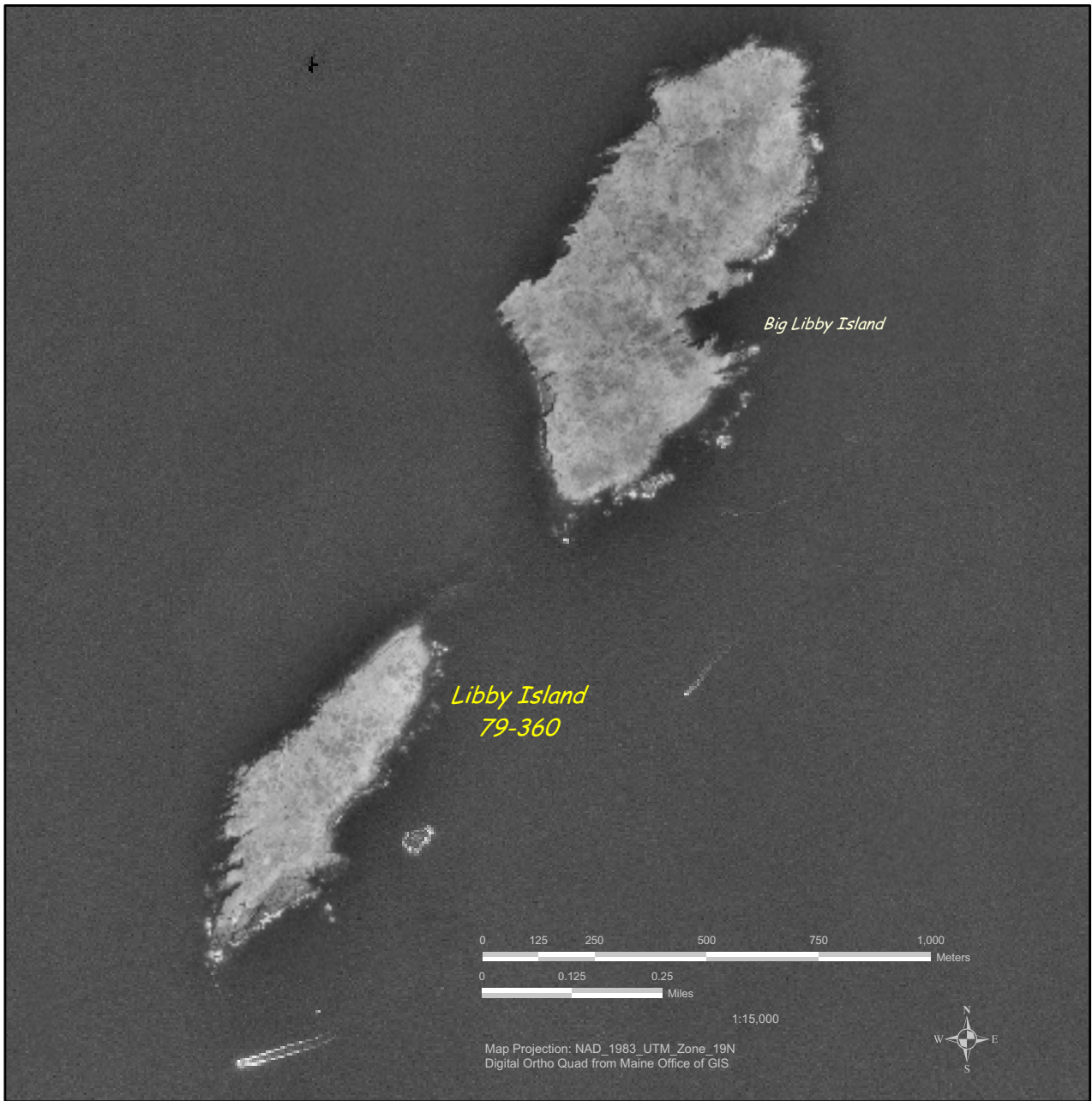
Halifax, Schoppee and Eastern Brother Islands





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

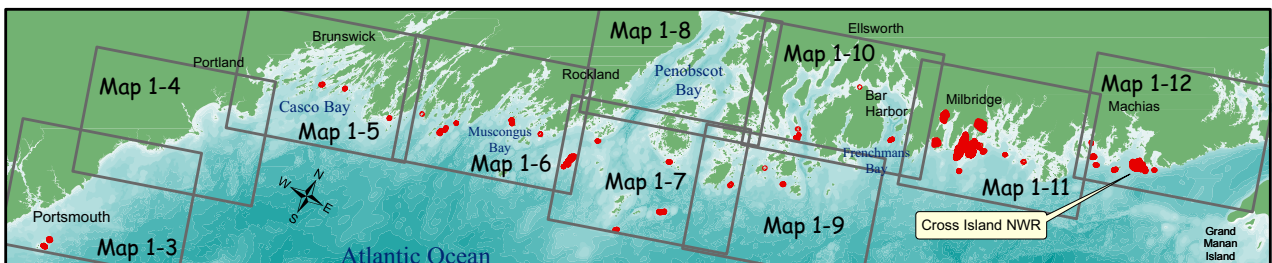
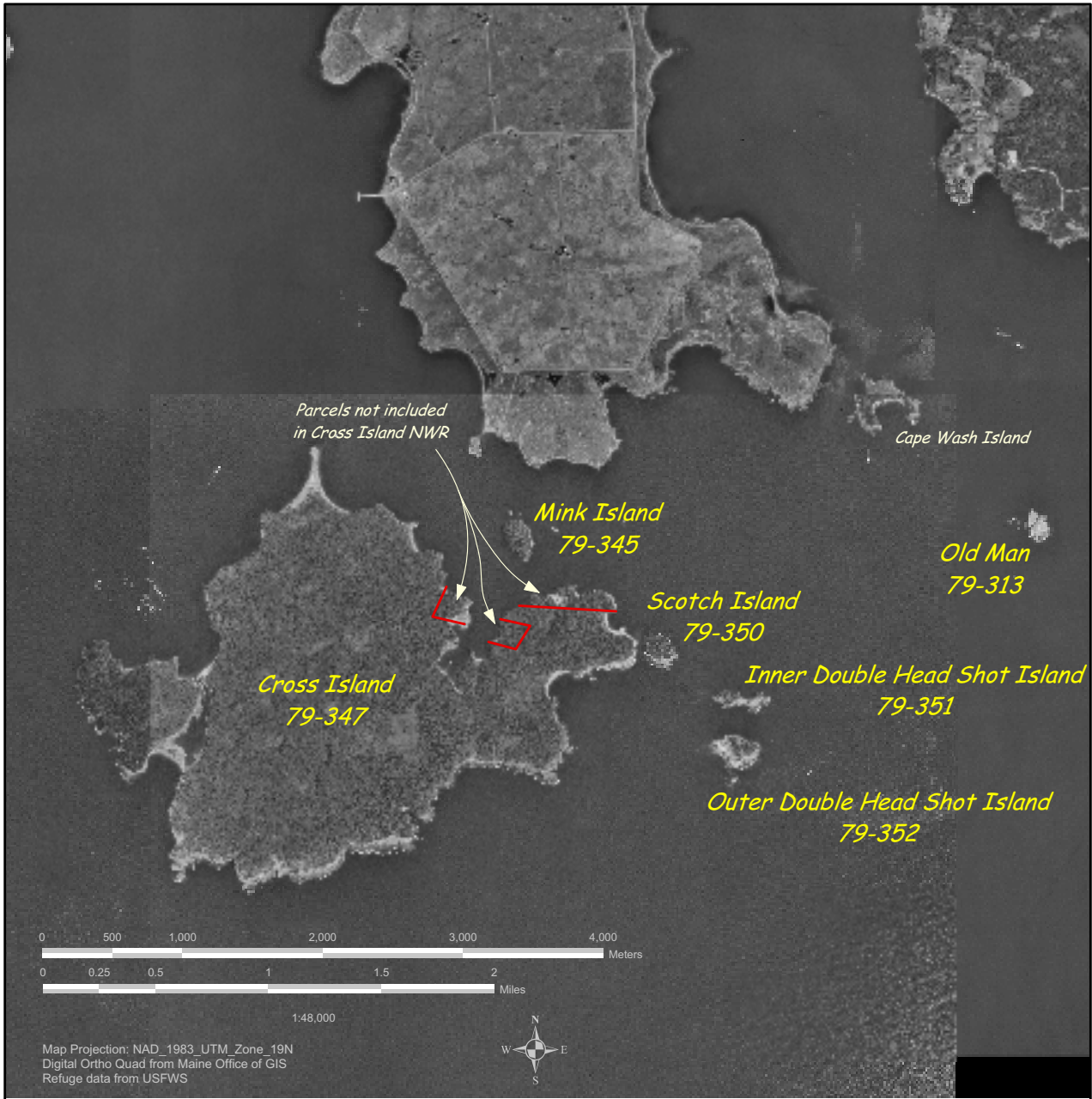
Libby Island





MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Cross Island National Wildlife Refuge



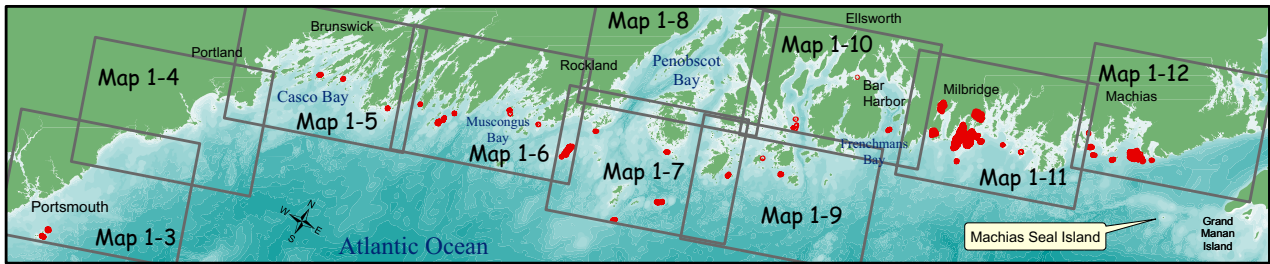


MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT



Machias Seal Island

*Machias Seal Island*



## Part 3: Refuge Mainland Resources

The Refuge's mainland is composed of three divisions: Petit Manan Point, Gouldsboro Bay, and Saywers Marsh. A fourth division, Corea Heath, is a pending transfer from the U.S. Department of the U.S. Navy. All mainland divisions are part of the Petit Manan Refuge. Each one is ecologically diverse, providing habitat for a tremendous variety of resident and migratory species.

A primary management objective on these lands is to protect and restore critical stopover points for Neotropical migratory land birds, waterfowl, and shorebirds during their spring and fall migrations along the Maine coast. In recent years, management emphasis has also been on acquiring private inholdings from willing sellers, conducting baseline biological surveys, and providing high quality interpretive trails. Each of the divisions is described in more detail below.

Table 3-42, at the end of this chapter, presents a summary of cover types for the entire Refuge.

### Petit Manan Point Division

#### Acquisition History

Much of Petit Manan Point was acquired by the Service in 1976 from The Nature Conservancy and William Mague. It consists of 2,195 acres in the Town of Steuben, Washington County. Map 3-26 depicts current Service ownership.

This division has had an interesting and colorful past. At the turn of the century, most of Petit Manan Point was owned by the Maine Coast Club, a company that intended to develop the land for "rusticators." Tennis courts, a golf course, a saltwater swimming impoundment, a deer enclosure, a wharf, and even a casino were built. In addition, portions of the property were subdivided into building lots. However, its expectations were never realized, and the club went bankrupt. Most of Petit Manan Point was eventually acquired by the Mague family, who turned it back into a saltwater farm, using the cleared areas for sheep pasture and blueberry fields. The old club buildings gradually disappeared, and, aside from two old camps and a small chapel, few traces of it remain.

#### Biological Resources

Petit Manan Point has an uncommon diversity of habitats, including rocky ledges, sphagnum bogs, exposed cobble beaches, blueberry barrens, maritime slope bog, cedar swamp, jack pine stands, red spruce forests with some mixed hardwoods, coastal raised heath peatlands, fresh and saltwater marshes and old hayfields. The Point also includes over 10 miles of shoreline. Some of the more exposed areas have a distinct, rugged and windswept character. A cover-type map using national vegetation classification standards was completed

in 2002. Acres calculated from cover typing are based on GIS and may vary from deed acreage. A summary of cover types by acre is presented in Table 3-38 below; Map 3-27 portrays the cover types on the landscape.

**Table 3-38 Petit Manan Point Division cover types by acres**

Cover Type	Acres (GIS)	Percent (%) of Area
Mature conifer forest	905	41
Northern hardwood -mixed forest	453	21
Early successional forest	226	10
Open field	70	3
Jack pine woodland	11	0.5
Freshwater wetlands	219	10
Maritime saltmarsh & estuary	8	0.4
Saltwater tidal / aquatic bed	302	14
Building / camp	1	0.1
<b>Total</b>	<b>2,195</b>	<b>100</b>

Several rare plants and community types have been documented on Petit Manan Point. The State-listed plants include: Nova Scotia false-foxglove (*Agalinis neoscotica*), Pickering's reed bent-grass (*Calamagrostis pickeringii*), salt-marsh sedge (*Carex recta*), swarthy sedge (*Carex adjusta*), and moonwort (*Botrychium lunaria*) (Widrig 1996). The rare or noteworthy community types include: maritime slope bog, tall meadow, Larch forest, maritime spruce-fir, jack pine, spruce-fir flats, spruce woodland, northern white cedar swamp, and spruce slope forest (MNAP 2002).

Petit Manan Point is noted for its use by migrating waterfowl, songbirds, shorebirds, and raptors. Annual breeding bird surveys are ongoing, including, marsh bird, grassland bird, woodcock, and land bird. A variety of land bird species of concern (Appendix B) have documented breeding on the refuge, include American woodcock, eastern wood-pewee, chestnut-sided warbler, and bobolink. We have participated in the Monitoring Avian Productivity and Survivorship (MAPS) program for five years on Petit

Manan Point. The emphasis of this program is to measure demographic parameters such as migratory landbird survival and productivity rates at over 500 MAPS stations continent-wide. This data will be pooled to help evaluate what and where population fluctuations are occurring for captured species. This MAPS station is one of the top 5% in terms of productivity of stations in North America, excluding Alaska. On the average, 337 birds are captured each year, representing 43 species (Brokaw and Burke 1997, Taylor and Famous 2000). Common warbler species captured include magnolia, black-and-white, black-throated green, and Nashville warbler. Other common species include American redstart,



Bobolink  
USFWS photo



white-throated sparrow, hermit and Swainson's thrush, and common yellowthroat. Bird and plants species checklists are available from the Refuge Headquarters upon request.



*Northern pintail ducks*  
USFWS photo

The three impoundments on Petit Manan Point are used extensively by migratory waterfowl; it is common to observe over 4,000 ducks during fall migration in the area. These three freshwater wetlands cover 219 acres, and are managed to provide habitat for fall migratory waterfowl, shorebirds, and wading birds. The most abundant species observed are American black duck, mallard, and green-wing teal. We have been trying to increase wild rice production in one of the impoundments to provide high quality waterfowl forage.

Current upland habitat management activities include mowing and prescribed burning as means of maintaining open fields. Use of fire to manage open habitats has an historic and cultural context in this part of Maine. Blueberries, a chief export product for Maine, are managed using prescribed fire. In spring, burning is commonplace in Washington County, with more than 10,000 acres of blueberry lands burned each year. Prior to acquisition, Refuge lands on the Point were burned to maintain blueberry fields.

Approximately 65 acres of these same fields are scheduled for burning in the approved Fire Management Plan every 3 to 5 years, laid out in 11 separate burn units. The objective is to maintain blueberry and grass fields for forage and nesting bird habitat. Invasive sweetfern and other woody vegetation will be controlled by burning. We burn during the spring (April-May) or fall (September-November), as conditions permit and outside the upland bird nesting season. Because of the narrow burn window, precipitation levels, and the humid coastal climate, burning has not always been accomplished. Other limitations, like inadequate fuel in blueberry fields, may limit fire's effectiveness in some areas. During years when burning is not feasible, we use mowing to accomplish vegetation management.

Efforts to inventory invertebrates on Petit Manan Point have recently been initiated. A refuge volunteer is currently conducting dragonfly and damselfly surveys (Hildreth 2001 and Hildreth 2002). At this point in time, 33 species of Odonates have been documented on the refuge, several of which are considered rare or special concern in Maine. We have also recently initiated extensive survey efforts for spiders. To date, 178 species have been documented on the refuge, including several new records for the state of Maine, and several previously undescribed species (Jennings 2000, Jennings 2001, and Jennings 2002). Efforts to document presence and abundance of amphibians and vernal pools on Petit Manan Point will continue.

### Public Use

A seasonal biological technician was hired between 2000 - 2002 to work on the Point to conduct baseline wildlife and habitat surveys, monitor public use, and conduct outreach with Refuge visitors. Current public use estimates are approximately 15,000 visitors per year.

The Point has two hiking trails, the John Hollingsworth Memorial and Birch Point trails. There is a parking lot at each trailhead; the Hollingsworth trailhead has approximately 6 spaces, and the Birch Point trailhead has approximately 15 spaces. The Hollingsworth trail is self-guided with interpretive panels. A visitor information kiosk is located at the Birch Point Trail head. Interpretive programs are occasionally given by Refuge staff and volunteers on both trails. Teacher-led environmental programs take place on these trails as well.

In addition to the trail use, roadside blueberry picking, by hand for personal use, is popular in the fall.

This Division is not currently open to hunting.



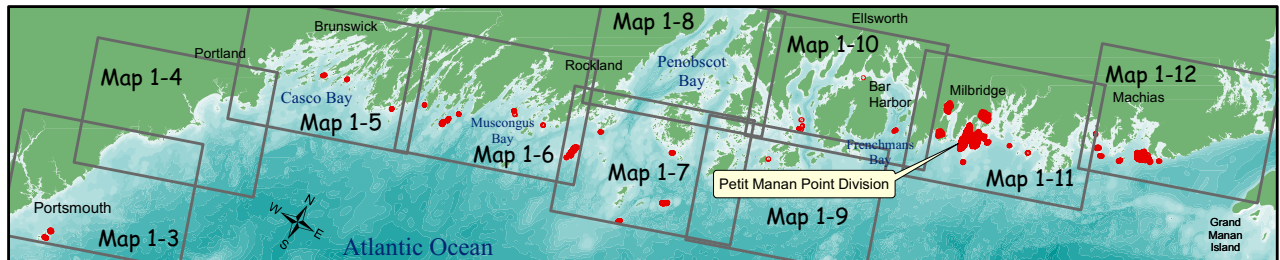
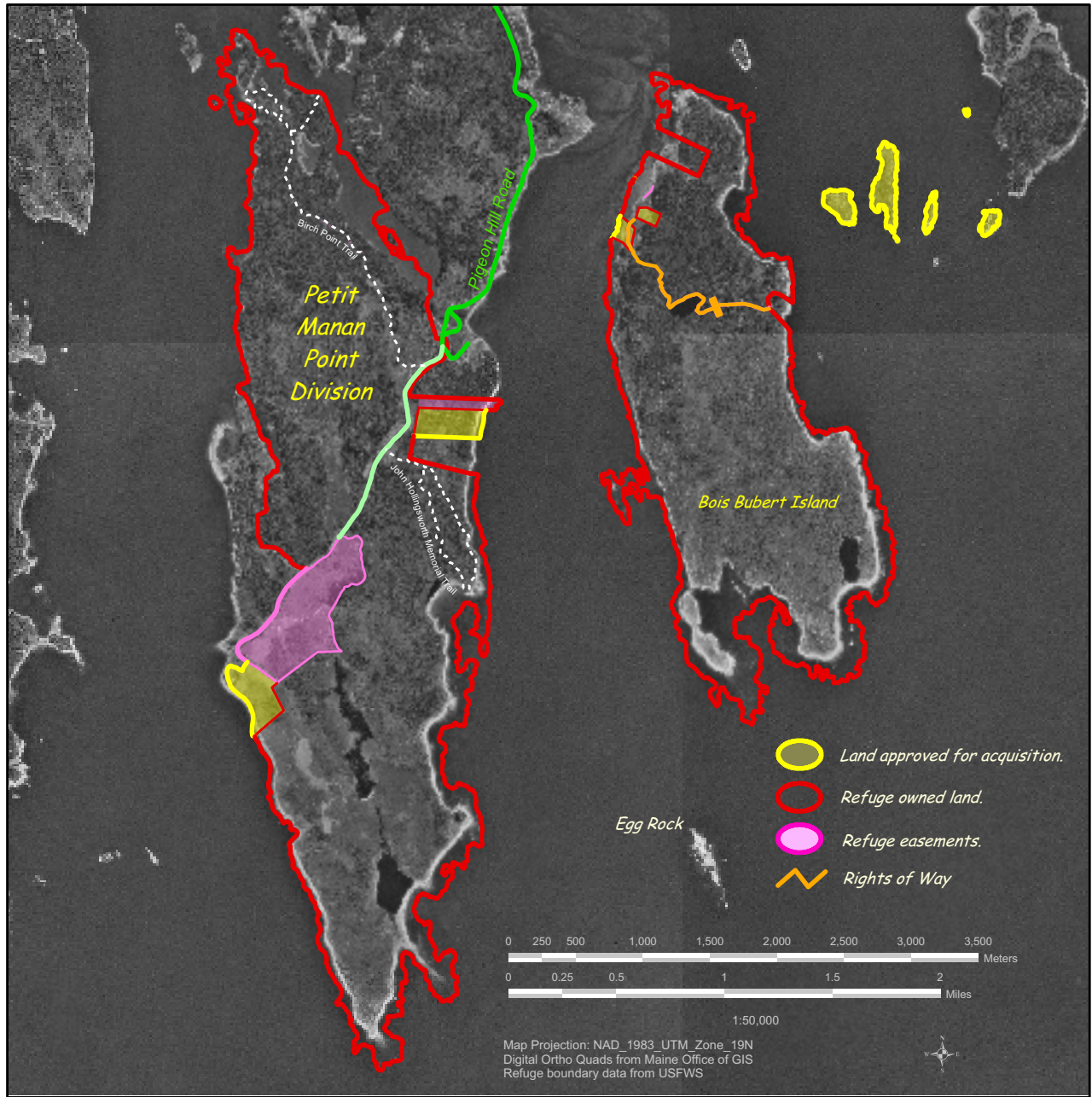
*Semipalmated sandpipers*  
Photo by Craig Snapp

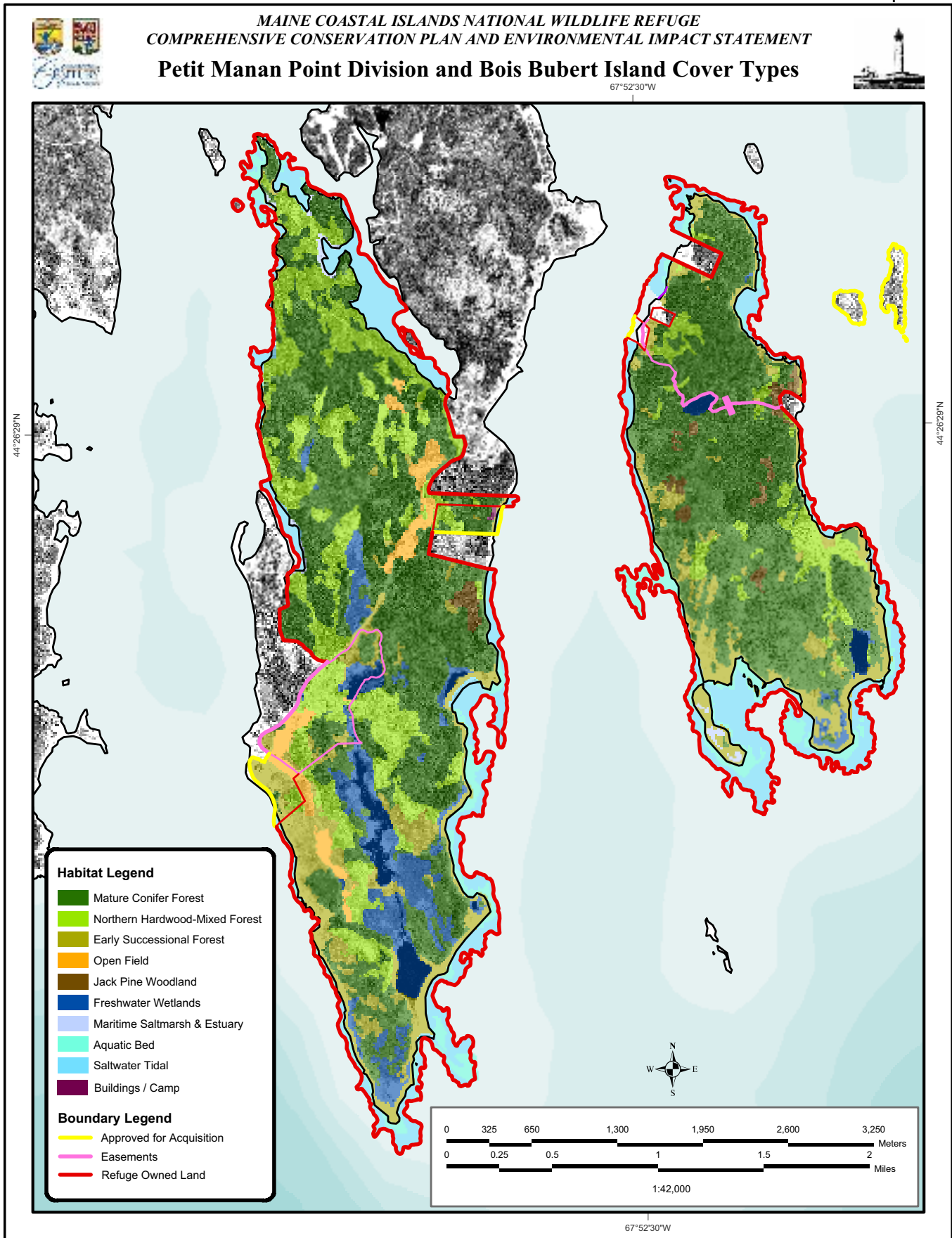


MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT



Petit Manan Point Division and Bois Bubert Island





**Gouldsboro Bay Division**

**Acquisition History**

The Gouldsboro Bay Division is a 607 acre parcel in the Town of Gouldsboro, Hancock County. It was acquired in 1994 and 1995 by donation and sale from a private landowner. Additional tracts were acquired in 1998 and 2000. Map 3-28 depicts current Service ownership. Historically, the division was once the site of the Gouldsboro Town center and the surrounding lands were dotted with farms. The town buildings and farms gradually disappeared and, aside from several old foundations, stone walls and apple trees scattered about, few traces remain.

**Biological Resources**

A national vegetation classification standards cover type map was completed in 2002. A summary of habitat cover types by acre is presented in Table 3-39 below; Map 3-29 portrays the cover types on the landscape.

Forest stand age varies throughout the division as limited cutting occurred on the property prior to Service acquisition.



*Canada geese with goslings*  
USFWS photo

Annual breeding bird surveys are ongoing, including land bird, marsh bird, and bald eagle. This division also has a MAPS station that has been monitored for the past three years. This station includes 337 bird captures per year, including 43 different species (Brokaw and Burke 1997, Taylor and Famous 2000). The common bird species are the same as those mentioned for Petit Manan Point. Bald eagles were first observed breeding on Gouldsboro Bay Division in 2001, and the nest site was again active in 2002. Efforts to document presence and abundance of amphibians and vernal pools on Gouldsboro Bay Division will continue.

**Table 3-39 Gouldsboro Bay Division habitat cover types by acres**

Cover Type	Acres (GIS)	Percent (%) of Area
Mature conifer forest	253	41.6
Northern hardwood -mixed forest	123	20
Early successional forest	5	0.8
Maritime saltmarsh & estuary	28	4.6
Saltwater tidal / aquatic bed	198	33
<b>Total</b>	<b>607</b>	<b>100</b>

### Public Use

A hiking trail to the saltmarsh, an overlook, and interpretation of an historical site are in the developmental stage. Unfortunately, there is illegal use of all-terrain vehicles (ATVs) to access the saltmarsh. Signs are in place to alert ATV users that all-terrain vehicles are not allowed on the refuge.

This division is open to hunting migratory gamebirds and waterfowl, and small and big game under State and Refuge regulations.

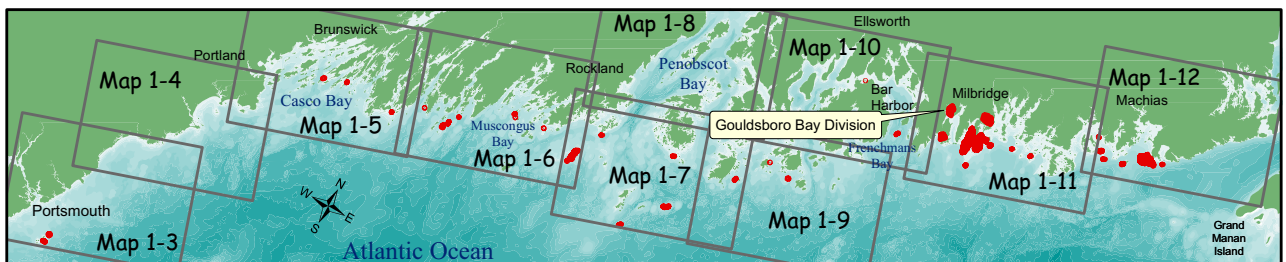
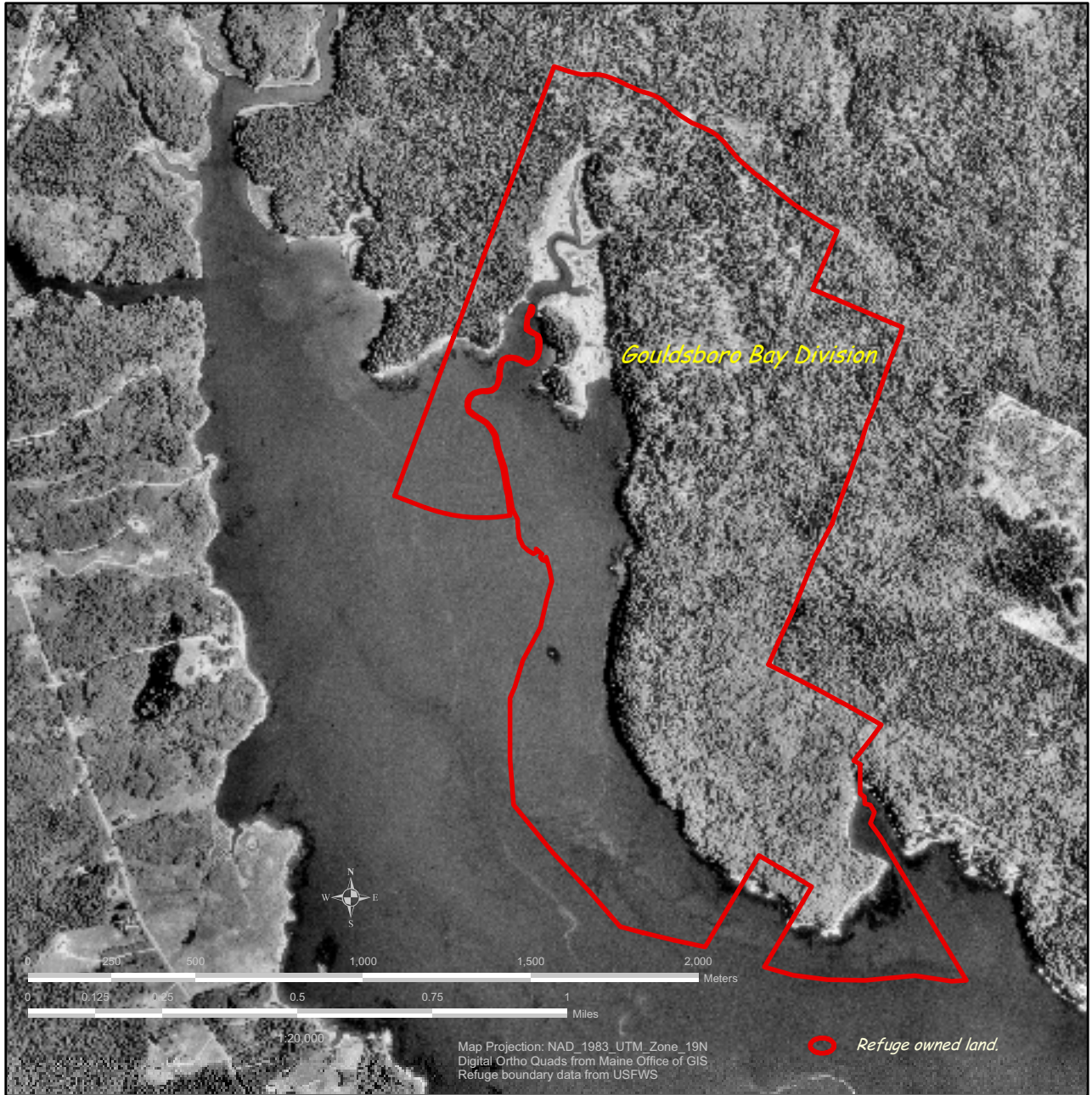


*Green frog*  
USFWS photo



MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Gouldsboro Bay Division

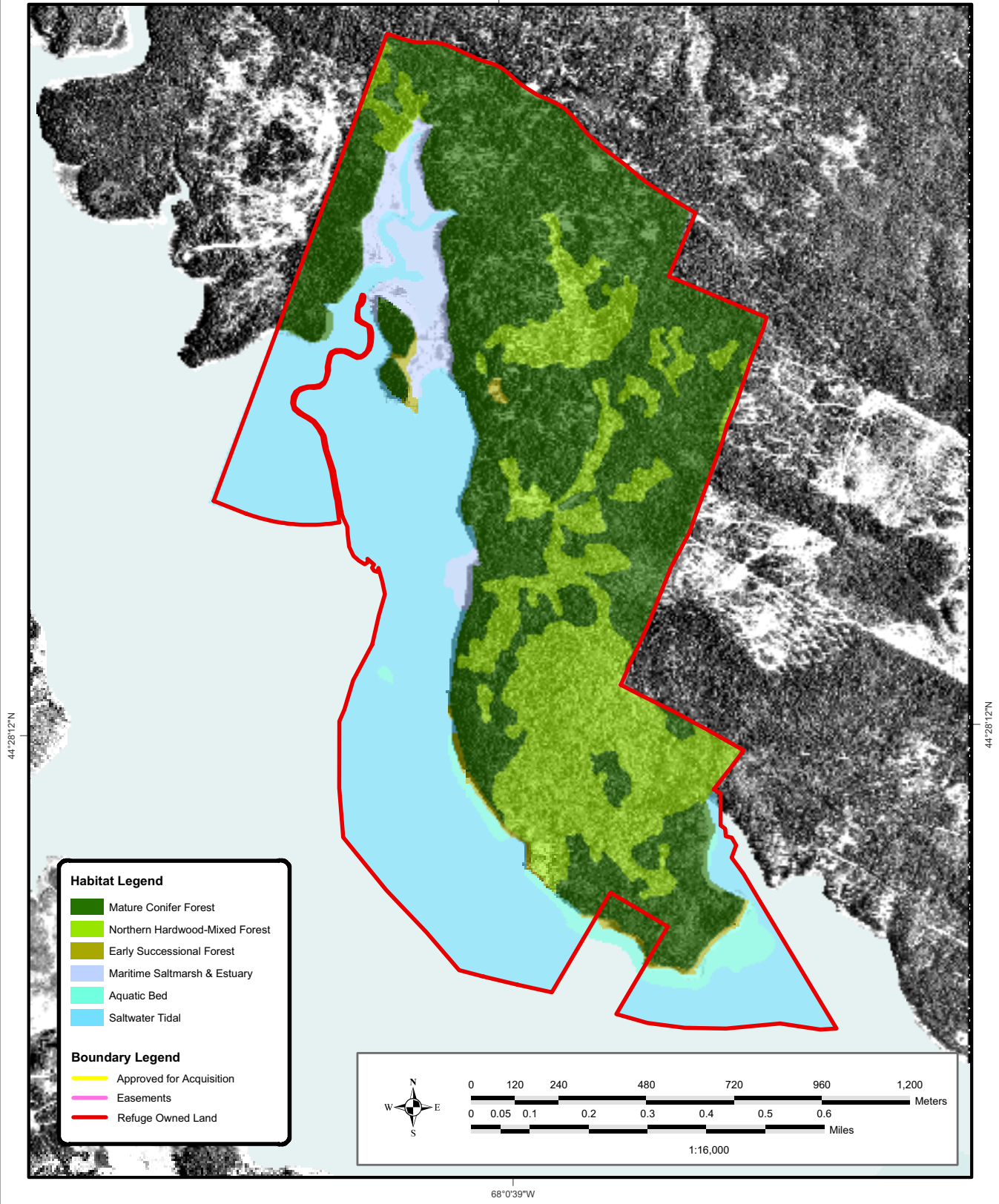




MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
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Gouldsboro Bay Division Cover Types

68°0'39"W





**Sawyers Marsh Division      Acquisition History**

The Sawyer's Marsh Division, Town of Milbridge, Washington County, consists of 933 acres acquired through fee title in 1998 and 2000. Map 3-30 depicts the current Service ownership. The area lies to the northeast of Petit Manan Point, at the head of a broad tidal marsh used extensively by migratory shorebirds and waterfowl, including black duck, goldeneye, wood ducks and Canada geese. A majority of the marsh is privately owned. The outlet for this tract is Bobby's Creek estuary, which eventually drains into the Narraguagus River and the Gulf of Maine.

**Biological Resources**

The upland habitat surrounding the marsh consists of several large stands of white birch, various other hardwood species, red spruce, and balsam fir. Forest stand age varies throughout this upland, as a portion of the area was burned in a wildfire in the early 1950's, and timber harvesting occurred on the property prior to acquisition by the Service.

A national vegetation classification standards cover type map was completed in 2002. A summary of habitat cover types by acre is presented in Table 3-40; Map 3-31 portrays the cover types on the landscape.



*Dragonfly*  
USFWS photo

Table 3-40 Sawyers Marsh Division habitat cover types by acres

Cover Type	Acres (GIS)	Percent (%) of Area
Early successional forest	4	0.4
Mature conifer forest	403	43
Freshwater wetland	69	7.4
Northern hardwood - mixed forest	455	49
Maritime saltmarsh & estuary	2	0.2
<b>Total</b>	<b>933</b>	<b>100</b>

Many species of shorebirds and wading birds utilize the shallow waters and adjacent intertidal areas for feeding.

A seasonal biological technician was hired in 2002 to initiate baseline wildlife surveys. Waterbird surveys are currently being done on this area. We have also recently initiated extensive survey efforts for spiders. To date, 178 spiders species have been documented on the refuge, including several new records for the state of Maine, and several previously undescribed species (Jennings 2001 and Jennings 2002). Efforts to document presence and abundance of amphibians and vernal pools on Sawyers Marsh Division will continue.

### Public Use

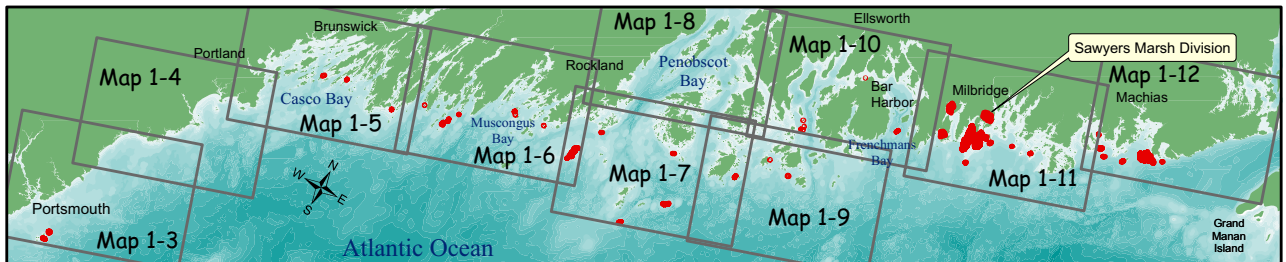
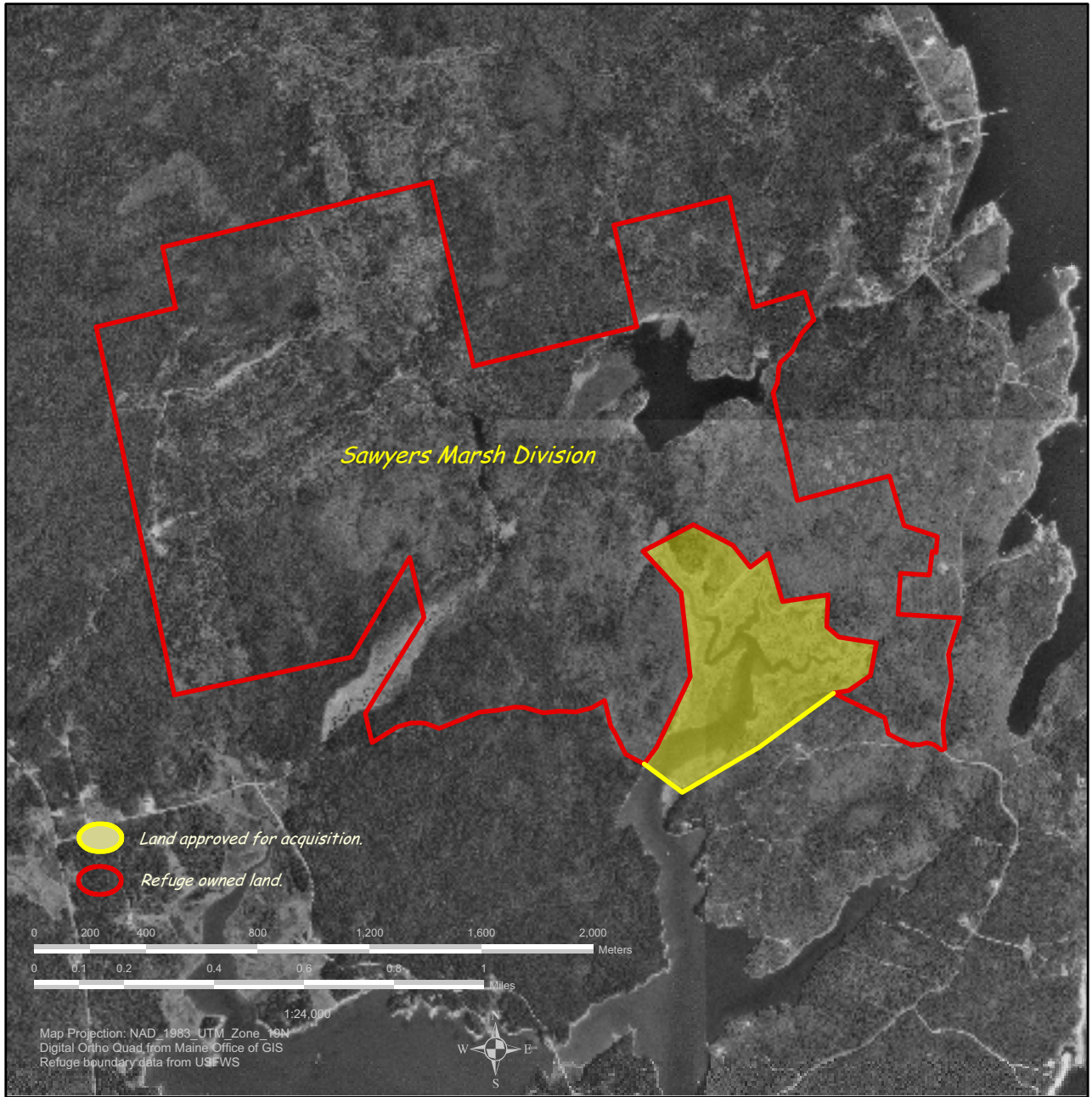
This area allows little opportunity for public access as it is surrounded by privately-owned land. ATVs vehicles are, however, illegally using this area for access to the saltmarsh similar to the Gouldsboro Bay Division. Signs are in place to alert ATV users that vehicles are not allowed on refuge lands.

This division is open to hunting migratory gamebirds and waterfowl, and small and big game under State and Refuge regulations.



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Sawyers Marsh Division



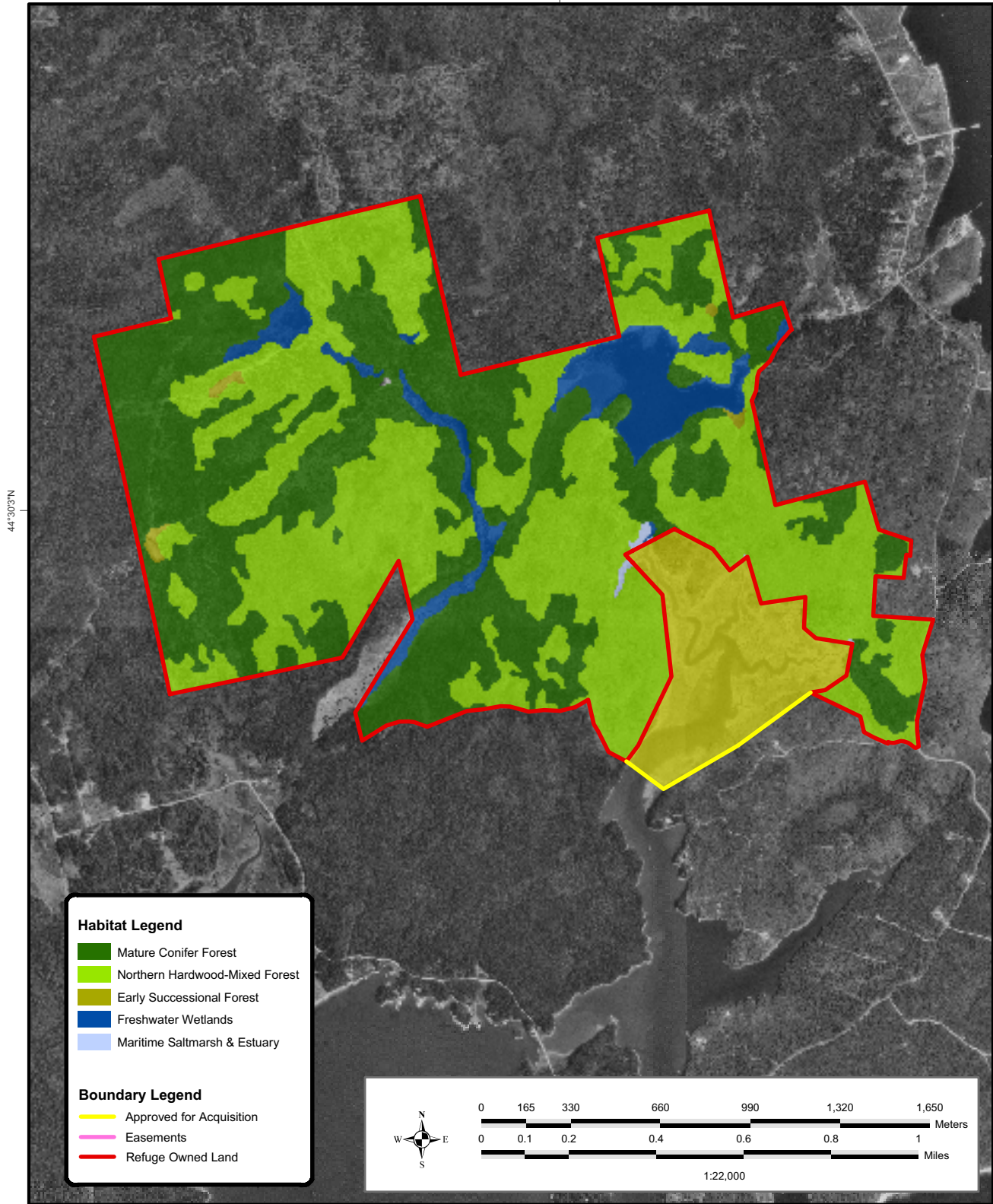


MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
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Sawyers Marsh Division Cover Types



67°52'30"W



44°30'30"N

44°30'30"N

67°52'30"W

**Corea Heath Division  
(pending transfer from  
the U.S. Navy)**

**Acquisition History**

The Corea Heath Division is an approximately 400 acre raised coastal peatland situated on the Schoodic peninsula in the Town of Gouldsboro, Washington County. The U.S. Navy has occupied the site since the 1950's, using it as a communications facility (a high frequency direction finding network). Roads, support buildings, and extensive antennae arrays marked the landscape during this time. In 2002, the U.S. Navy ended its mission on Schoodic peninsula and began the transfer of U.S. Navy lands to the National Park Service as part of Acadia National Park, to the towns of Gouldsboro and Winter Harbor, and to the Service. The Corea Heath portion of the former U.S. Navy facility was designated for transfer to the Service. Map 3-32 depicts which lands are approved for the transfer to the Service. The transfer is scheduled for 2004. In addition to the botanically significant peatland or "heath," the Service will also receive 3 to 4 acres with two buildings that can be used for future office and storage space.

**Biological Resources**

The ecological values and unique features of Corea Heath are well-documented (Worley 1980, Glanz et al. 1999). Characterized as a coastal plateau bog, the area is wholly affected by a maritime climate which is in part responsible for the varied plant communities that occur there. Among



*Indian Pipe is only one of the many plant species that flourishes on Refuge lands.*  
USFWS photo

115 coastal raised peatlands in Maine, Corea Heath ranks 5<sup>th</sup> for coastal peatland features, and 6<sup>th</sup> for all peatland features.

In 1950, the U.S. Navy designated a 240 acre portion of the heath as an Ecological Preserve Area. Ecological communities occurring at Corea Heath include: open bog, forested bog, open fen, acidic ledges, coniferous and birch woodlands, and more than a mile of boulder and cobble shoreline.

A biological inventory was completed by the University of Maine and Acadia National Park in 1996. Floral and faunal inventories included amphibians, terrestrial mammals, bats, birds, and bryophytes. A copy of the biological inventory is on file at the Refuge office in Milbridge.

A national vegetation classification standards cover type map was completed in 2002. A summary of habitat cover types by acres is presented in Table 3-41 below; Map 3-33 portrays these cover types on the landscape.

**Table 3-41 Corea Heath Division habitat cover types by acres**

<b>Cover Type Area</b>	<b>Acres (GIS)</b>	<b>Percent (%) of</b>
Northern hardwood -mixed forest	59	14.7
Early successional forest	26	7
Freshwater wetland	179	44.7
Mature conifer forest	129	32
Jack pine woodland	1	0.2
Saltwater tidal / aquatic bed	3	0.7
Building / camp	3	0.7
<b>Total</b>	<b>400</b>	<b>100</b>

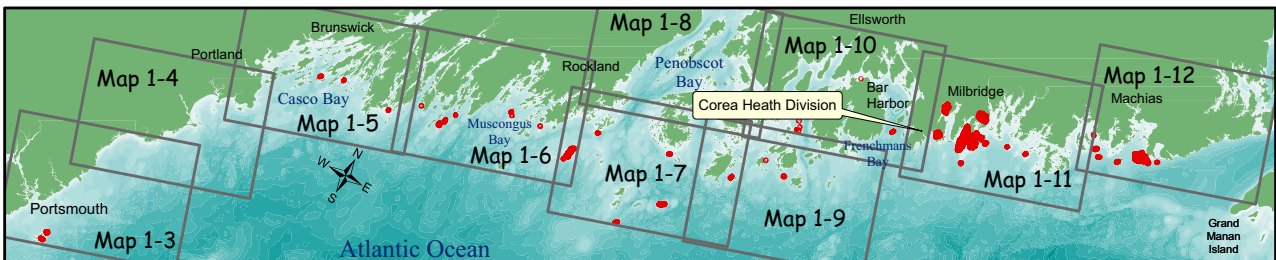
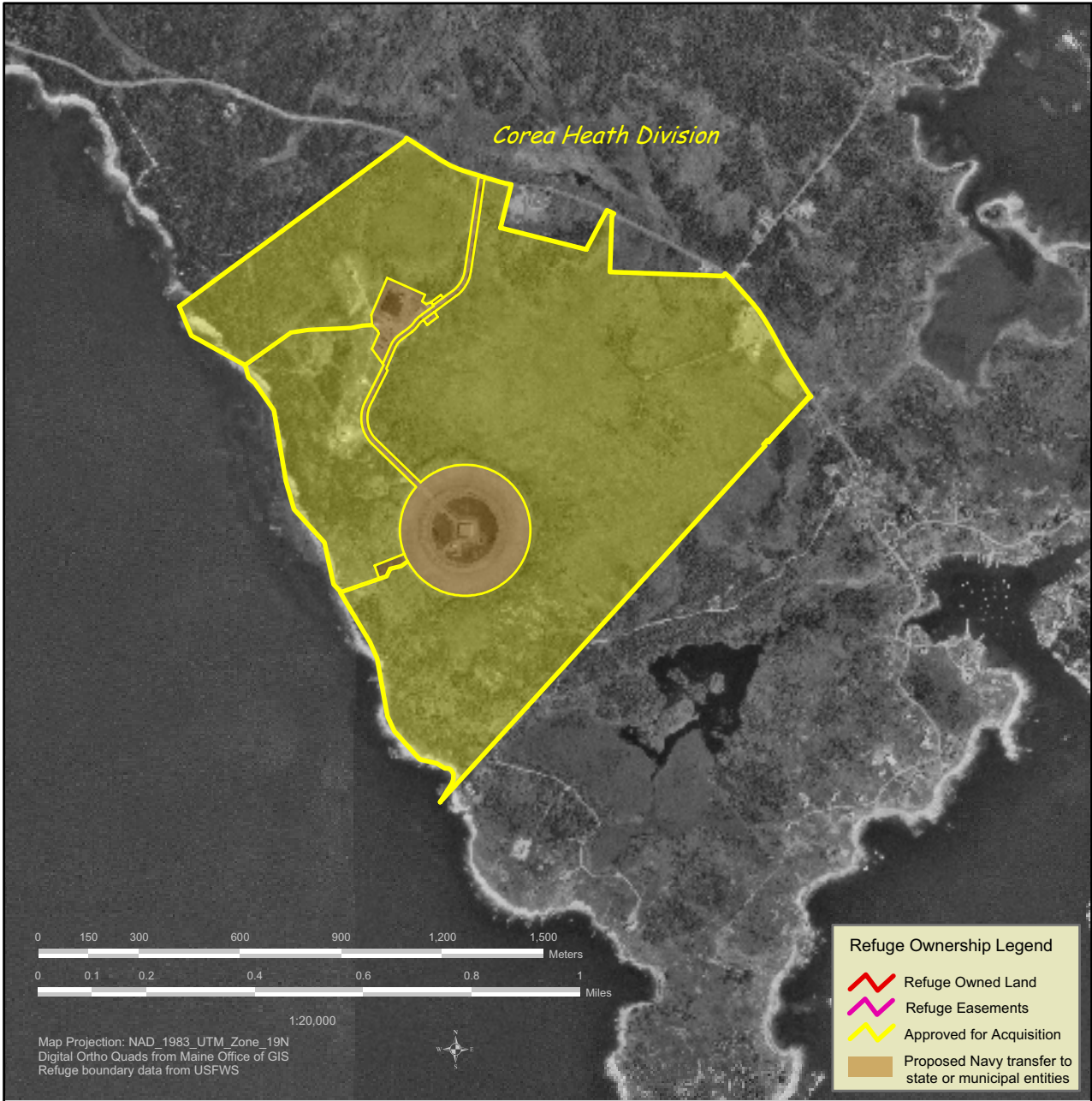
### **Public Use**

The area has been closed to public access and use since it was acquired by the U.S. Navy in the 1950's.



MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE  
COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Corea Heath Division



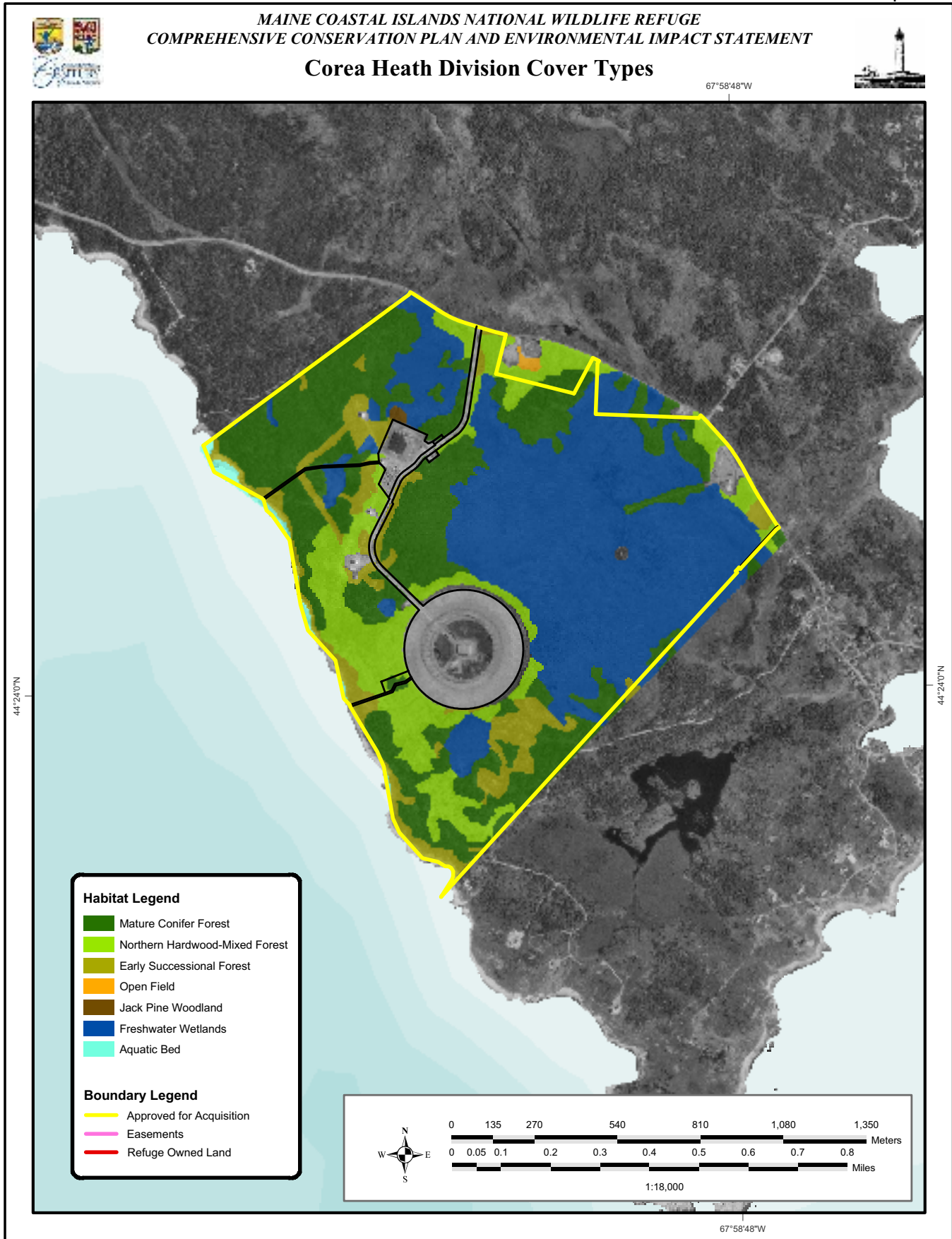




Table 3-42 Summary of cover types by location on Maine Coastal Islands National Wildlife Refuge

Cover Types	Petit	Gouldsboro Bay	Sawyers Marsh	Corea Heath	All 4	Bois Bubert Island	Cross Is NWR (6 isl)	Other*	Total Acreage
	Manan Point Division				Divisions Total Acreage				
Open Field Grassland	70	0	0	0	70	0	0	392.5	462.5
Early Successional Forest/Shrub Habitat	226	5	4	26	261	164	29	105.5	559.5
Freshwater Wetland	219	0	69	179	467	28	99	49	643
Maritime Saltmarsh & Estuary	8	28	2	0	38	4	27	0	69
Mature Conifer Forest	905	253	403	129	1690	734	1248	162.2	3834.2
Northern Hardwood-Mixed Forest	453	123	455	59	1090	92	53	0	1235
Jack Pine Woodland	11	0	0	1	12	28	0	0	40
Saltwater tidal/Aquatic bed	302	198	0	3	503	271	240	17.5	1031.5
Camps/Buildings	1	0	0	3	4	0	0	0	4
Ledge	0	0	0	0	0	0	7	75.5	82.5
<b>Totals</b>	<b>2195</b>	<b>607</b>	<b>933</b>	<b>400</b>	<b>4135</b>	<b>1321</b>	<b>1703</b>	<b>802.2</b>	<b>7961.2</b>

\* Acres estimated from aerial photos; other acres in table are either survey acres or deed acres.

**“Other” Refuge Islands**  
(Listed Under Their Predominant Cover Type)

**Conifer Forest**

Outer Heron (66 acres)  
Inner Sand (18 acres; 15 forested/3 shrub)  
Schoppee (16.5 acres)  
Little Marshall (14 acres)  
Sally (1 acre)  
Abbott (3.5 acres)  
Franklin (12 acres; 7 forested/5 grass)

**Early Successional Forest/Shrub**

Trumpet (3 acres)  
Ship (11 acres; 6 shrub/5 grass)  
Upper Flag (30 acres; 26 shrub/4 wetland)  
Smuttynose (50 acres; 20 shrub/20 grass/10 aquatic bed)  
Crane (12 acres; 8 shrub/4 forested)  
Lower Mark (9.5 acres)

**Ledge**

Malaga (10 acres; 2.5 ledge/7.5 aquatic bed)  
East Barge (0.5 acres)  
West Barge (0.5 acres)  
Little Roberts (1 acre)

**Open Field/Grassland**

Metinic (150 acres; 120 grass/30 forested)  
Libby (43 acres)  
Eastern Brothers (17 acres)  
Nash (5 acres)  
Petit Manan (10 acres)  
John's (43 acres)  
Egg Rock (13 acres; 8 grass/5 ledge)  
Roberts (10 acres)  
Two Bush (8 acres)  
Pond (10 acres; 4 grass/6 ledge)  
Seal (65 acres; 35 grass/30 ledge)  
Matinicus Rock (28 acres; 10 grass/18 ledge)  
Bar (17.2 acres; 12 grass/5.2 forested)  
Inner White (5 acres; 3 grass/2 ledge)  
Outer White (16 acres; 11 grass/5 ledge)  
Ram (10 acres; 8 grass/2 ledge)  
Little Thrumcap (8.5 acres; 5.5 grass/3 ledge)  
  
Machias Seal (10 acres; managed under MOU with MDIFW)

**Wetland**

Halifax (75 acres; 45 wetland/30 shrub)





*Seaside sedge*  
USFWS photo

## Environmental Consequences

- Introduction
- Effects on Water Quality and Soils
- Effects on Air Quality
- Effects on the Local and Regional Economy
- Effects on Public Access, Educational and Recreational Opportunities
- Effects on Cultural Resources
- Effects on Vegetation and Habitats
- Effects on Threatened and Endangered Species
- Effects on Seabirds, Wading Birds, and Waterfowl
- Effects on Other Native Wildlife of Concern
- Effects of Wilderness Recommendations
- Environmental Justice
- Cumulative Impacts
- Relationship Between Short-term Uses and Long-term Productivity
- Unavoidable Adverse Effects
- Potential Irreversible and Irretrievable Commitment of Resources

## Introduction

This chapter describes the environmental consequences we predict from implementing the management alternatives presented in Chapter 2. Where detailed information is available, we present a scientific and analytic comparison between alternatives and their anticipated consequences, which we describe as “impacts” or “effects”. In the absence of detailed information, we make comparisons based on our professional judgment and experience. We specifically predict the effects of implementing the management actions and strategies for each of the four alternatives: Alternative A (Current Management), which serves as the baseline for comparing Alternatives B (Service’s Preferred Alternative), Alternatives C, and D.

We discuss in more detail the impacts to those resources associated with the goals and significant issues identified in Chapter 1 - Purpose and Need for Action. Direct, indirect, short-term, beneficial and adverse effects likely to occur over the 15 year life span of the plan are discussed. Beyond the 15-year planning horizon, we give a more speculative description of the direct, indirect, and cumulative effects. Table 4-3 summarizes the effects predicted for each alternative and allows for a side-by-side comparison. Finally, this chapter identifies any irreversible and irretrievable commitments of resources and the relationship of short-term uses and long-term productivity.

As you read our descriptions of impacts, we ask that you also keep in mind the relative size of the Refuge in geographic proportion to the entire Gulf of Maine ecosystem. The Refuge comprises 7,961 acres, a relatively small land base compared to the 26 million acre ecosystem. We generally describe the direct and indirect environmental effects on a finer, or more local, geographic scale since these are easier to determine with any certainty.

We would also like to point out that Refuge lands are not isolated units, and our prediction on the extent and duration of impacts may be less accurate when considering the influence on the surrounding landscape. In other words, we may have overstated some effects within their larger geographic context.

Although the Refuge lands comprise only .03% of the ecosystem, all alternatives were developed to contribute towards conservation goals in a larger geographic context. The proposed species and habitat actions are consistent with the State, Regional, Ecosystem Team, and watershed conservation plans identified in Chapter 1. At varying levels, they would each make positive contributions to these larger landscape-scale conservation endeavors.



*Herring gull*  
USFWS photo

Where we do not have reliable, quantitative information, we use the terms “positive”, “negative”, and “neutral” as qualitative measures of how an action could impact resources of concern. A positive impact implies an action we predict would enhance or benefit the resources under consideration and help accomplish goals and objectives over the short- (<15 years) or long-term (>15 years). A negative impact implies an action we predict would be detrimental to a resource over the short- or long-term, possibly affecting our ability to achieve goals and objectives. A neutral impact means either (a) there would be no discernible effect, positive or negative, on the resources under consideration; or, (b) predicted positive and negative effects would cancel each other out.

There are certain types of actions identified in Chapter 2 that do not require additional NEPA analysis because they do not individually, or cumulatively, have a significant effect on the human environment. These actions are “categorically excluded” from further analysis or review and, as such, their consequences are not further described in this chapter. These categorically excluded actions include, but are not limited to, the following:

- environmental education and interpretation programs (unless major construction is involved)
- research, resource inventories, and other resource information collection activities
- operations and maintenance of existing infrastructure and facilities (unless major renovation is involved)
- routine, recurring management activities and improvements
- small construction projects (e.g. fences, berms, small water control structures, interpretative kiosks, development of access for routine management purposes)
- vegetation plantings
- reintroduction of native plants and animals
- minor changes in amounts or types of public use
- issuance of new or revised management plans when only minor changes are planned
- law enforcement activities

We have organized this chapter by major resource heading. Under each heading, we offer an introduction and explanation of potential threats. This is followed by our analysis, organized by alternative, and sub-divided by the four refuge programs expected to result in the biggest resource impacts: 1) land acquisition and protection; 2) public use and access management; 3) vegetation and habitat management; and 4) wildlife populations management. Exceptions to this organization are our discussions on impacts to the local economy, cultural resources, and wilderness.

## Effects on Water Quality and Soils

Maine's coastal area is the State's main attraction and has become the single most important resource for tourism and the recreation industry in the state (Colgan and Plumstead 1995). Commercial and private development pressures along Maine's coast continue to increase with additional waterfront real estate being developed for summer homes, piers, and docks. This development, combined with associated human activities, can alter water quality, as well as displace and/or eliminate vegetation, resulting in increased soil disturbance, erosion and storm water runoff and change water circulation patterns. In particular, deteriorating water quality, decreased soil productivity, and erosion in coastal Maine has become a priority issue for State agencies and local communities. Direct impacts can include filling, dredging, dragging, riprapping, damming, covering, impounding, scraping, or other physical activities (Ward 1999). Although building projects may appear small and losses minimal, their cumulative effect can be significant. Direct or nonpoint discharges of pollution can cause increased water temperatures, degrade water quality, create turbid conditions, change currents, or alter water salinity. Any of these can diminish habitat quality or make the area unsuitable for native species.

Failing septic systems have been implicated as one of the major contributors to water quality problems in coastal Maine. When septic systems fail, untreated nitrogen and bacteria may flow directly into groundwater, streams or coastal waters. Even in fully functioning systems, it is estimated that only half the nitrogen dissipates during treatment (Horsley and Witten Inc. 1995). Increasing restrictions on intertidal harvesting due to bacterial contamination is an indication of how degraded water quality can directly effect an important tradition and economic resource for coastal Maine. These same areas also are extremely important to wildlife species, who rely on many of the same resources for food and habitat.

Public use of Maine's islands is increasing and damage to soils and water quality is evident in heavily used areas. Soils can be impacted by reduction



*Saltmarsh on Gouldsboro Bay Division*  
USFWS photo

in soil macro porosity, decreased air and water permeability, accelerated erosion, loss of ground cover, and increased soil compaction. Water quality can also be affected by public use of islands through improper disposal of human waste, garbage, and litter which can degrade water quality, cause death to marine life, and impair scenic values. Where camping is allowed, soil compaction and vegetation damage can occur at tent site locations.

A cooperative, interagency, watershed-level approach to protecting these resources offers the greatest opportunity to improve conditions over the long term. On a local level, Refuge management can help improve conditions in

four ways: 1) acquire wetlands, associated uplands, and coastal islands threatened with development; 2) facilitate protection by others of important coastal habitats; 3) exchange technical information with landowners on best management practices; and, 4) restore degraded areas. There are, however, some management practices we employ, (such as herbicides and prescribed fire), that have the potential to negatively impact water quality and soils.

Under each alternative, we present the beneficial and potential adverse consequences of our proposed management.

### **Alternative A (Current Management)**

#### **Impacts from Proposed Land Acquisition and Protection**

Under Alternative A, we do not anticipate any negative impacts to water quality or soils from our land acquisition and protection program. On the contrary, Alternative A would result in the Service acquiring the 467.1 acres currently within Petit Manan Refuge's approved acquisition boundary, and 30 additional coastal islands (881 acres), providing all with permanent protection from development. Together, these mainland and islands would result in 1,274 acres protected from further human-induced degradation. Service acquisition of these lands would eliminate the direct and indirect threats, and short- and long-term impacts associated with development and public over-use and would maintain or enhance the water quality and soils over the long- term.

Under Alternative A, we would continue to work with the Gulf of Maine Program and MDIFW to identify significant habitat areas in need of protection. We would continue to assist other conservation partners in facilitating protection of these areas, providing the benefit noted above.

#### **Impacts from Proposed Public Use and Access Management**

Under Alternative A, we would continue our current management to minimize resource impacts from public use by allowing only four refuge islands open to public use year round (Bois Bubert, Halifax, Cross, and Scotch Islands). These four islands would be able to support continued year round use without significant impact to water quality and soils because of: their larger size and the fact that public use is dispersed (Cross and Bois Bubert Islands); they are forested and their soils are less susceptible to erosion (Bois Bubert, Cross, and Scotch islands); or, because any sensitive areas are precluded from access (Halifax Island). The remaining islands within the Refuge would continue to be closed seasonally during the seabird nesting period (April 1 - August 31). This seasonal restriction coincides with the highest tourism visitation period, thus reducing the potential for human-induced degradation.

On Bois Bubert and Halifax islands, where overnight camping occurs, capacity limits would remain at 10 campers/island/day. Outreach to visitors by MITA and our staff on "Leave No Trace" outdoor ethics would

continue, as limited sources allow, to promote appropriate uses. All campers would continue to receive “Leave No Trace” guides either as a member of MITA or from our staff when reserving a campsite. We believe these actions would continue to be effective in reducing visitor impacts since little disturbance, and none that appears irreversible, has been observed at camping areas to date.

We do not predict any impacts from continuing our current hunting program. Hunting density is relatively low and access is by foot or boat. We have not observed any impacts on water quality or soils from hunting since the program was established in 2001.

### **Impacts from Proposed Vegetation and Habitat Management**

We would continue limited use (120m<sup>2</sup>) of the herbicide Roundup on the 10 acre Petit Manan Island in an effort to control raspberry. The primary active ingredient of Roundup is glyphosate, which has undergone extensive environmental review and has not been found to be toxic to wildlife, or bioaccumulate in the foodchain (Monsanto 1993). Roundup is a broad-spectrum herbicide with no soil residual activity. The compound is degraded by microbes within the soil and the average half life of glyphosate is less than 45 days (Monsanto 1993). On Petit Manan Island, the compound would be applied directly to the raspberry plants using a hand sprayer. The Regional Contaminants Specialist, who is responsible for upholding Federal standards for water quality and soil protection, has reviewed our proposals and approves chemical herbicide use.

Under Alternative A we would continue maintaining approximately 30 acres/year of open field habitat on Petit Manan Point through mowing, brush hogging, hydroaxing, prescribed burning, and limited chemical treatments. The soil types in these uplands sites are not susceptible to compaction, except under saturated conditions. Operations typically occur in early spring or late fall when these conditions are unlikely. No compaction from past mechanical treatments has been noted to date.

Sheep grazing would also continue to be used as a vegetation management tool on Metinic Island to maintain short grasses for nesting terns. This island has been grazed for generations. Approximately 120 sheep graze on the island year round. We would continue to utilize fencing to restrict grazing near the tern colony during the nesting season, but allow this area to be grazed August through April. Without seasonal fencing, sheep grazing can result in disturbance to seabirds, decreased nesting cover, and trampling of nests. Some localized shoreline soil erosion has occurred as a result of reduced ground cover caused by grazing, combined with natural wave and wind action. While some erosion probably has occurred historically under natural conditions, we are not sure of the range of natural variation. It is likely that continued grazing would further result in soil compaction and potential erosion on island banks.



In 2002, we completed an EA for our Fire Program which includes stipulations under which we would operate. We describe these stipulations in greater detail under the “Air Quality” discussion that follows. We would continue to use prescribed fire to manage open fields and grasslands on the Petit Manan Point and continue its use on a limited basis on coastal islands, such as Petit Manan Island. We use fire to maintain those cover types important to migrating and nesting birds, other resident wildlife, and to reduce invasive plants. Up to 55 acres would be burned annually across the Refuge. Our mowing equipment is not always available to do this work, nor accessible to coastal islands, so use of fire is our most viable tool under most conditions. GOMSWG seabird experts are particularly interested in evaluating best management techniques, including fire, for treating island nesting habitat for seabirds over the long-term. Coordinated monitoring of fire effects on the habitat used by nesting seabirds would continue. We would also consider using prescribed fire to manage habitat for seabirds on several additional islands based on our success to date.

While we would strive to maintain all fires within prescription to minimize resource degradation, impacts could occur in small areas. Prescribed fire elevates surface temperatures; mineralizes detritus, litter and standing dead material; volatilizes some nutrients and organic matter; alters soil water-holding capacity; and alters populations of soil micro- and macrofauna (Barbour et al. 1999).

The effects to organic matter depend on the intensity and duration of fire. Intense, long duration fires consume more organic matter than brief, low intensity fires. Nitrogen compounds volatilize and are lost at temperatures of 100-200 °C; in contrast, calcium, sodium, and magnesium are usually deposited on the soil surface and recycled. At temperatures of 200-300 °C, large amounts of organic substances are lost, which can reduce the cation exchange and moisture holding capacity of soils.

Fire usually elevates soil pH, as a result of cation release; the effect is particularly evident in acidic soils. In coastal plain regions, there is often an increase in soil potassium and phosphorous levels following fires. Soil microbial nitrogen fixation may be enhanced following fire, due to mineralization of nutrients and elevated pH levels in soils (Barbour et al. 1999).

Removal of litter and duff may initially facilitate water infiltration; nevertheless, evaporation is also mediated by loss of litter and blackened soils. This results in an overall reduction in the water-holding capacity of soils. There is little change in water repellency with cool fires (below 176 °C); moderately hot fires increase water repellence (176-204 °C). Extremely hot fires (above 204 °C) volatilize hydrophobic substances



*Petit Manan Point Division, field after prescribe burn, 2002*  
USFWS photo

and destroy soil water repellence (Debano et al. 1998). After moderately intense fires, runoff may be increased due to lowered infiltration, and erosion may result.

Fires usually reduce fungi, but increase soil bacteria. It may remove soil and litter pathogens. Nitrifying bacteria are often destroyed by fire. Legumes and other nitrogen-fixing plants often must recover nitrogen losses due to volatilization, as the recovery of nitrifying bacteria is slow (Barbour et al. 1999).

Our prescribed fires are carried out on a small scale in confined areas, lasting for short durations, and are of low to moderate intensity. They also consume only part of the duff/litter layer and rarely transfer significant amounts of heat into the soils. Prescribed fires would be used to remove litter and light fuels, and avoid the significant adverse effects of severe, hot wildfires on soil resources.

Considering all potential treatment methods, we expect negligible direct or indirect impacts on upland soils, as effects are limited due to short duration, and low to moderate intensity, and confined to the project area. We expect none of the proposed actions to adversely impact soils or water quality over the long term.

#### **Impacts from Proposed Wildlife Populations Management**

Under Alternative A, no impacts are predicted. No ground-disturbing activities are proposed in support of this program, and there would be no use of avicides.

#### **Alternative B (Service's Preferred Alternative)**

#### **Impacts from Proposed Land Acquisition and Protection**

Similar to Alternative A, the greatest potential in Alternative B to improve water quality and soils conditions is primarily through land acquisition, protection, and sharing of best management practices to other landowners. Under Alternative B, the Service would acquire the same 467.1 acres within the Petit Manan Refuge approved boundary as Alternative A, but would increase island acquisition to 87 nationally significant nesting islands and acquire 153.3 acres of important wetlands on the mainland. In total, this would add 2,859 acres to the Refuge and afford these acres permanent protection and eliminate the development threats identified in the introduction. This represents an increase of 1,585 permanently protected acres over Alternative A. We would also continue working with our conservation partners to determine the best methods for protecting the remaining 64 unprotected nationally significant islands from development. Alternative B would primarily represent an increase in our ability to maintain or improve water quality and soils conditions on coastal islands.

#### **Impacts from Proposed Public Use and Access Management**

Similar to Alternative A, all 87 islands acquired would be seasonally closed during the peak of the tourist season to protect resources, namely

nesting seabirds. This limited access protects the soils from impact as well. Camping would continue to occur on Halifax and Bois Bubert islands, but limits of acceptable change would be established to ensure that water quality, soils, and other natural resources found on the islands are not being adversely effected by camping activities. In cooperation with MITA, we would monitor the camp sites on a regular basis. Although some soil compaction and loss of vegetation is expected at these sites, efforts would be initiated to confine these effects to established sites, within acceptable limits. We would not establish any new tenting sites, and capacity limits would be enforced. We would lower intensity or discontinue camping on the islands if the limits of acceptable change are exceeded. Thus, no long-term, adverse or irreversible impacts would be expected to island soils. Effects to water quality would be the same as described in Alternative A.

Some soil compaction would likely result from the construction of new trails and parking areas on the Gouldsboro Bay, Sawyers Marsh and Corea Heath divisions. We would maintain up to approximately 106,000 square feet (2.5 miles long by eight feet wide) of vegetation for each trail and 800 square feet (room for 10 cars) at each parking area. We would utilize as much of existing, old dirt logging roads as possible. Within two years of trail construction, two trail-side interpretive overlooks impacting 200 square feet each may be added to each trail. Boardwalks would be constructed over saturated sections to protect sensitive vegetation. The trails and parking areas would increase access to the Refuge's mainland divisions for visitors such as photographers, bird watchers, and hunters. Development of the trails would adversely effect the vegetation and compact the soils within the footprint of the trails; however, it would minimize continued soil compaction resulting from the creation of "unauthorized" trails.

On Petit Manan Point, we would build at least one overlook, impacting 200 square feet, on the Birch Point Trail, at Carrying Place Cove. Currently, Refuge visitors routinely venture off the established trail to view this area. While development of the overlook and access trail would adversely effect the vegetation and soils within the footprint of the project, steps would be taken to utilize an existing "unauthorized" trail for the designated access to minimize additional disturbance. Establishment of a viewing platform and access trail should limit human activity to one defined area and minimize adverse effects to vegetation and soils along the various access trails currently used by the public.

As described for Alternative A, we do not predict any impacts from our current hunting program. Further, we do not anticipate impacts from expanding the hunting program to include a limited deer hunt on the Petit Manan Point Division. The new hunt area will occur in upland habitat types where soils are not susceptible to compaction. Access to the hunt area is on foot, and we predict a relatively low hunting density. In addition, the hunt season occurs when soils are likely to be frozen.

### **Impacts from Proposed Vegetation and Habitat Management**

With the exception of an additional 55 acres/year managed for open field, grasslands, and early successional habitat, the effects noted for soils and water quality on the mainland would be similar to those described in Alternative A. Also, treatment methods would be the same as proposed under Alternative A. We would expand the seabird restoration program to include an additional 6 island projects (12 total). We would evaluate the use of sheep grazing, fire and herbicides on additional coastal seabird nesting islands. We predict the same local, low intensity, short duration impacts as described for Alternative A on the new seabird sites. In addition, we would establish a monitoring and evaluation protocol to ascertain the long-term implications of grazing on island soils and avoid irreversible impacts. This alternative would also establish thresholds of acceptable change on each island to ensure long-term protection and productivity of soil and water resources.

### **Impacts from Proposed Wildlife Populations Management**

There would be no impact to water quality or soils from managing wildlife populations under Alternative B. No ground disturbing activities are proposed in support of this program. The use of the avicide DRC-1339 for lethal gull control may be employed to establish the six proposed new seabird restoration islands, but is only likely if other measures prove ineffective. The toxicant is very host specific and decomposes rapidly within 48 hours resulting in no adverse long-term environmental effects to water quality or soils.

## **Alternative C**

### **Impacts from Proposed Land Acquisition and Protection**

Of all the proposed alternatives, Alternative C would result in the most lands acquired by the Service, leading to the most acres in permanent protection to the benefit of water quality and soils. Under Alternative C, the Service would acquire the same 467.1 acres on Petit Manan Refuge as the other alternatives, but also would acquire all 151 nationally significant nesting islands; or portions of the larger islands, and 153.3 acres of mainland described in Alternative B. On larger islands, most of which are nationally significant for bald eagle nesting, we estimate we would pursue approximately 125 acres of land surrounding the nest sites. In total, approximately 6,003 additional acres would be permanently protected. This alternative would provide the greatest protection from the direct and indirect threats to water quality and soils attributed to development and would maintain or improve the integrity of these coastal island habitats.

### Impacts from Proposed Public Use and Access Management

Under Alternative C, all 151 new islands, or portions of larger islands, acquired would be closed seasonally to public use and access to protect nesting birds and sensitive habitat areas. The effects would be similar to those outlined in Alternatives A and B. During the open seasons, we would initiate a permit system for day-use activities for groups larger than six people in an effort to better manage the potentially adverse effects (trampling, soil compaction and erosion) of public use on the coastal island resources.

We would develop the same public use infrastructure on the mainland divisions as Alternative B, resulting in the same levels of impact. Development of the trails would adversely effect the vegetation and compact the soils within the footprint of the trails; however, it would minimize continued adverse effects resulting from the creation of “unauthorized” trails. Boardwalks would be constructed over saturated areas to protect sensitive vegetation.

We would also construct two photo blinds on the mainland divisions to enhance opportunities for wildlife photography. At this point in time, locations for the blinds have not been determined, but we anticipate effects to the soils would be limited to the footprint of the structures, approximately 200 square feet, and short access trails.

We would erect gates on either end of the Old County Road in Gouldsboro in cooperation with town officials in an effort to eliminate illegal off-road

vehicle use of the Gouldsboro Bay Division. This action would minimize any further vegetation destruction, soil compaction, and erosion caused by this activity. We have noted these impacts when visiting the division, but have not quantified them.

The impacts we described under Alternative B for our hunting program would be the same under this alternative.

Generally, the proposed actions seek to minimize any direct and long-term impacts to soils and water quality. Where impacts are unavoidable, our actions are designed to contain the impacts to the smallest specific areas.



*Ruts resulting from illegal off-road vehicle use, Gouldsboro Bay Division, April 2000*  
USFWS photo

### Impacts from Proposed Vegetation and Habitat Management

The type of impacts are the same as described for Alternative B, only expanded in scope to include 151 new nesting islands, or portions of larger islands, instead of Alternative B’s 87 islands. In addition, we would pursue 12 new seabird restoration sites (18 total) commensurate with the in-

creased island ownership proposed. We would follow the same vegetation management and techniques proposed in Alternatives A and B. As we describe in Alternative B, we would evaluate the use of sheep grazing, fire and herbicides on additional coastal seabird nesting islands. We predict the same local, low intensity, short duration impacts as described for Alternative A on the new seabird sites. Similar to Alternative B, we would establish a monitoring and evaluation protocol to ascertain the long-term implications of grazing on island soils and avoid irreversible impacts. This alternative would also establish thresholds of acceptable change on each island to ensure long-term protection and productivity of soil and water resources.

#### **Impacts from Proposed Wildlife Populations Management**

Same as Alternative B, except 12 new seabird restoration sites are proposed (18 total), and the use of avicide may be expanded as necessary, when other measures prove ineffective. However, no impacts are predicted to soils or water quality based on our knowledge of the chemical properties of DCR-1339.

### **Alternative D**

#### **Impacts from Proposed Land Acquisition and Protection**

Under Alternative D, we would propose service acquisition of only the 467.1 acres currently within the approved Petit Manan Refuge acquisition boundary. Service acquisition of these lands would eliminate the direct and indirect threats to soils and water quality associated with development. Our ability to have a significant impact on water quality and soils protection on coastal islands is much less under this alternative compared to the others due to the more conservative land protection proposed.

#### **Impacts from Proposed Public Use and Access Management**

All Refuge islands would be closed to public use and access year round, thereby eliminating all human-induced impacts to soils and water. Natural erosion from wind and wave action would continue at natural levels. While Alternative D offers greater protection for water quality and soils on existing Refuge lands, its limited proposal for new acquisitions would afford much less protection of coastal habitats compared to the other alternatives.

#### **Impacts from Proposed Vegetation and Habitat Management**

Under Alternative D, we predict negligible impacts to water quality and soils as no major ground disturbing activities would occur. We would, however, burn up to three acres/year to remove debris piles or remove brush along boundaries. These smaller, debris-pile fires would occur only under the stipulations in the Fire EA. We would discontinue use of mowing and other mechanical treatments and herbicides, thereby minimizing

threats of soil compaction. Unfortunately, precluding the use of Federal-approved herbicides, prescribed fires, and mechanical treatments would severely hamper our ability to control invasive plants. In particular, herbicides and prescribed fire have been used on other refuges to reduce invasive plants and to establish and maintain successful habitat areas in a cost-effective or timely way. Over the long-term, some areas may end up dominated by invasive plants.

This alternative would also eliminate sheep grazing from all Refuge lands, avoiding any further contributions to soil compaction and erosion of shoreline banks from this source. In the absence of burning, grazing, mowing, and herbicide use, island habitats would succeed to denser and higher vegetation favoring some seabird species, but reducing suitable nesting habitat for most seabird species of concern over the long-term. Soils and water quality would be protected, but on fewer acres under this alternative.

### **Impacts from Proposed Wildlife Populations Management**

No wildlife populations management would occur, thus, no impacts are predicted to water quality and soils.

### **Water Quality and Soils - Summary**

None of the actions proposed in any alternative violate the Federal or State Clean Water acts. Over the long-term, considering direct and indirect impacts, Alternative C would provide the most benefits to improved water quality and soils protection. This is due to the greater land protection it affords, while its habitat and public use management designs would maintain or restore water quality and soils. Alternative B would be ranked next highest, followed by Alternative A, then Alternative D.

### **Effects on Air Quality**

Chapter 3 - Affected Environment presents the status of air quality along the Maine coast. Poor air quality has adverse impacts on the Refuge and other natural areas, including the Class I airshed over Moosehorn Refuge's Wilderness Area. These impacts are also noted in Chapter 3.

Our activities are most likely to directly impact air quality through use of prescribed fire for habitat management, and by attracting visitors in vehicles. Prescribed fires and vehicle emissions directly impact air quality in three principal ways: 1) decreased visibility; 2) increased particulates; and, 3) increased pollutants. Air pollutants contributed by vehicle emissions are a major concern in Maine. The State is dealing with this problem through programs to reduce automobile emissions. While our visitors' vehicles directly contribute air pollutants, they are not a principle cause of poor conditions. Most Refuge visitors are either local residents or summer vacationers who are in the area already. The Refuge is a secondary destination. Most visitors travel less than 100 miles to the Refuge from their

permanent or vacation residences. Their contribution to poor air quality is negligible compared to that of urban and industrial centers within a 200-mile radius.

The Refuge positively impacts air quality primarily through protection of natural lands. Natural vegetation and wetlands help offset pollution levels by acting as filters to the environment. Unfortunately, this benefit has never been quantified for existing Refuge lands.

**Alternative A (Current Management)**

**Impacts from Proposed Land Acquisition and Protection**

Alternative A would result in the Service acquiring and permanently protecting 1,274 acres of natural lands. While difficult to quantify, Service acquisition of these lands would eliminate the direct and indirect threats to air quality associated with increased development, and permanently maintain the pollution filtering effects of natural vegetation and wetlands.

**Impacts from Proposed Public Use and Access Management**

We predict annual visitation to the Refuge after 15 years would increase by 10 percent, or an additional 5,000 visitors, based on some planned improvements to our visitor service's program and the State's predicted increase in tourism to the area. We expect much of the additional visitation would occur during the summer and fall months, when families seek an alternative to the congestion at Acadia National Park.

**Impacts from Proposed Vegetation and Habitat Management**

Under Alternative A, we would contribute to poor air quality primarily through our prescribed fire program.

In April 2002, we completed an environmental assessment (EA) and Fire Management Plan for our wildfire suppression and prescribed fire program. All alternatives in this draft CCP/EA incorporate the decision of that Fire EA. Alternative A proposes to utilize prescribed fire to maintain grasslands, enhance habitats for threatened and endangered species, reduce hazardous fuels and debris, or control invasive plant species. Under the current Fire Management Plan, with existing Refuge lands, we proposed between 12 and 30 acres would be burned annually. Since 1988, we have conducted 26 prescribed burns on 120.8 acres with the majority of the burns occurring on mainland blueberry and grassland units. It is estimated that the size of the burn program would increase slightly (20 to 55 acres annually) as additional lands are acquired and a Habitat Management Plan is developed. Alternative A would implement the following planned projects using prescribed fire over the next 15 years. Consider these figures annual maximums.



- 30 acres/year for enhancing or maintenance of wildlife and plant species populations;
- 15 acres/year to preserve threatened and endangered species and promote biological diversity;
- 7 acres/year to control invasive plants and reduce hazardous fuels, and;
- 3 acres/year for boundary maintenance or debris removal around boundaries, structures and facilities.

Visibility and clean air are important natural resource values on the Refuge and the protection of these resources would be given full consideration in fire management planning and operations. We would comply with all applicable Federal, state, and local air pollution requirements, as specified within Section 118 of the Clean Air Act, as amended (42 USC 7418). In addition, further guidance can be found in the Fire Management Handbook (USFWS 2001). The plan stipulates required conditions under which prescribed fires would occur, to control its size, to minimize or eliminate impacts on visibility, and to reduce the potential for adding particulates and pollutants into the air created by the burning. All the required conditions are geared to minimize smoke emissions and follow Best Available Control Technology. The following measures would minimize the impacts to air quality from prescribed fires:

- Burning would only be permitted provided that the existing wind speed, wind direction, and atmospheric conditions do not create nuisance smoke conditions.
- Smoke sensitive areas would be identified and addressed within the Annual Prescribed Fire Plan. The direction of wind vector selected would be such that smoke and other particulate emissions are transported away from sensitive areas.
- Burning would be conducted only when the visibility exceeds 2 miles and the fire weather forecast indicates the presence of an unstable airmass, mixing heights are greater than 1,500 feet, and ventilation rates (mixing height x transport wind speed) is 7,500 or greater. A minimum transport wind speed of 5 mph is recommended. A daily spot forecast is required and is obtained from the National Weather Service.
- No burning would occur if any government agency has issued an air pollution health advisory, alert, warning, or emergency for the area surrounding the Refuge.
- Backing and flanking fires would be used when possible to minimize particulate emissions.
- Media sources would be kept informed of fire and smoke dispersal conditions throughout any fire event.

Contrary to the short-term adverse effects on air quality resulting from our prescribed fire program, the pollution-filtering benefits derived from maintaining these areas in natural vegetation conditions would last in perpetuity.

Since we predict our actions would only contribute negligibly to air pollution levels, including impacts to the Class I airshed over Moosehorn Refuge's Wilderness Area, and assuming the prescribed fire stipulations are implemented as stated above, the negative direct and indirect impacts from implementing Alternative A should be of relatively short duration and light intensity.

#### **Impacts from Proposed Wildlife Populations Management**

No impacts to air quality are predicted that are not already described in the vegetation management discussion above.

#### **Alternative B (Service's Preferred Alternative)**

#### **Impacts from Proposed Land Acquisition and Protection**

Compared to Alternative A, greater benefits to air quality would be derived from implementing Alternative B since 2,859 acres of native vegetation and wetlands would be permanently protected from development and would continue to filter pollutants in perpetuity.

#### **Impacts from Proposed Public Use and Access**

We predict annual visitation would increase approximately 25 percent over current levels after 15 years (11,750 additional visitors), due to the significant expansion in priority public use services and programs across the Refuge and projected increases in tourism to Maine. More than half of this increase would be attributed to increased commercial boat tours. The contribution to automobile emissions from Refuge related activities would increase proportionately over that projected for Alternative A. However, some of the increased use would be spread throughout the year as we develop environmental education and interpretation programs for children during the school year. Many of these latter programs would consist of larger groups traveling together in public transportation. The contribution to poor air quality through vehicle emissions would increase slightly over current levels, but would remain relatively insignificant in light of the industrial centers nearby. As described with Alternative A, the additional emissions directly resulting from our activities would cause impacts that are negligible and of short duration. The Refuge would continue to be a secondary destination for out-of-town tourists or visited by local residents.

#### **Impacts from Proposed Vegetation and Habitat Management**

The impacts and concerns to air quality from managing vegetation stated for Alternative A are the same for Alternative B. However, this alternative

has a slightly increased potential to adversely affect air quality because we would use prescribed fire on more acres. The following planned projects, with their potential use of prescribed fire, would occur under Alternative B. Consider these figures annual maximums.

- 70 acres/year total for enhancement or maintenance of wildlife and plant species populations (includes the existing seabird island restoration projects and the future island restoration projects along the coast of Maine(12 total));
- 25 total acres/year to preserve threatened and endangered species and promote biological diversity;
- 10 acres/year to control invasive plant and reduce hazardous fuels; and
- 5 acres/year for boundary maintenance or debris removal around structures and facilities.

Similar to Alternative A, the natural vegetation and wetlands maintained on the Refuge would help offset pollution levels by acting as filters to the environment. Unfortunately, this benefit has never been quantified for refuge lands. Contrary to the short-term adverse effects on air quality resulting from our prescribed fire, the pollution-filtering benefits derived from maintaining these areas under natural vegetation conditions would last in perpetuity.

#### **Impacts from Proposed Wildlife Populations Management**

No impacts predicted to air quality from the implementation of either lethal or nonlethal predator management, or other population management measures except as noted in the vegetation management discussion above.

### **Alternative C**

#### **Impacts from Proposed Land Acquisition and Protection**

Compared to Alternative A, substantially greater benefits to air quality would be derived from permanently protecting approximately 6,003 acres of native vegetation and wetlands. Protected from development, these lands would continue to filter pollutants in the atmosphere to the long-term benefit of air quality in the region.

#### **Impacts from Proposed Public Use and Access**

We predict annual visitation to the Refuge would increase approximately 50% over current levels after 15 years (23,500 additional visitors) due to a dramatic expansion of priority public use opportunities. The distribution of this increase and its impacts would be similar to Alternative B, with the largest increase in visitors on commercial tour boats. Despite this increase, we believe impacts to air quality are negligible over the long-term.

### **Impacts from Proposed Vegetation and Habitat Management**

The types of impacts and concerns stated for Alternative A and B are similar for Alternative C. However, this alternative has the highest potential to adversely affect these resources since we would be expanding the use of prescribed fire, mechanical, and chemical means on more acres proposed for habitat restoration and invasive species control. The following planned projects would occur under Alternative C. Consider these figures annual maximums.

- 140 acres/year total for enhancement or maintenance of wildlife and plant species populations (includes the existing seabird island restoration projects and the future island restoration projects along the coast of Maine(18 islands total));
- 50 total acres/year to preserve threatened and endangered species and promote biological diversity;
- 50 acres/year to control invasive plant and reduce hazardous fuels; and
- 10 acres/year for boundary maintenance or debris removal around structures and facilities.

### **Impacts from Proposed Wildlife Populations Management**

Same as Alternative B.

## **Alternative D**

### **Impacts from Proposed Land Acquisition and Protection**

Under Alternative D, the Service would acquire only the 467 acres within the Petit Manan Refuge's approved boundary. We would continue working with our conservation partners to determine the most appropriate means of providing permanent protection for the remaining 151 unprotected, nationally significant nesting islands. However, there is no assurance that these islands would be protected. As such, the unprotected islands would be subject to development and there would be a loss of the pollution filtering effect afforded by natural vegetation and wetlands.

### **Impacts from Proposed Public Use and Access**

We would expect visitation to be the same as Alternative A on our mainland divisions, but annual island visitation would decline by approximately 34% (16,000 fewer visitors). This decline would be attributed to a year-round closure on all Refuge islands and decreased habitat quality for nesting seabirds resulting in fewer commercial tours. As such, the Refuge's contribution to poor air quality from vehicle emissions would be similar to Alternative A, which is negligible, given the impacts of nearby industrial centers and tourist destinations.

### **Impacts from Proposed Vegetation and Habitat Management**

Alternative D would not implement prescribed fire for any restoration or habitat project. However, we would burn up to 3 acres/year to remove debris piles or remove brush along boundaries. These smaller, debris-pile fires would occur only under the conditions stipulated in the Fire EA. These stipulations limit the scope, duration, and intensity of the fires, and ensure that the impacts to air quality from the burn program would be negligible.

### **Impacts from Proposed Wildlife Populations Management**

No impacts are predicted as no population management is proposed.

## **Air Quality - Summary**

No actions proposed in any of the alternatives violates State or Federal EPA standards for the Clean Air Act. Alternative D would not contribute any additional vehicular emissions, impair visibility, or use prescribed fire. As such, Alternative D results in the least direct and indirect negative impact to air quality compared to the other alternatives. Alternative A would follow with the next lowest visitation numbers expected and next least acres proposed for prescribed burning. This is followed by Alternative B, then C. Of note, however, is that while Alternative C proposes the most acres of prescribed fire and would result in the highest number of visitors traveling by automobile, these impacts are offset, though difficult to quantify, by the alternative's substantially greater land protection benefits compared to the other alternatives. In summary, Alternative D would have the least adverse impact on air quality, followed by Alternative A, then B, then C.

## **Effects on the Local and Regional Economy**

It is said that Maine's seacoast is the backbone of the State's economy. This is not surprising as coastal Maine's southern and mid-coast regions are growing at a faster rate (1.7 percent during 1990-1996) than the state as a whole (0.9 percent during 1990-1996) with 44 percent of the State's 1.2 million people living here (State Planning Office, 2000).

The coastal counties of Maine comprised 56% of employment in 2001, up from 53% in 1990. Over 1990-2001, the coastal counties saw employment grow by more than 18%, compared with only 6.4% in the inland counties. The coastal counties from York to Washington accounted for nearly 80% of all the job growth in Maine over 1990-2001. Waldo County (46%) and Knox County (33%) were the fastest growing in employment. Sagadahoc County saw a small decline in employment (-5.2%) (Colgan 2001).

Tourism, with the highest percentage along the coast, has also increased substantially in recent years and is now significant to the Maine economy. In 2000, nonresident visitors to Maine directly and indirectly generated \$8.8 billion in sales of goods and services, over 116,000 jobs; and \$2.5 billion in total payroll (ME Office of Tourism, [www.visitmaine.com](http://www.visitmaine.com)).

Most certainly, it is the natural beauty, rich natural resources, and diverse recreational opportunities that draw people to the coast. Likewise, the need to conserve this rich, natural biodiversity has attracted the Service's efforts in wildlife conservation in this area.

Coastal visitors engaged in recreational pursuits generate huge revenues to the economies of local towns as they purchase equipment, lodging, food, and guide services in support of their activities. Commercial wildlife-viewing and hunting are two nature-based recreational activities that are directly affected by Refuge management.

In this section, our discussion focuses on the economic impacts to: 1) local property taxes and associated revenues from additional Service land acquisition; 2) tax revenues generated from commercial wildlife viewing; 3) tax revenues generated from hunting; 4) sheep farming; and, 5) commercial harvest of marine resources. These are the economic entities we believe would be most directly affected by Refuge management.

### **Property Taxes and Associated Revenues**

The Service, in partnership with many other conservation organizations, is an important player in land protection in coastal Maine. Lands acquired by the Service become part of the National Wildlife Refuge System. Besides this Refuge, there are two other refuges along the coast of Maine: Rachel Carson Refuge, based in Wells, ME, and Moosehorn Refuge, based in Baring, ME. In this document, we will only be evaluating the impacts from the proposed land acquisition for Maine Coastal Islands Refuge. Lands would be acquired by the Service through either fee acquisition or conservation easements, and only from willing sellers.

Service acquisition would withdraw potentially developable, revenue-generating acreage in respective towns. Since the Federal government does not pay property taxes, there is a direct net loss to towns in property tax revenues. We predict the greatest loss in towns where the property acquired by the Service is zoned residential. On the other hand, it is important to recognize that the potential to develop a home or business on offshore islands is tempered by existing state and local environmental laws that regulate coastline development (Kelley, et al., 1989, Maine Dept. of Inland Fisheries and Wildlife, 2000). Unfortunately, it is difficult for us to predict at this time what limits might be placed on proposed island development. However, we can predict with some accuracy the loss of property tax revenue to respective towns.

Still, a reduction in developable acreage does not necessarily equate to a net economic loss to local towns. Several studies question the common assumption that development always provides greater economic benefits than conservation (Cheney, 1993, Freedgood, 1993, Infante, 1994, Maine Coast Heritage Trust, 1991). They suggest that lands reserved in open space for conservation may actually have higher net revenues because of their low- to no-demand on infrastructure services. Conservation owner-

ship has been found to result in reduced needs for services such as police, fire, roads, utilities, and school facilities, all of which could offset property tax losses.

While the Service does not pay property taxes, under Federal law, a town which hosts a national wildlife refuge is entitled to annual Refuge Revenue Sharing (RRS) payments. These payments are the greater of 75 cents per acre or \$.075 of market value. The exact amount of the annual payment depends on Congressional appropriations, which in recent years, has tended to be less than the full amount. In 2001, the actual payment was 51.89% of authorized levels. That year, the Service paid \$51,134 to Maine communities for lands under administration of the Refuge. Interestingly, in rural areas of low growth, the RRS payments can be equal to, or even exceed, the amount that would have been collected from taxes if in private ownership. In many areas, such as the Maine coast where development pressures are high, RRS payments on developable land are typically less than revenues that would have accrued from taxation.

In order to analyze property tax losses to affected towns with our refuge expansion proposals, and the offset gained from RRS payments, we enlisted Dr. Charles Colgan, Professor of Public Policy, University of Southern Maine, to help us. His full report is included as Appendix G. What follows is a summary of his assessment of the net reduction in revenues to towns associated with the proposed refuge expansion of additional islands. This analysis was done by alternative. There was no analysis done for Alternative D, since we are not proposing an expansion from what is currently approved.

The analysis of property tax impacts does not include those islands over 200 acres where the Service proposes to protect bald eagle nesting sites. In these cases, the Service would likely purchase a conservation easement on up to 125 acres surrounding the nest site. Because precise sites and properties for potential acquisition have not been identified, it was not possible to calculate the property tax impacts in the same manner as was done with the islands purchased in fee in their entirety. Purchase of these bald eagle sites would increase the property tax impacts in the towns of Vinalhaven, Isleboro, Isle Au Haut, Bar Harbor, Mt Desert, and Jonesboro. Furthermore, we acknowledge that given the escalating property values in coastal Maine, and the fact that the analysis is based on 2002 and 2003 values, our figures may have underestimated actual impacts. However, we continue to believe the analysis is a reasonable approximation.

#### **Alternative A (Current Management)**

Service acquisition of 30 islands would result in property tax impacts that are predicted to be quite small. We were able to get assessed values on all but one of them. If all islands proposed in Alternative A for which assessed value is available are acquired, property taxes rise in the affected towns by

a total of \$31,000; an overall average of 0.04% per town assuming RRS payments occur at FY02 levels. This figure is the net of RRS payments at 52% of authorized levels. The town with the largest impact would be Matinicus Isle Plantation in Knox County which would see a 3.5% increase in its mil rate; however, the actual loss is only slightly more than \$3,450.

### **Alternative B (Service's Preferred Alternative)**

Service acquisition of 87 islands would result in property tax impacts that are predicted to be small. We were able to obtain assessed values on 84 of these islands. If all islands proposed in Alternative B for which assessed value is available are acquired, property taxes would potentially rise in the affected towns by approximately \$130,000; an overall average of 0.05% per town assuming RRS payments occur at FY02 levels. This figure is the net of RRS payments at 52% of authorized levels. The Town of Kittery in York County would see the largest absolute reduction in taxes at \$30,738, while the Town of Frenchboro in Hancock County would be most affected in proportional terms. Data on two of the three islands proposed for acquisition in Frenchboro was available, and should these islands be acquired, there would be an estimated increase of 9% in Frenchboro's mil rate, although the total taxes lost amount to approximately \$6,300 after RRS payments. The increase in mil rate for Frenchboro would be even higher if all three islands proposed are acquired by the Service. Appendix G identifies the 3 islands that were not included in this analysis, and the towns that would be additionally impacted.

### **Alternative C**

Under Alternative C, the Service would acquire up to 130 islands in fee or conservation easement and, on up to 21 larger islands (>200 acres) significant for bald eagle nesting, the Service would only acquire approximately 125 acres surrounding the nest sites. We were able to obtain assessed values on 132 of the islands proposed for acquisition in fee or easement. If all islands proposed in Alternative C for which assessed value is available are acquired, property taxes rise in the affected towns by approximately \$225,000; an overall average of 0.08% assuming RRS payments occur at FY02 levels. Similar to Alternative B, the Town of Kittery in York County would see the largest absolute reduction in taxes at \$30,738, while the Town of Frenchboro in Hancock County would be most affected in proportional terms. The impact in the Town of Frenchboro is the same as Alternative B. Appendix G identifies the 19 islands that were not included in this analysis, and the towns that would be additionally impacted.

### **Alternative D**

No impacts are predicted as no expansion is proposed.



**Wildlife Viewing**

In Chapter 3-Affected Environment, we describe the status and significance of the commercial and recreational seabird viewing industry in Maine, since it benefits directly from Refuge seabird management. Two islands within the Refuge are currently the focus of tour boat trips to view coastal nesting seabirds: Petit Manan and Cross islands. Machias Seal Island, which we manage under an MOU with MDIFW, is a third island popular for commercial seabird viewing tours.

We enlisted Dr. Charles Colgan to analyze the revenues generated from this activity and the impacts refuge management might have on this activity. His analysis, further described in Chapter 3, determined that \$5-10 million in commercial seabird viewing related spending occurred in 2001 in Maine. When we asked Dr. Colgan whether or not the commercial seabird-viewing industry could continue to grow, he responded that it is probably at its maximum potential given the present distribution of active seabird colonies with sufficient numbers of birds to make a commercial trip worthwhile. In other words, unless seabirds establish new colonies, accessible for viewing by commercial tour boats, there are no new expansion opportunities for a commercial venture, except perhaps more boats to islands currently on tour.

Dr. Colgan's 1996 survey, described in Chapter 3, presents the scope of recreational seabird viewing and its importance in regional economic terms. However, because seabird viewing takes place throughout the coastal region, and because birds range over the same area, it is not possible to assign a specific economic value to a specific nesting island or even group of islands. This makes it impossible to differentiate the effects of alternative nesting habitat protection strategies from an economic value perspective. It is clear that protection of habitat will support the maintenance and possible expansion of this recreational activity, with its attendant benefits to individuals and firms, into the future. It is also the case that loss of habitat will, over time, degrade the resource upon which these benefits depend. The pace and extent of this degradation cannot be forecast.

**Lost Economic Benefits**

While the total economic value, and the level of economic activity, associated with seabird viewing is substantial, assessing the impacts of specific protection strategies creates some difficulties. Economic costs will also be associated with protection efforts, since an important element of habitat protection will be to restrict access to islands with significant sea bird nesting habitat during the summer, which is also the prime time for recreation. This will limit the recreational activities of some, decreasing to some degree their recreational values. This is particularly likely to be the case for members of the Maine Island Trail Association, who visit the islands for general recreation purposes. Thus, there will be some loss of recreational economic benefits to those who visit islands directly. The exact losses cannot be estimated, but will depend upon:

- which islands are chosen for protection;
- the extent of restrictions on activity; and,
- the extent to which alternative islands which would provide the same or slightly lower benefits are available.

#### **Alternative A (Current Management)**

No new seabird colonies would be established under Alternative A; therefore, no new seabird viewing opportunities would result. Existing restoration sites would continue to be managed, maintaining the current industry. As such, there would be no impacts to the current economic outputs contributed by the seabird viewing industry directly resulting from Refuge management.

#### **Alternative B (Service's Preferred Alternative)**

Alternative B would include 6 new seabird restoration sites. In our estimation, at least one of these sites could meet the criteria for size, distribution, access, and location needed for a viable commercial venture. However, it is important to note that we estimate it would be at least 8-10 years before a new colony with sufficient numbers of birds would be established to make a commercial venture worthwhile. This is due to the time needed to acquire the island, complete the restoration work necessary to make the island attractive to seabirds, and build the seabird population in that colony. As such, benefits to the commercial seabird industry would not occur to a significant degree in the short-term.

#### **Alternative C**

Alternative C would include 12 new restoration sites, creating the most potential opportunities for additional seabird viewing businesses over the long-term. We estimate that at least two sites could meet the criteria for a viable commercial venture. However, as with Alternative B, it would take at least 8-10 years to get a colony established.

#### **Alternative D**

No new seabird colonies would be established under Alternative D. In fact, management of the existing colony at Petit Manan Island would be scaled back, with less intervention and habitat manipulation. Over the long term, this would likely lead to a decrease in nesting habitat quality for those seabirds requiring short vegetation. Gull nesting and predation would likely increase as a result, and with no predator control, most seabirds would abandon the site within the 15 year planning horizon. While it is possible the birds would move to a new location, in all likelihood, seabird viewing opportunities would be lost over the long-term at Petit Manan Island.

## Hunting

Hunting is another nature-based recreational activity generating substantial revenues in Maine, and is supported on the Refuge. Currently, migratory game bird and waterfowl, small game, and big game hunting is offered on refuge lands as described in Chapter 3. Also of note is the fact that the Colonial Ordinance of 1641-1647, as clarified by Title 12 M.R.S.A. 571 et seq. (Colonial Ordinance), reserves a broadly construed right for public use of privately-owned intertidal zones for hunting, fishing, and fowling. As a result, waterfowl hunting occurs within the intertidal areas of most of the Refuge islands under the jurisdiction of the state, and is administered by the MDIFW.

Nationally, hunting participation is decreasing. This is also true for the State of Maine, as evidenced by the sales of hunting licenses. According to Boyle and Teisl (1998), sales of Maine hunting licenses declined by 1.7% between 1986 and 1996. It is primarily small game hunting that is declining in Maine; big game and migratory bird hunting has stayed relatively flat in terms of the number of hunters and number of hunting days (USFWS 2002). According to Service statistics, the average hunter in Maine is spending \$327/trip for a big game hunt, \$167/trip for a small game hunt, and \$222/trip for a migratory bird hunt (USFWS 2002). The expenditures are related to lodging, food, gas, and equipment. The types of hunters are distributed as follows: 39% waterfowl, 7% other migrating birds, 25% upland game, and 29% big game.

Unfortunately, we have no census of hunter numbers for the Refuge; however, we estimate approximately 280 hunter days occur during the mainland hunting seasons based on our field observations. Using the expenditures listed above, this would translate to \$66,710 in revenue to the local economy. However, we believe that the amount is overstated, because most of the Refuge hunters are local. Out-of-state hunters are likely to seek more productive and accessible hunting areas off Refuge lands which offer a greater likelihood of success. In our opinion, hunting on the Refuge is not contributing significantly to the local economy.

With regards to off-shore waterfowl hunting, it would be inaccurate to claim all the benefits of waterfowl hunting around Refuge islands, as most hunters are operating from boats in the inter-tidal area and are floating on and off Service-owned lands. Furthermore, it is virtually impossible to estimate waterfowl hunter numbers tied directly to Refuge lands. As such, we did not analyze this contribution further.

### **Alternative A (Current Management)**

Under Alternative A there would be no change in hunting opportunities from what is currently offered. The program includes migratory game, waterfowl, and small and big game on Sawyers Marsh and Gouldsboro Bay divisions; white-tailed deer hunting on Bois Bubert Island; and, migratory waterfowl hunting on 22 islands. As we describe above, we believe our program would not contribute significantly to the local economy.

### **Alternative B (Service's Preferred Alternative)**

Under Alternative B, we would open the Petit Manan Point Division to white-tailed deer hunting in addition to the hunting offered in Alternative A. During the regular firearms season, we would open the Division to disabled hunters only; during the muzzle-loading season, hunters of all abilities would be allowed.

We predict this would provide approximately 70 new hunter days. This is based on our estimate that 10 new hunters would partake in the disabled firearms season at 3 days each, and 10 hunters would participate in the muzzle-loader season at 4 days each. Using the expenditures/trip noted above, this new opportunity would generate approximately \$6,540 in hunter revenues (20 hunters x \$327/trip) above what was predicted in Alternative A. However, as described in Alternative A, this is likely overstated since most hunters would continue to be local, so there would be no lodging, and little food and gas expenditures. This is a relatively insignificant contribution to the local economy. Generally, the benefits from this new opportunity are more social, providing local hunters with a new hunting area. In the short term, Petit Manan Point would offer a high quality hunt, with hunter numbers low and success rate high, since it has been closed to hunting for years and deer are congregating here. However, over the long term we would expect the success rate to decline as deer disperse, resulting in the low densities common to the coastal area.

In addition, we would evaluate the potential for waterfowl hunting opportunities on all 87 islands proposed for Service acquisition. In general, we plan to open the islands to waterfowl hunting unless we determine there are overriding resource concerns unforeseen at this time. We do not know at this time whether or not the current landowners allow public hunting, but because of the Colonial Ordinance allowing hunting in all intertidal areas, we suspect that it is occurring on most islands. As such, we would not effectively be offering new hunting opportunities with Service acquisition of coastal islands.

### **Alternative C**

Same as Alternative B, except we would evaluate waterfowl hunting on all 151 islands proposed for Service acquisition.

### **Alternative D**

Under Alternative D we would not allow hunting on Refuge lands. While the economic losses to the local economy would be negligible, there would be social costs to local hunters who would lose the small game and big game hunting opportunities on the Gouldsboro Bay and Sawyers Marsh divisions, and big game hunting on Bois Bubert Island. Waterfowl hunting would not likely be affected because of the intertidal Colonial Ordinance that reserves the public right to hunting in these areas.

## Sheep Farming

Sheep farming has occurred on certain Maine islands for generations. It is considered an historic and traditional cultural use by many residents of Maine. As we describe in Chapter 3 in the island descriptions, there are two Refuge islands, Metinic and Little Nash islands, where sheep grazing is occurring. On Metinic Island, half the island is owned by the Service and most of the remaining portion is owned by a private landowner who leases his land to a shepherd. On Nash Island, sheep walk from the adjacent Big Nash Island at low tide. In most years, there are approximately 120 sheep on Metinic and 30 sheep on Nash islands, respectively. Since the private landowners do not fence, it is incumbent on us to install fencing to manage the sheep on the islands. We have incorporated sheep grazing into our vegetation management program for nesting seabirds on Metinic Island. Our monitoring has indicated that the current situation appears to be providing suitable nesting habitat for the terns.

Although locally important as a traditional and historic cultural use, these two sheep operations represent a negligible contribution to the State's sheep industry, and to the local economy, when compared to other coastal industries.

### Alternative A

Under Alternative A, sheep grazing on Metinic Island would continue to be used for vegetation management. On Nash Island, we would continue to monitor the grazing, but not otherwise implement a change. As such, there would be no economic impacts to the current operators or the local economy as no change would occur.

### Alternative B

Under Alternative B, sheep grazing on Metinic and Nash islands would be used for vegetation management, but only under special use permit stipulating numbers, timing, and intensity. In addition, we would consider

sheep grazing on future island acquisitions where we determine it can be used to effectively manage vegetation in support of our habitat goals. Under this alternative, the individual sheep operators may incur additional expenses to adhere to permit requirements, but we would not expect costs to be prohibitive or cause an operator to fail. While we expect new opportunities for sheep grazing would occur with future island acquisitions, we cannot predict where or when with any certainty. With implementation of Alternative B, there would be little to no adverse impact to the current sheep operators, and no effect on the local economy.



*Sheep grazing on Metinic Island*  
USFWS photo

### Alternative C

Same as Alternative B.

### Alternative D

Alternative D we would eliminate sheep grazing from the Service-owned portions of Metinic and Nash islands. With a loss in access to these lands, we predict that shepherds would be forced to modify their operations, possibly by reducing herd size or establishing more human presence on the islands. In either case, some economic burden would be incurred by the sheep owners and/or operators. However, because these operations are so few and small, their loss would not result in any impact to the local economy.

### Commercial Harvest of Marine Resources

The harvesting of plants and animals for commercial purposes in the intertidal and near-shore zones in coastal Maine is not only significant to the State's economy, but is also a traditional and historic way of life in many coastal communities. Harvesting marine resources on and adjacent to refuge lands occurred well before the Refuge was established. Intertidal resources that are harvested include: clams, mussels, oysters, and marine worms. In addition, lobstering and salmon aquaculture are probably the best known commercial marine industries, occurring in offshore State-waters. Seaweed harvesting is also becoming a more viable industry as harvesting equipment improves and seaweed processing centers become established. Rockweed is the common name given to the furoid seaweeds and usually refers to the knotted wrack (*Ascophyllum nodosum*).

Intertidal zones provide abundant habitat for many invertebrate species that are important food sources for migratory birds. These areas serve as foraging sites for tens of thousands of migratory shorebirds and waterfowl. Currently, we have no documentation on the level of harvest or the numbers of harvesters using the Refuge intertidal areas. Monitoring the level of use and harvest is needed to determine how Federal trust resources are affected.

With regard to the increasing commercial interest in rockweed harvest, there is a concern by many people, including scientists, about the short-term and long-term effects of unregulated harvesting of a plant so vital to many birds and marine wildlife. The invertebrates that cling to rockweed are an incredible source of nutrients to many migrating shorebirds and waterfowl. Rockweed filters nutrients and contaminants, produces oxygen, and recycles nutrients. In Maine, the Department of Marine Resources has adopted regulations to allow for a sustainable harvest; however, in our opinion, monitoring and enforcement to prevent over-harvesting is not commensurate with the use. Rockweed and other seaweed harvesting is not allowed in Refuge intertidal zones because no commercial collection

of vegetation is allowed on national wildlife refuges, the activity is not considered appropriate in light of the Refuge's purposes and is not supported by a compatibility determination.

As described under waterfowl hunting, the Colonial Ordinance reserves a broadly construed right for the public to use privately owned intertidal zones for fishing, fowling, and navigation. We recognize this ordinance and allow harvest of shellfish and worms in Refuge intertidal areas. Although our ability to monitor these activities is limited, we do have the authority to eliminate these activities on Refuge lands if we determine Federal trust resources are adversely impacted, such as at seabird or bald eagle nesting sites.

In Chapter 3, we describe the status of the finfish and shellfish aquaculture industries and their contribution to the State and local economy. In 2000, the salmon aquaculture industry generated \$78.9 million; and in 2001, the lobstering industry produced a market value of \$151.9 million.

Maine's salmon aquaculture industry has faced several challenges in recent years. Outbreaks of the highly infectious salmon anemia, foreign competition, Federal listing of the endangered Atlantic salmon, and a lengthy leasing process are each examples of events that have impacted the industry. All of these factors are outside of the influence of the Refuge. However, none of these events were caused, directly or indirectly, by Refuge management activities.

In Chapter 1, we describe why some people view Service ownership as a potential threat to aquaculture, and commercial fishing and lobstering operations. In general, industry supporters believe that Service acquisition would result in restrictions or limits on operations in State- adjacent waters. In fact, the Service has no direct authority over these operations and can not unilaterally impose restrictions. On the other hand, if a Federal trust species, such as an endangered or threatened species, could be impacted, then the Service will initiate Section 7 consultations under the Endangered Species Act. Commercial finfishing and shellfishing is regulated by the State. Aquaculture leases are issued by the U.S. ACOE and State of Maine.

### **Alternative A**

Under Alternative A, there would be no change in opportunity for commercial harvest of shellfish and worms. Harvesting rockweed would be eliminated on the intertidal areas surrounding the 1,274 acres proposed for Service acquisition. We do not know the extent of the opportunity lost, or its economic impact, because we have not surveyed for rockweed in these areas, nor monitored levels of harvesting. In addition, we are not aware of any reliable source for this information.

We do not anticipate any measurable impacts on the salmon aquaculture or lobstering industries from either Service acquisition of new islands or Refuge management in general. No existing aquaculture facilities would be impacted near existing Refuge lands. Indirect benefits to these industries may be realized through the permanent protection of natural areas, but we have no way to quantify this benefit. There are no active aquaculture leases on record in the vicinity of lands proposed for acquisition.

### **Alternative B**

Under Alternative B, the impacts would be the same as Alternative A, except there are 2,859 acres proposed for acquisition, including 87 nationally significant nesting islands that would be added to the Refuge boundary. Rockweed harvesting would be eliminated on these islands, but we do not know the extent of this economic loss. Impacts to salmon and lobstering industries are the same as predicted in Alternative A.

### **Alternative C**

Under Alternative C, the impacts would be the same as Alternative B, except there are approximately 6,310 acres proposed for acquisition, including all or portions of 151 nationally significant nesting islands that would be added to the Refuge boundary. As with Alternative B, all islands would be closed to rockweed harvesting, although we cannot predict the impact to this industry because we have no baseline information. There are four finfish leases and two shellfish leases on record near to islands proposed for acquisition. At this writing, our information indicates that three of the finfish leased operations (Little Black, Great Waas, and Little River islands) are more than 1/4 mile from nesting areas, and the two shellfish operations (French House and Treasure islands) are low intensity with no anticipated impacts. Only one of the finfish operations may be a concern to us (Treat Island), but only if a new or expanded facility is proposed within 1/4 mile of the bald eagle nesting site. Given that Service acquisition of Treat Island is speculative at the current time, and no direct impacts are predicted to this or the other 5 leased operations, and because of the external influences we described in Chapter 1 (Re: Issues Outside the Scope of this CCP/EIS, Issue #1) and Chapter 3, we do not expect any impacts to current operations over the short-term. Also, given these current external influences on the industry, and the uncertainty of how they would affect the industry as a whole, and/or individual operations, we did not further evaluate long-term impacts from our respective, proposed actions.

### **Alternative D**

Same as Alternative A, except there are only 467.1 acres within the currently approved boundary that would be acquired; no expansion is proposed.



## Local and Regional Economy - Summary

Overall property tax losses to towns is greatest in Alternative C because it proposes the largest Refuge expansion, followed by Alternative B, then A. There is no property tax loss in Alternative D since no expansion is proposed.

Alternative C would possibly result in two new commercial seabird viewing opportunities, while Alternative B would possibly result in one new opportunity. We would maintain current opportunities with implementation of Alternative A, and there would be a loss of opportunity on Petit Manan island with implementation of Alternative D.

Alternatives B and C would effectively provide the greatest increases in hunting opportunity and associated revenues. An approximate increase of 70 hunter days is predicted with either alternative, generating an additional \$6,540 to the local economy. There would be no change in hunter opportunity or revenues generated with Alternative A. Alternative D proposes to eliminate hunting, so it would result in a total loss of hunter opportunity and revenues generated.

None of the alternatives would appreciably impact Maine's sheep industry; however, the two local sheep operators would be most impacted by Alternative D as it would cause them to modify their operations and incur some expenses in doing so.

It is difficult to predict with any certainty the potential impacts on the lobstering or aquaculture industries since our recommendations for a 1/4 mile no-activity buffer are not always incorporated into ACOE permits. However, Alternative C, which proposes the largest Refuge expansion, has the greatest potential to impact the industry. At present, we know of six aquaculture leases which have been issued off islands proposed for acquisition in this alternative. Alternative B has the next highest potential to impact the industry because of the expansion proposed, although no aquaculture leases have been issued next to proposed islands. Alternative A follows next, although no leases are known. No impact would result from Alternative D.



*Aquaculture pens at Cross Island*  
USFWS photo

## Effects to Public Access, Educational and Recreational Opportunities

As described previously, coastal Maine is a major attraction for outdoor enthusiasts. While the Refuge is not typically the principal destination in and of itself, it does enhance the coastal experience by offering public access to a premiere setting with outstanding opportunities for wildlife-dependent recreational activities. Since Refuge lands are held in the public trust by the Service, access is ensured for these activities unless Federal trust resources would be impacted. In addition, Colonial Ordinance grants easement to the public over intertidal lands for the purpose of fishing, fowling, or navigation. Refuge lands are open to the following priority, wildlife-dependent public uses: hunting, wildlife observation and photography, and environmental education and interpretation. We have never officially opened the Refuge to fishing as freshwater fishing opportunities are so few or low quality, and there has been no public interest. The surf fishing generally occurs in the intertidal area, where the State ordinance is recognized.

Total visitation on the Refuge in 2004 was estimated to be approximately 47,000 visitors; 19,000 visitors on the mainland divisions units, and 28,000 to the islands or surrounding waters.

The mainland divisions are open year round from sunrise to sunset. We currently maintain two interpretive hiking trails, the Hollingsworth Memorial Trail (1.5 miles) and the Birch Point Trail (four miles round-trip), both on the Petit Manan Point Division. The Hollingsworth Trail has parking for approximately eight cars; the Birch Point Trail has parking for approximately 10 cars. The only universally accessible facility on the Refuge is an informational kiosk on the Petit Manan Point Division. The Gouldsboro Bay and Sawyer's Marsh divisions contain old logging roads that are passable by foot but have no designated trails or parking lots.

Of the 28,000 visitors to the Refuge islands during 2004, 24,000 of these visitors only experienced them aboard commercial tour boats. With the exception of Machias Seal Island, these tour boat visits do not involve landing on the islands. We estimated that the remaining 4,000 visitors land on Refuge islands, typically by kayak or canoe.

In order to minimize disturbance to nesting birds, the Refuge's seabird nesting islands are closed to public use from April 1 - August 31 each year. In addition, four active bald eagle nesting islands are closed to public access from February 15 - August 31. Four historic bald eagle nesting islands are also closed to public access from February 15 - August 31, but may be open after May 1 if no nesting occurs.



*Nash Island Lighthouse*  
USFWS photo

While island closures limit the public's access during the popular spring and summer tourist seasons, all islands (except Seal Island) are open in the early fall, when weather still allows visitation.

Cross, Scotch, and Bois Bubert islands, along with a portion of Halifax Island, are open year round because they do not support nesting seabirds. Most of Halifax Island is closed year round to protect botanical resources. Seal Island is also closed to all public uses year round due to unexploded ordnance.

Some popular activities are not compatible and are prohibited by Refuge regulations. Activities prohibited include seaweed harvesting, collecting balsam fir branches for making Christmas wreaths, use of off-road vehicles, and open fires. While leashed dogs are permitted on the Refuge mainland, dogs are prohibited on Refuge islands. Local residents expressed concern when these restrictions were first implemented, but complaints have diminished in recent years. Public trapping has never been allowed on Refuge lands.

Two Refuge islands are part of the MITA trail: Bois Bubert and Halifax islands. Campers must obtain a permit from either MITA, who administers this program as a service to their members, or the Refuge headquarters. All campers receive information on practicing "Leave No Trace" principles. In addition, MITA has a very effective campaign within their membership to reinforce and promote these stewardship principles through literature, other media, and through personal contacts while monitoring the sites. Our experience monitoring these two refuge island campsites validates that "Leave No Trace" principles are usually followed.

#### Alternative A (Current Management)

#### Impacts from Proposed Land Acquisition and Protection

Implementation of Alternative A includes Service acquisition of 467.1 acres within Petit Manan Refuge's approved boundary and another 30 nationally significant coastal nesting islands. At this time, we do not know whether these private island owners currently allow public access. Our observations indicate that some island owners tolerate a low level of day use activities, but do not approve of extensive use of their islands, nor would they allow camping. Most absentee owners probably do not know the extent of activities on their island. It is also possible that some of the islands proposed for acquisition under this alternative are effectively closed to all public access.

All islands proposed for acquisition under this alternative support nesting seabirds or eagles, and would therefore be closed to public access during the peak visitation season. Without knowing for certain what current owners allow in terms of public use, we are unable to quantify this impact on visitors. In addition, it is important to recognize that not all 30 proposed islands are within reach of many recreational boaters and have accessible

landing sites. Therefore, it is an overstatement to suggest Service acquisition would represent a lost opportunity on all 30 islands. We would expect that the biggest adverse impact to visitors would be the restricted access to undeveloped islands with landing sites and within 5 miles of shore. Islands beyond 5 miles from shoreline are generally too far for kayakers and canoeists. On the other hand, Service acquisition would allow legal, approved access to these same islands during the fall months.

### Impacts from Proposed Public Use and Access Management

With implementation of Alternative A, we project a 10% increase in annual visitation over the next 15 years based on regional tourism trends, increased Service land acquisition, and planned visitor services activities. This would result in an additional 4,700 visitors/year; approximately 2,400 of whom would be taking part in commercial tours, 400 of whom would visit refuge islands on their own, and 1,900 of whom would visit the mainland. We do not anticipate that this increase would adversely affect resources or use or enjoyment by current visitors because most of the increased use is on boat tours and because of our proposed increase in the land base. The increases projected for other refuge islands and the mainland would be well-distributed and primarily associated with organized Refuge programs.

There is an increasing local demand for outreach and environmental education programs as evidenced by the numerous requests we receive, increased regional tourism, and the growth of coastal populations. Alternative A would continue to provide limited environmental education and outreach. These include taking part in local fairs, talks to local organizations, newspaper articles, and providing refuge brochures to chambers of commerce and highway information centers.

Under Alternative A, we would also maintain our environmental education partnerships with the Chewonki Foundation, Damariscotta River Association, National Audubon Society, and Hurricane Island Outward Bound School. Humboldt Research Station would continue to use refuge lands as an outdoor classroom and laboratory. The Friends of Maine Seabird Islands, a newly formed Refuge Friends Group, would continue to assist us with outreach activities. While these important activities would continue, our current staff would not be able to meet even the current demand for outreach and educational programs.



*Public education may reduce illegal ATV use*  
USFWS photo

Alternative A would continue to provide mainland infrastructure for wildlife observation and photography on the Petit Manan Point Division, with access provided by the refuge road and two trails. This alternative would not expand parking or trails, and summer weekend visitors would often continue to find parking lots filled and the quality of their visit reduced because mainland visitors are concentrated on this unit's two interpretive trails. The islands (except Seal) would continue to be accessible for wildlife observation and photography outside of closure periods. Commercial photographers would continue to be allowed access to closed areas by special use permit only.

We would continue to provide the current level of interpretative programs. Similar to our other programs, the demands for interpretive programs would exceed our ability to meet them. The existing informational kiosks would be maintained at the Petit Manan Point Division and new kiosks would be built at refuge offices in Rockport and Milbridge as planned. Two to three staff- and volunteer-led interpretive programs would occur on Refuge and partner lands each year. A summer interpretive intern would be hired for Petit Manan Point Division. Interpretive signs would also be developed for Halifax Island focusing on the rare plant communities. While these actions would improve our current programs, we would not be able to meet all requests for programs.

Alternative A would maintain current hunting opportunities on Sawyers Marsh and Gouldsboro Bay divisions and the 22 islands. Local hunters and MDIFW have expressed an interest in seeing us expand our hunting opportunities to the Petit Manan Point Division. Since Petit Manan Point would remain closed to hunting under Alternative A, we would not be fulfilling this request.

Alternative A would continue to allow blueberry picking for personal use only. Hand raking of blueberries would not be permitted to ensure some berries are left for wildlife. This restriction has been accepted by the public, and has generally been adhered to. Further, there are many other local places open to the public where more intensive harvesting could occur.

The MDIFW has previously requested we open the Refuge mainland divisions to furbearer trapping. The islands were not suggested because they do not have viable furbearer populations. Under Alternative A, public trapping would not be allowed on existing or proposed Refuge lands. Trapping would only occur for management purposes and would be conducted only by professional contracted trappers or our staff. With our existing knowledge of the mainland tracts proposed for acquisition, we do not believe that any of the current owners allows public trapping. As such, there would be no net loss of trapping opportunities with proposed Service land acquisition; however, there would continue to be an unmet request of MDIFW's by not allowing it on existing Refuge lands.

### **Impacts from Proposed Vegetation and Habitat Management**

Under Alternative A, we would continue to maintain the blueberry and grass fields along the entrance road at the Petit Manan Point Division, enhancing wildlife viewing opportunities and providing the public easy access to blueberries for personal use. The vegetation and habitat activities conducted on Refuge islands is specifically designed to enhance nesting habitat for seabirds. This has a direct and positive benefit to the quality of wildlife viewing opportunities, especially to the commercial seabird viewing tours.

### **Impacts from Proposed Wildlife Populations Management**

Managing the six seabird colonies that are visible to commercial tour boats or recreational boaters provides a unique wildlife observation and photography experience. The seabird viewing opportunity on Machias Seal Island, which we cooperatively manage, is unrivaled in the lower 48 States. No adverse impacts are predicted to public use and access from this program.

### **Alternative B (Service's Preferred Alternative)**

#### **Impacts from Proposed Land Acquisition and Protection**

Alternative B would result in Service acquisition of 467.1 acres within the Petit Manan Refuge's approved boundary and the addition of 87 nationally significant nesting islands and 153.3 acres of mainland. Similar to Alternative A, we do not know whether the current landowners allow public access. All of these islands proposed for acquisition would have a seasonal closure, as described under Alternative A. The island closures would be implemented during the peak visitor season, as all the islands support either nesting seabirds or bald eagles. However, under Alternative B, there would be one modification to the seasonal closure dates. On islands where only gulls and eiders are nesting, we would allow day use access to begin on July 31 rather than August 31. This change would be consistent with MDIFW island closure periods and would provide the public with an additional month for day use activities on 9 Refuge islands and 6 islands proposed for acquisition. This change would directly benefit kayak and canoe enthusiasts.

As described in Alternative A, not all 87 islands proposed for acquisition are accessible to boaters, especially to kayakers and canoeists, because of their distance from shoreline and the lack of suitable landing sites. As such, it is an overstatement to suggest that public access opportunities would be lost with seasonal closures on all 87 islands. Further, we suggest that Service acquisition may actually afford legal access, in the fall months, to many islands where it may not have been allowed previously by a private landowner.

### Impacts from Proposed Public Use and Access Management

Under Alternative B, we project a 25% increase in annual visitation over the next 15 years, representing an additional 11,750 people/year over current visitation. In total, we estimate that 58,750 people would visit the Refuge annually; approximately 13,750 would visit the mainland; 30,000 would engage in commercial seabird tours; and 5,000 would visit islands on their own. On the mainland, we predict that most of this increase would result from developing new interpretive and environmental education programs for schools and other groups. On the islands, the increase would be due to the fact that more islands are included in the Refuge. Our visitor capacity is greatly expanded with these additional 87 islands, and we do not anticipate that this increase would adversely affect resources or the use and enjoyment by current visitors. We would implement monitoring strategies to ensure resource damage does not occur, and to evaluate visitor satisfaction.

Under Alternative B, we would increase our environmental education and outreach programs and partnerships substantially. We would continue to explore a partnership with the National Park Service, Acadia National Park, at their Schoodic Point property which they have converted to a Learning Facility for research and environmental education. This would also help us foster a stronger relationship with Acadia National Park. In addition, we would continue to pursue a new Refuge Administration and Coastal Education Center in the mid-coast area to further enhance environmental education opportunities. With full implementation of this alternative, we believe we would be able to meet most demands for environmental education and outreach.

Opportunities for commercial photographers might be reduced since we would ensure there is a direct benefit to the Service before issuing a

special use permit. However, amateur nature photographers would directly benefit from construction of photo blinds and observation platforms on the mainland divisions. This new construction would be accessible to persons with disabilities, an opportunity new on the Refuge.

We would be creating access to the Gouldsboro Bay Division with a designated trail and expanded parking area with a capacity for 10 cars. This would provide a more inviting area for a greater number of visitors interested in wildlife-dependent activities. It would also alleviate some of the pressure Petit Manan Point Division receives. We would be able to distribute mainland visitors better.



*Alternative B would substantially increase environmental programs such as this walking tour*  
USFWS photo

Under Alternative B, we would create a new opportunity for hunting by opening up the Petit Manan Point Division to white-tailed deer hunting. The hunt would allow only disabled hunters during the regular firearms season, and hunters of all abilities during the muzzle-loader season. The hunting area would be north of the access road, in the Birch Point Trail area.

This would satisfy a request from MDIFW and local hunters. For the first few years, we predict this area would provide a high quality, successful hunting opportunity. After approximately three years, we expect this would diminish when the deer no longer feel as secure and disperse to the lower densities more common along the Maine coast. As a result of opening the area to hunting, public access to the Birch Point Trail on Petit Manan Point may need to be closed during the firearm and muzzle loader season depending on the number of hunters. We predict that approximately 200 non-hunting visitors would be impacted from Monday through Saturday during late October to early December if we determine the trail must be closed for public safety. On Sundays there is no hunting allowed in the State.

The new trail and parking area on the Gouldsboro Bay Division would also facilitate access and parking to this popular waterfowl hunting area. All islands and mainland property acquired under this alternative would be opened to waterfowl hunting unless restricted by deed. As we described previously, the Colonial Ordinance allows “fowling” in intertidal areas, so our actions would not appreciably increase the amount of area open to waterfowl hunting.

Under Alternative B, we would continue existing camping opportunities on Bois Bubert and Halifax islands by permit-reservation with cooperation from MITA, Maine Bureau of Parks and Lands, and other partners. We would utilize this partnership to develop and implement a monitoring program that would identify threshold limits of island usage. Five islands we propose to acquire under this alternative are currently part of the Maine Island Trail. Three of the islands are currently day use only, while two also allow camping. If acquired by the Service, all would be subject to a seasonal closure to protect wildlife and habitat. Access for day use would only be allowed outside the nesting season. In addition, we would close these islands to camping year round. These restrictions would likely necessitate that MITA administrators seek alternative sites to ensure the trail has no gaps. Implementation of Alternative B would negatively affect MITA trail users until alternative sites can be located. We expect members of MITA would be inconvenienced by this action.

Under Alternative B, we would not allow public trapping. The impacts would be similar to those described under Alternative A.

### **Impacts from Proposed Vegetation and Habitat Management**

Under Alternative B we would continue to maintain the blueberry and grass fields as described in Alternative A. The increased habitat manage-



ment proposed in Alternative B would afford new opportunities for environmental education and interpretation, two programs where demand is ever increasing. Wildlife viewing and photography would also be enhanced by managing for habitat and wildlife diversity.

### **Impacts from Proposed Wildlife Populations Management**

We would establish six new seabird restoration projects, which may provide increased opportunities for both recreational and commercial tour boat operators to view wildlife in new sections of the coast. Distance from shore, proximity to population centers, and seabird colony size and species present would most likely dictate how well these new sites provide an opportunity. A new opportunity would not likely be realized for at least 8 years, the length of time we think it would take for a seabird colony to get established to a size that might interest a commercial seabird viewing operator.

## **Alternative C**

### **Impacts from Proposed Land Acquisition and Protection**

Alternative C would result in Service acquisition of all, or portions of, 151 unprotected nationally significant nesting islands, 153.3 acres of mainland, and 467.1 acres currently within Petit Manan Refuge's approved acquisition boundary. Similar to Alternatives A and B, without knowing the policies of current island landowners, we are not able to fully evaluate the effects of this action on public access. We anticipate that Service acquisition could result in greater access to some islands, outside the nesting season. More likely, however, Service acquisition would limit access at islands now open for year-round visitation.

Under Alternative C, each Refuge island would be evaluated separately to determine the most effective public access closure period for the species nesting on the island. For example, closure periods may extend outside of the currently used February 15 to August 31 dates, if appropriate, to cover the entire breeding season of all species present. Leach's storm-petrels are known to nest into November; so, on islands with these birds the closure period may not end until November 15. Other changes may be warranted with new and better information, or as necessary to protect sensitive areas such as rare or declining plants or habitats. It is possible that the closure dates could change on an annual basis as we respond to new information. We predict that frequent changes in closure periods on a given island, and different closure periods between the islands, would cause much confusion and inconvenience for visitors. It would also require us to conduct extensive outreach campaigns each year to alert people to the changes. We would not expect this strategy to be favored by our current visitors.

Under Alternative C, acquisition of new islands and the impacts on the current MITA trail users would be similar to those described for Alternative B.

### Impacts from Proposed Public Use and Access Management

Under Alternative C, we predict a 50% increase in annual visitation over the next 15 years, representing an additional 23,500 visitors/year over current levels. In total, we estimate 70,500 people would visit; 28,500 would visit the mainlands; 36,000 would visit on seabird boat tours; and 6,000 would visit the islands on their own. Similar to Alternative B, most of the increase would be attributed to the expanded land base and increased visitor programs. As with Alternative B, the expanded land base would disperse use so that we do not anticipate the increase in visitation to adversely affect resources or the use and enjoyment of individual visitors. We would also implement monitoring strategies to ensure resource damage does not occur and to evaluate visitor satisfaction.

We would implement new public use infrastructure on the mainland divisions as proposed in Alternative B. The new trails proposed would also alleviate some of the pressure that Petit Manan Point Division receives. As with Alternative B, we would be able to distribute mainland visitors better.

In addition to the new programs described in Alternative B, under Alternative C we would also develop a web-based environmental program whereby students around the world could view seabirds on refuge islands. Research data from the restoration islands would be posted on the website and students would be led through lessons using the data. This would effectively expand our outreach to a world-wide audience.

By implementing Alternative C, we would evaluate the compatibility of opening Petit Manan Island and other select islands to photo blind tours. If this use is found to be compatible with the purpose of the Refuge, it would be allowed, offering a rare opportunity for the public to view seabirds up close. In Maine, this opportunity only exists at Machias Seal Island and is in incredibly high demand. Bird watchers and photographers would especially benefit from this new opportunity.

Alternative C would result in impacts to waterfowl hunting similar to Alternative B. We anticipate opening all island property acquired under this alternative to waterfowl hunting unless restricted by deed. Without knowing the policies of current island owners, it is difficult to assess the effects of this action on hunting opportunities.

Bois Bubert and Halifax islands would remain open for camping, as part of the MITA trail. However, under Alternative C, special use camping permits would be administered only by our staff. This would allow us to better monitor the number of users, group size, length of stay, and their effects on resources. It could potentially result in a reduction in the number of days the area is available for camping. Other impacts to camping are similar to Alternative B.

Under Alternative C, we would allow public trapping on Petit Manan Point, Sawyers Marsh and Gouldsboro Bay divisions, and Cross and Bois

Bubert islands according to State and Refuge regulations. No trapping would be allowed on the three mainland divisions during waterfowl migration season (September through November) to reduce disturbance to waterfowl who are congregating on the refuge building reserves for their southern flight. Trapping for management purposes would continue as described in Alternative A. This new opportunity satisfies a request from MDIFW, which is seeking hunting and trapping opportunities on all public lands where safety and resource concerns are not an issue. We are not certain as to the number of trappers this would benefit; however, we would predict less than five trappers would participate.

#### **Impacts from Proposed Vegetation and Habitat Management**

Same as Alternative B

#### **Impacts from Proposed Wildlife Populations Management**

We would initiate 12 new seabird restoration projects, which may provide increased opportunities for both recreational and commercial boat operators to view wildlife in new sections of the coast. Similar to Alternative B, distance from shore, proximity to population centers, colony size and species present would most likely dictate how many of these new sites provide a new opportunity. As with Alternative B, new opportunities would not likely be realized for at least 8 years. Under Alternative C, we predict that 2 new viewing sites may become established and result in new destinations for commercial operators.

### **Alternative D**

#### **Impacts from Proposed Land Acquisition and Protection**

Under Alternative D, the Service would not acquire any more islands beyond those already in Petit Manan Refuge's approved boundary. In addition, this alternative would close all acquired islands to public use year round. As such, public access would be negatively impacted and many visitors would be upset by this change. We predict this action would significantly reduce public support for the Refuge and our programs.

#### **Impacts from Proposed Public Use Programs**

Implementation of Alternative D would result in all Refuge islands being closed to public access year round. The only public access to islands would be through staff-led programs or organized under special use permits. This would severely limit the public's access to the islands, depriving at least 4,400 people annually of this experience. Many visitors and local residents would be upset, as would local community officials. This would adversely impact the relationship of the Service with the local community over the long term. Mainland based opportunities would remain the same or decrease slightly as under Alternative A.

Under Alternative D, we would expect a 34% decline in total visitation over the next 15 years due to the elimination of public access to islands, as well as a 50% reduction in seabird viewing opportunities. This loss in seabird viewing is attributed to the fact that the Petit Manan Island colony would no longer be actively managed, it would be overtaken by gulls who could adapt to the changes in vegetation, and it would likely be abandoned by most other seabirds within the 15 year planning horizon and taken over by gulls. Most of our commercial tour boat visitation occurs at this island, so it would result in a total loss of viewing opportunities within 15 years.

Under Alternative D, the interpretive trails, overlooks, and other infrastructure described in Alternative B would not be built. The substantial demand for environmental education and interpretation programs would be even less satisfied than under Alternative A. We would disappoint many visitors and local educators with our limited resources.

Alternative D would close all Refuge lands to hunting, including those proposed for acquisition which may currently allow hunting. This would eliminate current Refuge hunting opportunities on 22 refuge islands, and mainland parcels at Sawyers Marsh and Gouldsboro Bay Divisions. Over 280 annual hunter visits would be eliminated. Local hunters would be the most impacted, and we believe that most would remove their support for the Refuge. We cannot predict the impact to hunting opportunities on those islands to be acquired under this alternative since we do not know what current owners allow.

Camping would be eliminated on the two Refuge islands included in the Maine Island Trail (Halifax and Bois Bubert). This action would reduce the number of islands in the Downeast section of the Maine Island Trail that are open to public camping, which is a very unique experience. Further, a gap would be created in the trail which would affect trail users' ability to island-hop. This would mostly affect members of MITA. In the long-term, MITA may be able to get permission for camping from private island owners, but this is not definite. MITA members would be very upset with this proposal. We would jeopardize our working relationship with them if this action were implemented.

### **Impacts from Proposed Vegetation and Habitat Management**

Under Alternative D, vegetation would grow unimpeded. Over the long-term, wildlife viewing opportunities would decrease as vegetation would screen wildlife from view. The habitat would no longer provide foraging opportunities for white-tailed deer. Blueberry picking would also be eliminated as blueberry fields require active management to stay productive and to eliminate encroachment by woody species.

### Impacts from Proposed Wildlife Populations Management

No impacts predicted.

#### Public Access, Educational and Recreational Opportunities - Summary

Compared to Alternatives A and D, Alternatives B and C would appreciably expand Service ownership (87 islands and 151 islands, or portions thereof, respectively) where priority public uses would be allowed outside of seabird and bald eagle nesting seasons. Since virtually all of these islands are privately-owned, this would represent a substantial increase in public access to Maine coastal islands. Alternative A includes a 30 island expansion and Alternative D would not allow any public access year round.

Over the next 15 years, we project increased visitation in Alternatives A, B, and C commensurate with the proposed expansions and increased visitor services programs. Alternative C would realize the greatest potential increase in annual visitation with an additional 23,500 visitors; followed by Alternative B with 11,750; and, Alternative C with 4,700. Under Alternative D, we predict annual visitation would actually decline over current levels over the next 15 years, since the seabird colonies in the most popular viewing areas would no longer be actively managed and their numbers would decline.

We would expect to meet or exceed the demand for priority public use programs under Alternatives B and C. We would increase our environmental education, interpretation, wildlife observation and photography programs on the mainland, offer a new deer hunting opportunity on Petit Manan Point Division, and continue to provide waterfowl hunting on the majority of islands. Camping would continue to be allowed on two Refuge islands, in partnership with MITA. Alternative C is the only alternative that would allow trapping in certain areas, a new opportunity on the Refuge. Alternative A would continue current programs, where unmet requests for programs is a common occurrence. Alternative D would emphasize environmental education on the mainland and with partners, but would scale back on programs that draw more people to the area.



*Many visitors use their own boats to access Refuge islands outside the seabird nesting season*  
USFWS photo

## **Effects on Cultural Resources**

In protecting our cultural and historic resources, we are guided by specific executive orders, policies, laws, regulations, standards, and guidelines. We would comply with all appropriate legal mandates in our efforts to protect and manage the cultural resources on the Refuge. Our actions likely to affect archaeological and historic sites are routinely reviewed and assessed under provisions of Sec. 106 of the National Historic Preservation Act. To date, projects requiring such review on the Refuge include the rehabilitation and stabilization of historical lighthouse structures.

It is probable that unrecorded coastal archaeological sites exist on current Refuge lands and on islands proposed for Service acquisition. Many of these are likely to include seasonal shore fishing stations and trading locations dating from approximately 2000 years ago up to the earliest periods of European contact and settlement. Few of these locations have been successfully located within New England, and even fewer studied through archaeological excavation. Such sites could be among the most significant of the nation's historic archaeological sites, and the threat of loss by erosion makes their discovery, study, and protection increasingly urgent.

### **Alternative A (Current Management)**

Under Alternative A, the proposed Service acquisition of 467.1 acres within the approved Petit Manan Refuge boundary and 30 additional islands would have a direct, positive effect on cultural resource protection. Service acquisition affords permanent protection from losses or disturbances due to development. While we are not aware of any recorded sites on these lands, it is probable there are sites worthy of further study. Unfortunately, under this alternative, we would not be equipped for further cultural resource inventories or studies, or able to reverse losses to sites impacted by natural or human-induced erosion.

Lacking trained staff, a formal cultural resources survey, cultural resources plan, and partnerships to cooperatively protect resources, we would not be proactive in evaluating and protecting sites. Also, the limited law enforcement staff under this alternative would not allow us to adequately prevent or address Archeological Resources Protection Act (ARPA) violations. With regards to our historic structures, we would continue to be unable to adequately maintain them due to funding and staffing shortfalls; we would simply not be able to address all of their existing and future maintenance and stabilization requirements.

### **Alternative B (Service's Preferred Alternative)**

Under Alternative B, the proposed Service acquisition of 467.1 acres within the approved Petit Manan Refuge boundary and 87 additional islands would have a direct, positive effect on cultural resource protection, almost tripling island protection compared to Alternative A.

This alternative would allow us to make an important, positive contribution to meeting our cultural resource public trust responsibilities. We would have adequate resources to survey, map, catalog, monitor, and protect archaeological and historic resources. Under Alternative B, we

would increase staffing and training, conduct surveys and inventories, develop formal agreements with the Coast Guard and respective lighthouse Friends Groups, and establish a partnership with the Passamaquoddy Tribal Nation. Also, this alternative would result in the development and dissemination of educational and outreach information emphasizing the need to respect and protect cultural resources. We would be able to advance public awareness, understanding, and cooperation in protecting these resource. This alternative would result in a significant increase in our ability to meet and carry out national mandates to protect cultural resources on Refuge lands. Appendix K shows a letter from the Maine Historic Preservation Commission which concurs with our findings.

**Alternative C**

Under Alternative C, impacts would be similar in context to Alternative B, except the increased Service land acquisition of 151 islands would make an even greater contribution to the protection of cultural resources in coastal Maine. Implementation of Alternative C would incorporate all the cultural resource protection actions included in Alternative B, plus add additional public use and law enforcement personnel. We would increase by magnitudes our effectiveness in cultural and historic resource protection over the long-term.

**Alternative D**

Under Alternative D, we would also contribute positively to cultural resource protection through Service acquisition of the 467.1 acres in the approved Petit Manan Refuge boundary. However, the overall benefits are much less than those proposed in Alternatives A, B, and C, since no new islands are proposed for acquisition.

We would obtain more staff able identify and address ARPA violations than we currently have. In addition, all islands would be closed to public access under this alternative, thereby reducing the potential for direct human-induced impacts on cultural resources. We would seek alternative and supplemental funding sources to assist us in protecting the historic lighthouse structures. Our goal would be to meet or exceed minimum standards for their protection. This would positively impact historic resource protection over the long term, more so than Alternative A.

No formal education or outreach program would be planned under this alternative, thus reducing the effectiveness of our own protection efforts and the ability to gain recognition and assistance from others.

**Cultural Resources -  
Summary**

All alternatives comply with legal mandates to protect and maintain archeological and historic sites. All alternatives also propose to improve relations with the Passamaquoddy and other Wabanaki Tribes through a partnership agreement. Alternatives B and C would improve our baseline information on existing and potential sites through surveys. Partnerships would be developed to protect and restore historic sites. Under Alternatives A and D, very little change would occur; we would continue to meet only the minimum standards for protection of historic sites.

## Effects on Vegetation and Habitats

The Refuge includes an incredible diversity of habitats, some of which are unique to the Refuge System. Our limited habitat management on the Refuge mainland is focused on maintaining grasslands, open fields and blueberry barrens, and water impoundments for migrating birds. We very successfully manage six Refuge islands to benefit nesting seabirds. The effects of our management actions on Refuge habitats, including forested uplands, shrub and early successional habitat, saltmarsh and freshwater wetlands are described below for each of the four alternatives. Effects on native, exotic, invasive plants, and rare plant communities are also described.

### Alternative A (Current Management)

#### Impacts from Proposed Land Acquisition and Protection

Our land acquisition proposal under Alternative A would protect 467.1 acres currently within Petit Manan Refuge's approved boundary, and 30 additional nationally significant islands, from one of the principle threats facing coastal habitats: habitat degradation resulting from development. We do not anticipate the need for any active habitat management on the 30 coastal islands acquired under this alternative. Therefore, in the short term, natural processes would dictate any changes to the existing vegetation communities. Vegetative succession is slow on these islands and we do not anticipate any significant changes over the next 15 years. As a result, the habitats found on these islands and coastal properties would continue to support diverse vegetation communities, and provide valuable nesting, foraging, and stopover habitat for a variety of species. On the mainland, acquisition of the 95-acre Sawyers Marsh property would allow us to initiate measures to protect important saltmarsh habitat, which is currently being impacted by illegal off-road vehicle use.

#### Impacts from Proposed Public Use and Access Management

Under Alternative A, we would continue to provide public use opportunities on the two interpretive hiking trails, the Hollingsworth Memorial Trail and the Birch Point Trail, both on the Petit Manan Point Division. Soil compaction and vegetation trampling would likely continue to occur on both trails, although under current public use levels, neither is considered a major threat to Refuge resources. Generally, the disturbance would continue to be confined to the trail.

No public use facilities or parking areas have been developed on the Gouldsboro Bay or Sawyer Marsh divisions, nor would any be developed under Alternative A. Visitors would continue to utilize existing unauthorized "trails" created during past forestry harvesting operations. Hunters and shellfish harvesters would also continue to violate Refuge and State regulations on the Gouldsboro Bay Division by driving off-road vehicles into the saltmarsh, thus trampling vegetation. Similarly, illegal off-road vehicle use would continue at the Sawyers Marsh Division where no



infrastructure is in place. This practice would continue to result in soil compaction, erosion, and destruction of vegetation. Without law enforcement staff to enforce regulations, both upland and saltmarsh vegetation on Sawyers Marsh and Gouldsboro Bay Divisions would continue to be adversely affected, resulting in long-term habitat degradation.

All seabird nesting islands would remain closed to public visitation from April 1 - August 31, to protect nesting seabirds from human disturbance. The seasonal closures on the 30 proposed new islands would limit traditional uses, such as camping, which has a high probability of impacting vegetation through trampling if not managed properly. The seasonal restrictions would also serve to limit potential damage during the peak growing season of most fragile botanical communities located on coastal islands.

Camping would continue to be allowed in designated sites on Bois Bubert and Halifax islands. While some soil compaction has occurred, we do not believe that continued camping would cause irreversible degradation in the short term. We would continue to work with MITA to monitor sites to detect and reverse the potential for long-term negative impacts

A significant portion of Halifax Island would remain closed to public access year round to protect rare plant communities. We anticipate that some of the 30 proposed new islands would also host rare plant communities. Acquisition by the Service would protect these sites from the threats associated with development (vegetation clearing, construction, and off-road vehicle use) and uncontrolled public access during the peak growing season.

### **Impacts from Proposed Vegetation and Habitat Management**

Under Alternative A, once land is acquired by the Service, natural disturbances would be the dominant force altering the forest composition of these lands over the long-term. As a result, the combined effects of wind, fire, ice, insects, and pathogens would create a variety of landscape patterns that vary in stand sizes, shapes, ages, and structural diversity (Elliot 1999). Small natural disturbances can create gaps in the forest canopy that promote the growth of younger trees and increase the overall diversity of the stand (Elliot 1999). We do not anticipate any significant short-term effects to the composition of Refuge forests through our acquisition process or management actions. However, over the long-term, these forests would be sustained as mature and old growth conifer dominated stands subjected to natural processes. The resulting stands would be more diverse in structure and composition than they appear today.

We recently completed cover-type maps for the mainland divisions using the National Vegetation Classification System. Accurate cover-type maps allow us, with input from a variety of conservation agencies, to evaluate the current cover type patterns as well as the best cover type distribution to meet our goals and objectives on Refuge lands. Under Alternative A we would continue this evaluation in support of our goals and objectives.

We would continue to operate without a detailed Habitat Management Plan for the Refuge. Instead, we would continue to manage a few project areas without long-term goals, objectives, and evaluation strategies. We would continue to utilize a variety of vegetation management techniques to maintain or enhance open field habitat for species of conservation concern. These include use of prescribed burning, herbicides, fencing, mowing, rototilling, and sheep grazing. We would continue to monitor vegetation treatment areas pre- and post-treatment to evaluate the effectiveness of manipulating vegetation and determining wildlife response. Overall, the effects of our habitat manipulation efforts would rarely last beyond one to two growing seasons, and there are no significant changes to species composition. Plants would continue to primarily regenerate from seeds within the soil or roots left unharmed by the treatment method. A more detailed description of our treatment methods is presented below.

**Prescribed Burning:** We would continue to use prescribed fire to facilitate old field and blueberry barren management and restoration on approximately 70 acres, to manage threatened and endangered species habitats, to reduce hazardous fuels and debris, or to control invasive or exotic species. The following figures would be our annual maximums for prescribed burning under Alternative A:

- 30 acres/year for enhancing or maintaining wildlife or botanical populations;
- 15 acres/year to preserve threatened or endangered species and promote biological diversity;
- 7 acres/year to control exotic or invasive species and reduce hazardous fuels, and;
- 3 acres/year for boundary maintenance or debris removal around structures.

We have utilized prescribed burning and mowing to maintain grassland habitat on Petit Manan Island and we would continue its use there and potentially on other islands. Our efforts have focused on reducing the abundance and density of blue joint (*Calamagrostis canadensis*) and raspberry (*Rubus* sp.). Both species grow to densities and heights which exclude nesting by terns and may promote nesting competition by laughing gulls. In recent years, we have conducted these prescribed burns on portions of Petit Manan Island during the month of April. This practice results in an oxidation of standing dead biomass and surface litter, with little damage to regenerating herbaceous perennials (N. Richards pers. comm.). Although spring burns reduce small woody and semi-woody stems down to near ground level, the plants retain their ability to re-sprout below the burned stems. With the exception of species that re-sprout readily after a burn and benefit from the temporary reduction in dead plant cover, spring burning would not likely have a significant effect on the existing community composition.



*Prescribed burning efforts on Petit Manan Point Division*  
USFWS photo

Unfortunately, raspberry may actually benefit from the release of nitrogen, the warming of blackened soil, and the liming and fertilizer effect resulting from the burned vegetation (N. Richards pers. comm.). Although the long-term effects of repeated burning of blue joint and raspberry on Petit Manan Island are not currently known, fire does remove standing raspberry canes. At a minimum, this sets back plant height for the following growing season. For dense thatch forming species such as blue joint, burning reduces the thatch component and exposes more bare ground. Based on our experiences, the prescribed fire activities conducted on Petit Manan Island would rarely affect habitat conditions beyond the next growing season.

On the Petit Manan Point Division, we would continue to use prescribed fire to enhance blueberry production and control encroachment of invasive woody species such as sweet fern in the 70 acres of open field. Commercial blueberry growers have determined that crop yield can be improved with periodic pruning, including pruning by fire or mowing. In addition to removing the stems, fire offers several other benefits to the crop, including a reduction in insects, disease, and weeds (University of Maine, Coop. Ext. fact sheet #229). This practice maintains nesting habitat for a variety of grassland breeding birds, and also produces significant berry crops utilized by a variety of bird and mammal species, including migratory whimbrels. In addition to reducing plant height and density, burning removes accumulated layers of organic material from the surface of the ground. During the past five years, we have burned up to 33 acres per year on Petit Manan Point. We would continue to adhere to the Fire Plan to ensure burning effects are short-lived and do not degrade or cause long-term damage to soils or vegetation. We would typically burn these acres on 3 to 5 year intervals.

**Sheep Grazing:** We would continue to use sheep grazing to manage vegetation for common and Arctic terns nesting on Metinic Island. The flock of 120 sheep belongs to the family who owns the southern 150 acres of the island. With the exception of a few small vegetation study plots that we have fenced, the sheep are generally allowed to graze the entire island. In an effort to monitor the vegetation's response to grazing, we would continue to maintain two permanently fenced plots and two reference "unfenced" plots. Several times each season, we would continue to record the species composition and plant height in these four plots. Prior to the tern nesting season, we would also encircle the 3-acre tern restoration area with electric fencing. Protection from grazing allows the vegetation to

increase in height, and provide nesting cover for the terns. Although terns will nest within a variety of habitat conditions, they generally prefer some overhead cover and a mix of vegetation and open space (Cramp 1985, USFWS 2000). The density and height of the plants seem to be more significant in determining use by nesting terns rather than specific plant species composition. (NAS 1994, NAS 1995). Information we have gathered to date on Metinic Island indicates that sheep are altering the species composition, density, and height of the vegetation. However, it appears that the seasonal fencing of the restoration area is providing terns with appropriate nesting cover. At the end of the nesting season, the fence is removed and the sheep may graze the entire island. Seasonal grazing of the restoration area controls the growth of rank vegetation, which, in the absence of vegetation management, would eventually exclude nesting terns. We would continue seasonal grazing of the restoration area as it appears to be providing terns with suitable nesting habitat and is the most viable vegetation management tool we have available on this remote island.

On Nash Island, approximately 30 sheep graze the adjacent privately owned Big Nash Island and cross at low tide to access Service-owned Nash Island. The effects of sheep grazing on the vegetation and seabirds of Nash Island have not been studied. Our observations indicate that grazing pressure and vegetation conditions are similar to that observed on Metinic Island. We would continue to allow grazing on these two islands since it would remain the most viable means of vegetation management for nesting terns on a remote island. As with many coastal islands, sheep have grazed here for generations, so it is difficult to determine with certainty what the natural vegetation community would look like in the absence of grazing.

**Mowing:** On the Petit Manan Point Division, we would continue to mow to control the encroachment of invasive woody species such as sweet fern. Our primary objective would continue to be enhancement of habitat for migratory birds and grassland breeding birds. During the past five years we have mowed up to 18 acres per year. Typically, mowing has been utilized when weather or logistical constraints prohibit burning of targeted fields. Mowing reduces plant height without altering species composition or reducing accumulated thatch. Fields would require repeated mowing or burning within 3-5 years to maintain desired habitat conditions.

On several occasions, we have utilized mowing in an effort to enhance nesting habitat for terns on Petit Manan and Ship islands. We would continue this practice under Alternative A, mowing in the fall. Limited spring mowing efforts have proven unsuccessful, and the vegetation generally has recovered to full height within a matter of weeks. In 2002, we initiated a fall mowing schedule on Petit Manan Island. If favorable moisture conditions exist, mowing in August and September will set back plants that are actively growing at that time, and foster cool-season grasses and other species that have a second vegetative growth period in the fall

(N. Richards pers. com). We anticipate that repeated fall mowing efforts would reduce areas of raspberry, while promoting the growth of various grass species which would provide better nesting habitat for terns. This practice may also reduce the vigorous spread of the invasive species dodder (*Cuscuta gronovii*) on Petit Manan Island. We do not anticipate mowing on any other seabird islands due to the logistical difficulties of getting the equipment onto the islands.

**Herbicides:** We would continue very limited use of the herbicide Roundup<sup>1</sup> on Petit Manan Island in an effort to control raspberry. The primary active ingredient of Roundup is glyphosate, which has undergone extensive environmental review and has not been found to be toxic to wildlife, or bioaccumulate in the foodchain (Monsanto 1993). Roundup is a broad-spectrum herbicide with no soil residual activity. The compound is degraded by microbes within the soil and the average half life of glyphosate is less than 45 days (Monsanto 1993).

On Petit Manan Island, we applied the compound directly to the raspberry plants using a hand sprayer. The single application of Roundup was applied in August 1999 and resulted in the elimination of raspberry from the treated areas during the 2000 seabird season. In some treated areas, the raspberry started to recover in 2001, and now once again represents a significant component of the vegetative cover. It is possible that removal of the vegetative cover may have resulted in increased nutrient release from the soil resulting in increased seed germination (N. Richards pers. comm.). This could result in aggressive invasive species gaining a foothold in the treated area. We minimized effects to non-target species by hand spraying and applying the compound while non-target species were dormant. We do not anticipate significant future use of herbicides on Refuge property. Roundup application would continue to be appropriate for the control of exotic or invasive species, or to treat areas that are unsuitable for other methods of vegetation management (i.e. adjacent to structures, rocky terrain). Due to the availability of plant seeds within the soil, herbicide application would not have the ability to alter species composition on Petit Manan Island, nor would it be expected to have any effect beyond 1-3 years.

**Rare plants:** We would continue to conduct botanical evaluations on at least two Refuge islands per year to identify plant communities of concern and to serve as a baseline for future habitat management decisions. With island specific information, we would be better able to determine potential threats and the conservation measures necessary to ensure continued viability of rare plants. Unfortunately, our current staffing levels do not allow us to aggressively eradicate exotic and invasive species which have been documented as threats to rare plants on coastal islands.

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<sup>1</sup> The use of trade, firm, or corporation names in this publication is for the information and convenience of the reader. Such use does not constitute an official endorsement of any product or service by the U.S. Department of Interior.

### **Impacts from Proposed Wildlife Populations Management**

No impacts are predicted.

### **Alternative B (Service's Preferred Alternative)**

#### **Impacts from Proposed Land Acquisition and Protection**

In addition to the 467.1 acres currently within the approved Petit Manan Refuge boundary, the Service would acquire 87 nationally significant seabird, wading bird, bald eagle, and waterfowl nesting islands and 153.3 acres of important wetlands and migratory bird habitat. This effort would protect these parcels from one of the principle threats facing coastal habitats: habitat loss and degradation resulting from development. The islands span the entire Maine coast and represent the full diversity of island habitats. Service acquisition would result in permanent protection of representative coastal habitats, providing valuable nesting, foraging, and stopover areas for a wide variety of species.

On all but 12 of the islands, only natural processes would dictate changes to the vegetation communities, as we would not be actively managing the habitat. On the 12 islands selected for seabird restoration efforts, intensive habitat management would occur as described below.

#### **Impacts from Proposed Public Use and Access Management**

In addition to actions proposed in Alternative A, under Alternative B we would build a new trails and parking areas on the Gouldsboro Bay, Sawyers Marsh, and Corea Heath divisions. These would each require clearing approximately 106,000 square feet (2.5 miles long by eight feet wide) of vegetation for the trail and 800 square feet (room for 10 cars) for the parking area. We would utilize as much of old dirt logging roadbeds as possible. Up to two trail-side interpretive overlooks would also be added to each trail. The trail and parking area would increase access to the Refuge's mainland divisions for hikers, bird watchers, and hunters. Development of the trail would permanently remove vegetation within the footprint of the trail; however, it would minimize continued vegetation destruction resulting from creation and use of "unauthorized" trails. All visitors would be required to stay on designated trails. Boardwalks would be constructed over saturated areas to protect sensitive vegetation from adverse impacts.

Under Alternative B, on Petit Manan Point we would build a designated access trail to at least one overlook on the Birch Point Trail at Carrying Place Cove. Currently, visitors routinely venture off the present trail to view this cove. While development of the overlook and designated spur trail would result in a permanent loss of vegetation within the footprint of the trail, we would utilize existing "unauthorized" trails to the extent possible to minimize additional disturbance to vegetation. Establishment of a viewing platform and access trail should limit human activity to one

defined area and minimize adverse effects to vegetation along the various trails currently used by the public. Areas not part of the designated trail would revegetate naturally from adjacent seed and root sources.

The seasonal seabird and bald eagle nesting island closures would potentially limit traditional uses, such as camping, on some islands, but would also reduce vegetation damage associated with human visitation. These closures afford protection to the fragile botanical communities located on many of the islands during their peak growing season.

Gates would be erected at several vehicle access points on the Sawyers Marsh Division. This would eliminate or significantly reduce visitors' ability to drive onto refuge lands and adjacent saltmarsh for hunting or other purposes. While some visitors may be inconvenienced, this access by highway and off-road vehicles has never been authorized, and we have been concerned about resource damage. Soil compaction, erosion, and destruction of vegetation would all be reduced by this management action. Law enforcement staff hired under this alternative would allow us to enforce against these unauthorized activities.

The expanded deer hunt program on the Petit Manan Point Division may result in localized (less than 10 square feet), short-term disturbance to vegetation where temporary blinds may be constructed for the disabled hunt. However, the hunt occurs outside of the active growing season, so impacts on vegetation are predicted to be negligible

### **Impacts from Habitat and Vegetation Management**

Under Alternative B, we would complete a Habitat Management Plan (HMP) for the Refuge within one year, providing more detailed and site specific objectives and strategies for each cover type. We would work closely with our conservation partners during the development of this plan to ensure that we continue to contribute to the ecological diversity of the Maine coast. We would use vegetative treatments, similar to Alternative A, such as mechanical, biological, chemical, grazing, and prescribed fire, where appropriate, to manage for desirable vegetation and to control invasive and exotic plants. Our management activities would be designed to enhance habitat conditions for certain species of management concern, which may include negative trade-offs with other native species. Our HMP would further refine the direction for managing cover types provided below for Alternative B.

**Mature Conifer:** We would maintain mature conifer forest habitat where it exists on the Refuge; including, 905 acres on Petit Manan Point, 734 acres on Bois Bubert Island and 1,248 acres on Cross Island. Although conifers dominate a large percentage of Maine's forests, the forest industry has favored shorter harvest rotations which has created younger, even-aged forested stands that provide less structural and age-class diversity than

older stands. These younger, even-aged forests typically have a lower supply of downed and standing dead wood, more uniform vertical structure and canopy gaps, and a highly altered plant and animal composition (Elliott 1999). Under Service ownership, natural disturbances would be the dominate force altering forest composition, and the trees would grow and age as nature dictates. We would not anticipate any short-term changes to these forests resulting from our management. However, over the long-term, we anticipate that these forests would acquire more old-growth conditions, resulting in greater standing and down, live and dead biomass, more structural diversity and an increased variety of age classes.

**Northern Hardwood-mixed Forest:** We would maintain at least 1,250 acres of northern hardwood-mixed forest habitat where it exists on the Refuge. Although small amounts of this habitat type can be found on many of the islands, the largest parcels would remain on three mainland divisions (453 acres on Petit Manan Point Division, 123 acres on Gouldsboro Bay



*Timber cove, Gouldsboro Bay Division*  
USFWS photo

Division, and 455 acres on Sawyers Marsh Division). Our management actions would focus on maintaining a range of forest age structures. The majority of acres would be mid-successional and late-successional forest, providing structural diversity (shrubs and treefall) within the forest. We would not anticipate any short-term changes to the forest through our management. However, over the long-term we would predict that more shade tolerant species would dominate the stand, resulting in a gradual conversion to conifer forest. After 50 years, hardwood species would remain a viable component of the forest, but would likely develop a more patchy distribution as they would only germinate in canopy gaps created through natural disturbances.

**Early Successional Forest/Scrub-Shrub Community:** We would manage approximately 226 acres in early successional forest/scrub-shrub community, primarily on the Petit Manan Point Division, which is dominated by speckled alder, mountain ash, and sweet gale. In the Northeast, this habitat is typically created from natural disturbances such as fire, flooding, beaver activity, or severe storms or occurs as a relatively short-lived vegetation stage after agricultural abandonment or logging (Rosenberg and Hodgman 2000). Throughout coastal Maine, current land management practices strive to avoid these disturbances and, as a result, this habitat type and many landbirds associated with it are in decline. We would utilize some of the habitat management techniques described in Alternative A to maintain these serial stages of vegetation. Without active management, or natural disturbances, this habitat would eventually be replaced by northern hardwood, then conifer forest.



**Open Field/Blueberry Barrens:** We would manage up to 100 acres of open field and blueberry barren habitat on the Refuge mainland, mainly on Petit Manan Point Division. Without some level of intervention, it is likely that these fields would eventually evolve into shrubs and young forest. We would continue to use prescribed fire and mowing to facilitate open field and blueberry barren management and restoration across the Refuge, to manage threatened and endangered species, to reduce hazardous fuels and debris, or to control invasive or exotic species. The following figures should be considered annual maximums for prescribed burning:

- 70 acres / year for enhancing or maintaining wildlife or botanical populations;
- 25 acres / year to preserve threatened or endangered species and promote biological diversity;
- 10 acres / year to control exotic or invasive species and reduce hazardous fuels, and;
- 5 acres / year for boundary maintenance or debris removal around structures. The impact from prescribed fire and herbicides has already been described.

On the coastal islands there are extensive areas of mixed grasses and various herbaceous species, which provide high quality nesting and migration habitat for many bird species of conservation concern. Our management of these island cover types would continue to be at seabird restoration sites. Under Alternative B, we would establish six new seabird restoration projects on islands in addition to the six we currently manage. Several of these projects could require intensive habitat management in order to create suitable nesting habitat for the terns. We have not identified which islands would support these projects, therefore, we cannot evaluate the site specific consequences of our management actions at this time. However, we would utilize the vegetation management techniques outlined in Alternative A. Grazing may be permitted on some of the seabird islands, however, we would require special use permits be issued to the operators to better manage grazing intensity, distribution, and duration on Refuge lands. We would re-evaluate the effectiveness of grazing after 5 years of CCP approval as stipulated in the compatibility determination (Appendix C).

**Maritime Saltmarsh and Estuary:** We would maintain the existing 69 acres of maritime saltmarsh and estuary located on Cross Island, Sawyers Marsh, Gouldsboro Bay and Petit Manan Point Divisions, to ensure the quality and natural function of the marshes are sustained. Service acquisition of the marshes and the adjacent upland habitat would protect these sites from the adverse effects (i.e. non-point source pollution, erosion, invasive species) associated with development of surrounding uplands. We would manage to minimize the human-induced adverse impacts on this habitat type. We do not anticipate that the vegetation communities found in these marshes would be modified as the result of this manage-

ment action. Over the long-term, greater protection would be afforded these areas.

**Jack Pine:** We would maintain the existing 40 acres of jack pine woodlands (28 acres on Bois Bubert Island and 11 acres on the Petit Manan Point Division) to ensure this community continues to provide a unique and important contribution to the biological diversity of the Refuge. Jack pine is a “pioneer” species which establishes in areas that have been disturbed by fire or other disturbance processes that set back vegetation. The seeds do not usually survive in areas with a thick organic layer and studies indicate that seeds experience a higher germination rate when a fire consumes the organic material and exposes a more suitable seed bed of mineral soil (Maine NAP 1983). Exposure to periodic fires increases the ability of jack pine to maintain its dominance over potentially invasive or fire-sensitive tree species. Without further disturbances, these jack pine woodlands would be replaced by spruce-fir forests over time (Maine NAP 1983). The two jack pine stands found on the Refuge represent two of only eight known stands in Maine. Loss of these areas would represent a significant reduction in the biodiversity of this region. We would coordinate with our Regional Fire Management Officer to determine appropriate site-specific prescriptions for burning.

**Rare Plants and Invasive Plants:** We would manage rare plant communities on the Refuge to maintain or enhance their populations, ensuring that they remain viable and contribute to the natural botanical diversity of the area. We would conduct six botanical inventories per year on Refuge islands in an effort to document rare plant occurrences and to develop management actions. This information would serve as a baseline for future management decisions and allow us to address threats from exotic and invasive species. Similar to Alternative A, we may restrict public access in order to protect rare or fragile plant communities. Minimizing human disturbance would help to protect these plant communities from trampling, soil compaction, and illegal collection.

We would actively treat exotic and invasive plant species. Treatment methods used would include herbicides, prescribed fire, mowing, and biological control measures. We would work with our conservation partners to determine the most appropriate and effective means of control. With information available to us, we do not think we have a significant invasive plant problem at this time. However, as additional islands are added to the Refuge and botanical inventories are conducted, we anticipate that more active control measures would be needed. Invasive species control measures would protect the long-term native biodiversity of these coastal islands. Over the long-term, acquisition of islands supporting rare plants or communities would continue to be the best initial step to protect them from human induced habitat alteration. Over the long-term, our goal would be to ensure that rare plant communities are sustained and contributing to the rich ecological diversity of the Maine coast.

**Freshwater Wetlands:** We would manage the existing 467 acres of freshwater wetlands on the four mainland divisions. The wetlands represent a diversity of habitats ranging from forested wetland to coastal raised bogs. On Petit Manan Point, three large wetland complexes (Meadow Brook, Mague Flowage, and Cranberry impoundment) comprising 112 acres, provide areas of open and shallow water marshes, ericaceous shrubs, and wild rice. Although all three impoundments have water control structures, we do not actively manage the water levels. Annual precipitation levels and beaver dams would continue to dictate water levels. When conditions allow, we would introduce additional wild rice into Mague flowage in an effort to enhance foraging habitat for migratory waterfowl. We would not anticipate any significant long-term changes to the wetland vegetation as a result of our management actions. Also on the mainland divisions, we would continue surveys to locate vernal pools and document use by amphibians and reptiles. This baseline information would allow us to make more informed decisions on managing these habitats to benefit wetlands-dependent species over the long-term.

#### **Impacts from Wildlife Populations Management**

No impacts predicted.

### **Alternative C**

#### **Impacts from Proposed Land Acquisition and Protection**

In addition to the 467.1 acres currently within the approved Petit Manan Refuge boundary, the Service would acquire all, or portions of the larger (>200 acres), 151 nationally significant seabird, wading bird, bald eagle, and waterfowl nesting islands. These islands would be permanently protected from one of the principle threats facing coastal habitats: habitat degradation resulting from development. These 151 islands represent all of the seabird, wading bird, bald eagle, and waterfowl nesting islands not currently protected in conservation ownership. Similar to Alternative B, these islands include the full diversity of island habitats along the Maine coast. Their protection would ensure that valuable nesting, foraging, and stopover habitat would be available long-term to Federal trust species.

Similar to Alternative B, on most of the islands, natural processes would dictate any changes to the vegetation communities because they would not be actively managed. The only exception would be the proposed seabird restoration islands, which will increase from 6 to 12 new islands. Alternative B described these impacts in more detail.

#### **Impacts from Proposed Public Use and Access Management**

We would construct the same public use infrastructure as identified in Alternative B and the impacts would be similar. We predict that establishing the trails would minimize continued vegetation destruction resulting

from creation and use of “unauthorized” trails. Boardwalks would be constructed over saturated areas to protect sensitive vegetation. All visitors would be required to stay on designated trails. The impacts from the hunting program would be similar to those described for Alternative B.

We would also construct two photo blinds on the mainland divisions to enhance opportunities for wildlife photography. At this point in time, locations for the blinds have not been determined but we anticipate impacts on vegetation would be limited to the footprint of the structures and short access trails. Approximately 1 acre would be disturbed for each project.

With concurrence of the Town of Gouldsboro, we would erect gates on either end of the Old County Road. This would eliminate illegal off-road vehicle use of the Gouldsboro Bay Division. This action would minimize continued vegetation destruction, soil compaction, and erosion, all of which we have observed resulting from unauthorized ATV use. Law enforcement staff hired under this alternative would also provide us with the resources to enforce against unauthorized access and continued resource degradation.

### **Impacts from Proposed Vegetation and Habitat Management**

In addition to the HMP outlined under Alternative B, we would develop “island-specific” plans for each of the islands within the Refuge. This action would require extensive financial and staff support to document botanical communities and exotic and invasive species concerns on all current and proposed Refuge only islands.

Under Alternative C, we would manage the uplands and wetlands cover types, and rare plant communities on the mainland the same as Alternative B. We predict impacts would be similar to those described for Alternative B. On islands, the management strategies and impacts would also be the same, except they would be increased in scope over Alternative B by virtue of the proposed increased island acquisition.

We would continue to use prescribed fire and mowing to facilitate old field and blueberry barren management and restoration, to manage threatened and endangered species, to reduce hazardous fuels and debris, or to control invasive or exotic species. The following figures should be considered annual maximums:

- 140 acres / year for enhancing or maintaining wildlife or botanical populations;
- 50 acres / year to preserve threatened or endangered species and promote biological diversity;
- 50 acres / year to control exotic or invasive species and reduce hazardous fuels, and;
- 10 acres / year for boundary maintenance or debris removal around structures.

Under Alternative C, we would establish 12 new seabird restoration projects, in addition to the 6 we currently manage (e.g. 18 sites total). This represents a significant expansion of our restoration activities, and would require dramatic increases in funding and staffing support. We have not selected the new restoration islands, so it is not possible to thoroughly evaluate the consequences to vegetation. However, we would likely reduce the abundance of rank species such as raspberry, in an effort to promote vegetation favored by nesting terns (i.e. mixed grasses). We would utilize the variety of techniques outlined in Alternative A to maintain habitat on the restoration islands.

#### **Impacts from Proposed Wildlife Populations Management**

No impacts predicted.

### **Alternative D**

#### **Impacts from Proposed Land Acquisition and Protection**

Under Alternative D, the Service would acquire the 467.1 acres currently within the approved Petit Manan Refuge acquisition boundary. No additional protection would be afforded to the 151 nationally significant seabird, wading bird, bald eagle, and waterfowl nesting islands currently lacking conservation ownership. Instead, this alternative assumes the islands are best served through ownership by our conservation partners. However, we cannot commit our partners to acquiring these specific islands. Each conservation organization would evaluate its interest based on available resources, its mission, and commitment by constituents. We would expect that islands requiring active management, monitoring, or law enforcement would receive less protection under this alternative.

#### **Impacts from Proposed Public Use and Access Management**

Under Alternative D, all Refuge islands would be closed to public access year round. The islands would be managed as ecological reserves, where human intervention and presence are minimized. A few staff- or partner-led tours would be provided or permitted only under special use permits. As a result, soil compaction and vegetation trampling resulting from day visits and camping on the islands would be eliminated or significantly reduced over the long-term, and areas already impacted would be able to recover.

No additional public use facilities would be developed on the mainland, so no losses in vegetation would occur due to new construction. Soil compaction, vegetation trampling, and intrusions in to the saltmarshes would likely continue and ultimately worsen as public use continues to increase. In particular, failure to designate a trail at Gouldsboro Bay Division would result in continued loss of vegetation and degradation of conditions along the “unauthorized” trails currently utilized by visitors.

Under Alternative D, we would close the Refuge to hunting. It is unlikely this would result in significant vegetation change within the next 15 years; however, should deer population levels increase significantly, the inability to conduct a hunt may result in over browsing, damage to rare plant communities, and conflicts with adjacent landowners.

### Impacts from Proposed Habitat and Vegetation Management

Under Alternative D, we would allow natural succession to occur in all habitat types. The mature conifer and northern hardwood-mixed forest would continue to mature as proposed in Alternative B. In addition, we would no longer manage for early successional forest/edge habitat dominated by species such as alder (*Alnus* spp) and cherry (*Prunus* spp) approximately 2-10' tall. We anticipate that without management a significant percentage of this habitat would mature into conifer or conifer-hardwood mixed forest over the long-term. We would also not actively manage the saltmarsh and wetlands on the Refuge; however, we do not expect any appreciable impacts or changes to vegetation. Other impacts to cover types resulting from Alternative D are presented below.



*Northern blue flag*  
USFWS photo

**Open Field/Blueberry Barren:** We would eliminate sheep grazing, herbicides, mowing, and burning as habitat management tools. This change in management practices would significantly reduce our ability to maintain or enhance open field/grassland habitats. Within the next 15 years, the grass and blueberry fields on Petit Manan Point would likely be replaced by shrub communities, with conversion to forested habitat over the long-term. On the coastal islands, we would not actively manage vegetation, even on the six seabird restoration sites. This would result in a loss of nesting habitat for terns which generally require lower vegetation than would be expected under “non-managed” conditions. On several of the seabird islands, we have documented the expansion of rank vegetation and the subsequent loss of breeding opportunities for terns. Combined with a reduction in predator control efforts, this alternative would significantly limit our ability to contribute to restoration efforts for the endangered roseate tern and several other state-listed species. In contrast, species such as common eider and laughing

gull would benefit in the short-term from the growth of rank vegetation (blue joint and raspberry), and their nesting population would be expected to expand on these 6 islands. This benefit would not last over the long-term; however, as they would eventually succumb to the increase in predators.

**Rare Plants:** Service acquisition of the 467.1 acres in the approved Petit Manan Refuge boundary would permanently protect rare plants. However, botanical resources would be at risk on the remaining 151 nationally significant nesting islands unless protected by others, which we cannot guarantee. We would not actively manage the vegetation or permit grazing on Refuge islands which could have both positive and negative consequences on rare plants. Currently, we only manage the vegetation on three of the six seabird restoration islands and we avoid any rare plant communities during these management actions. However, it is possible that our management is suppressing a rare species or plant community that we have not detected to date. This type of species could benefit from a “no vegetation management/no-grazing” approach. Species which require periodic disturbance or removal of more aggressive vegetation growth in order to survive would be adversely affected by the “hands-off” approach proposed under Alternative D.

Under Alternative D, staff and financial resources would not allow us to adequately inventory and evaluate threats to rare plant communities. It is probable that rare species and botanical communities would be lost due to habitat change from succession, invasive or exotic species, or habitat alteration without our knowledge. Alternative D would limit our ability to detect plant population declines, and irreversible changes could occur.

**Jack Pine:** Due to the “hands-off” approach to management in this alternative, we would not initiate any actions, including prescribed burning, to benefit the maintaining the two jack pine woodlands found on the Refuge. The significance of these communities and their specific habitat requirements are outlined in Alternative B. Without future management actions or natural fire events, it is likely these jack pine woodlands would be replaced by spruce-fir forests (Maine NAP 1983). Although no significant change would be expected within the next 15 years, the long-term consequences of this alternative would be conversion to spruce-fir forest, and the biological diversity of the Refuge and coastal Maine would be negatively affected.

### **Impacts from Proposed Wildlife Populations Management**

No impacts predicted.

**Vegetation and Habitats - Summary**

Under Alternatives A, B, and C, few changes in vegetation management would occur on existing Refuge lands. The few changes would occur under Alternatives B and C and include up to 100 acres of northern hardwood-mixed forest and scrub shrub managed to diverse age classes, and active management of rare plant sites and Jack pine stands. Under Alternative D, no vegetation management would occur so any changes would be the result of natural processes. On the islands, the primary difference in active vegetation management would be associated with the number of proposed seabird restoration sites. Under Alternative A, it would remain at 6 sites; under Alternative B it would be 12 sites; under Alternative C it would be 18 sites, and under Alternative D it would be minimum maintenance of 6 sites.

**Effects on Threatened and Endangered Species**

The two Federal-listed species most likely to be impacted from our management actions are the endangered roseate tern and threatened bald eagle. We also discuss implications to the threatened piping plover. Appendix J shows an intra-Service evaluation form from our Ecological Services office in Maine, which concludes that all alternatives comply with the Endangered Species Act, and that no further consultation is required under Section 7 of this Act.

**Alternative A (Current Management)**

**Impacts from Proposed Land Acquisition and Protection**

Under Alternative A, Service acquisition of the 467.1 acres currently within the approved Petit Manan Refuge boundary and 30 additional nationally significant nesting islands would permanently protect these important nesting areas. One proposed new island currently supports nesting bald eagles, but several others provide suitable habitat for eagles to nest in the future. Permanent protection of nesting areas and protection from human disturbance are the two most significant factors necessary to insure the continued expansion of the Maine bald eagle population.

Two historic roseate tern nesting islands, currently not under conservation ownership, would also be permanently protected under Alternative A. Land protection remains a critical component in the recovery of roseate tern and other nesting seabirds because sufficient habitat must be available to accommodate expanding populations. Active predator control and/or habitat management may also be necessary if the roseate tern is to sustain nesting on any of these islands.

Protection of additional Refuge islands would also provide migratory stopover and foraging areas for the Federal-listed piping plover. The islands are generally free from mainland mammalian predators, and human disturbance is much reduced during the migration seasons. By protecting critical feeding and resting areas we would be contributing to improved physical conditions of piping plover during their migration, and ultimately contributing to the recovery of the species.



### Impacts from Proposed Public Use and Access Management

We would continue to manage public use and access on Refuge lands to minimize any disturbance or adverse impact to threatened and endangered species. Our seasonal public access restrictions on nesting islands would support this goal.

In addition to our current nesting islands, we would implement the seasonal restrictions outlined below on all 30 islands proposed for acquisition.

**Bald Eagles:** We would maintain seasonal closures on bald eagle nesting islands during the breeding season. Currently we have six active and four historic bald eagle nesting sites on the Refuge. Islands (or portions thereof) which support nesting bald eagles would remain closed to public access from February 15 to August 31. Historical eagle nesting islands would remain closed from February 15 to May 1. By May 1, we would determine whether to keep the islands closed to public visitation until August 31 due to the presence of eagles, or open them for day use. Several of the islands proposed for acquisition under this alternative could, in the future, provide nesting habitat for eagles. We would continue to use public education efforts to inform the public about the adverse effects of disturbing eagles during the nesting season.

**Roseate Terns:** We would continue to close all seabird nesting islands to public visitation from April 1 to August 31. When a human or other perceived predator enters a tern colony the majority of the colony will rise up from their nests to mob the “predator”. Group defense of the nesting area is one of the primary benefits of nesting colonially. Frequently, gulls will take advantage of this disturbance and enter the seabird colony to prey on eggs and chicks. Minimizing human disturbance at nest sites reduces the energy reserves seabirds need to spend defending their nest sites, reduces the susceptibility of nests to predation from other seabirds (i.e. gulls), and reduces the time adult seabirds are kept away from their nests. Closing nesting islands to public access during the breeding season should improve the nesting success of the endangered roseate tern and other seabird colonies.

### Impacts from Proposed Habitat and Vegetation Management

We would protect, but not actively manage, the habitat on the six active and four historic bald eagle nesting islands. Forests would be allowed to mature under natural conditions, and natural forces would dictate any significant changes. Mature forest conditions would also continue to develop on 15 existing forested Refuge islands, the mainland divisions, and approximately 25% of the islands proposed for acquisition. These developments would help to ensure continued availability of nesting areas for a growing population of bald eagles.

Habitat management techniques utilized for roseate tern nesting islands would be similar to those described in the “Effects on Vegetation and

Habitat” for Alternative A. We would provide a variety of habitats including open field, bare ground, and certain species of vegetation which would provide overhead cover to the terns. Roseate tern nests in the Northeast are predominantly under cover such as dense vegetation, under rocks or driftwood, or in artificial sites such as nest boxes (Spendelow 1982, Burger and Gochfield 1988a, Gochfield et al. 1998). We would continue to provide artificial nest structures for roseate terns nesting on Petit Manan Island. We would evaluate the need to provide additional boxes on an annual basis. Our actions would support recovery goals for this species, but probably not contribute significantly.

### **Impacts from Proposed Wildlife Populations Management**

After 20 years of active seabird restoration and predator management activities along the Maine coast, the endangered roseate tern population has increased 276%; from 76 pairs in 1984, to 285 pairs in 2002 (MDIFW 2002). Predator management remains a critical component of the restoration process, and population recovery for all three species of terns (roseate, Arctic, and common) would not have been possible without this management tool. In the absence of predator management, we have observed complete colony abandonment, decreased survival rates, or elimination of productivity.

Under Alternative A, we would continue to utilize a variety of gull control techniques including harassment, pyrotechnics, nest destruction, and shooting on our six existing seabird restoration islands. The majority of our predator management efforts have been, and would continue to be, targeted at herring and great black-backed gulls. Predator management efforts undertaken on the seabird restoration projects in Maine have not adversely affected the State or regional population of gulls. Less than 10 gulls per year are lethally removed from the six Refuge Complex restoration islands. Current survey information indicates that 15,800 pairs of great black-backed gulls are nesting on 231 islands in Maine. In addition, 28,290 pairs of herring gulls nest on 183 islands (Allen pers. comm.).

Control of nesting gulls on specific islands has resulted in significant population increases for several species of seabirds. All four islands supporting nesting roseate terns have ongoing predator management programs. Information gathered on the restoration islands demonstrates significantly higher site attendance, population growth, and survival rates for both juvenile and adult seabirds as compared to sites where gulls are not managed.

In addition to gull control, under Alternative A we would manage other predators as warranted on seabird islands. The presence of a single mammalian predator (i.e. mink) or nocturnal avian predator (i.e. black crowned night heron or great horned owl) can have disastrous effects on nesting seabirds. Mink have been observed killing large numbers of terns, and a

single mink is believed responsible for the drastic reduction in the NAS Jenny Island colony that dropped from over 1,000 pairs of terns in 2000, to 59 pairs in 2001 (Hall pers. comm.). Past experience has demonstrated that without prompt and effective predator control measures a small number of predators could significantly reduce the Maine roseate tern population. Predator management measures for mammals and nocturnal avian predators would continue to be targeted at individuals preying on the tern colony. No significant local or regional population declines would be expected.

Although predator management practices have resulted in a significant population gain for roseate terns, the birds remain extremely vulnerable to catastrophic events such as oil spills or disease outbreaks due to their limited distribution and population size. In 2002, 95% of the Maine roseate tern population was nesting on two islands, with the remaining 5% of the birds nesting on two additional islands. While we remain optimistic that roseate tern will initiate nesting on other existing restoration islands, the threat of a single event eliminating the majority of the population remains a significant concern.

Numerous other species of seabirds have benefitted from our predator management efforts. Common and Arctic terns, laughing gulls, Atlantic puffins, and razorbills have all expanded breeding populations on the islands with active predator management. Common eiders have also experienced increased duckling survival rates on the waters surrounding the seabird restoration islands, as compared to regions with no gull control (Mawhinney 1999).

Continued expansion of the bald eagle population could adversely affect other seabird species. Within Maine, eagles nesting along the coast have been found to forage primarily on gulls and cormorants (Welch 1994). Eagles will also prey on common eiders and wading birds if they are available. The presence of bald eagles nesting on islands adjacent to seabird or wading bird nesting islands may result in increased predation rates for those colonies. While we do not anticipate adverse effects on the regional populations of seabirds or wading bird colonies, reductions in individual colony productivity or site abandonment could result from increased bald eagle predation.

**Alternative B (Service's Preferred Alternative)**

**Impacts from Proposed Land Acquisition and Protection**

**Bald Eagles:** The primary goal of the Northern States Bald Eagle Recovery Plan, which includes Maine, is self-sustaining populations of bald eagles in suitable habitats. Protection and enhancement of eagle populations and their habitat continues to be a major focus of recovery plan implementation. Conservation agencies agree that continued habitat loss and degradation could reverse the current upward population trends. Service acquisition of 87 additional islands proposed in Alternative B would represent a significant contribution towards the recovery plan goal.

Currently, 37 of these islands support nesting bald eagles and represent the highest protection priority need based on habitat integrity, length of occupancy by eagles, absence of human disturbance, and strategic geographic importance in conserving the eagle population along the coast of Maine (MDIFW 2003). Additional islands acquired under this alternative would provide for future expansion of eagles into new nesting territories. Service acquisition of these bald eagle nesting islands would also contribute in a major way towards the State goal of securing 150 bald eagle nesting areas in conservation ownership. Once this goal is realized, the species can be removed from the Maine Endangered Species list.

**Roseate Terns:** The primary objective of the Roseate Tern Recovery Plan is to promote an increase in breeding population size, distribution, and productivity. Service acquisition of active and historic roseate tern nesting islands, public education, and restricted public access during sensitive nesting periods would allow us to make an important contribution to recovery. Under Alternative B, the Service would acquire two new islands with historic roseate tern nest sites. Since the few known active Maine colonies are concentrated on only four islands, protection of historic sites would be very important to future restoration efforts. Many of the other islands proposed for acquisition offer foraging habitat for these birds. Any opportunities to increase the population and improve the geographic distribution of these endangered species would promote recovery.

### **Impacts from Proposed Public Use and Access Management**

Management of public access to minimize impacts to nesting bald eagles and roseate terns on islands would be similar to Alternative A; the only difference is the number of islands affected. Both alternatives include the current Refuge islands; however, under Alternative B, an additional 87 islands would have seasonal public access restrictions. This island protection effort vastly improves nesting opportunities over the long-term, especially for bald eagles. With adequate enforcement, human disturbance would no longer be a threat at nesting sites.

The bald eagle nesting site in the Gouldsboro Bay Division would not be impacted by proposed public use and infrastructure. We would locate the trail to avoid disturbance, and would require people to stay on the trail. As with the islands, we would increase outreach and enforcement to ensure human disturbance would not pose a threat. If necessary, we would implement seasonal closures in the southern end of the division.

### **Impacts from Proposed Habitat and Vegetation Management**

Similar to Alternative A, we would protect, but not actively manage, the mature forest stands that support bald eagle nesting habitat. We do not predict any significant changes in the quality of nesting habitat over the short-term. Impacts would be similar to those described under Alternative A.

Under Alternative B, we would initiate six new seabird restoration projects. Our habitat management objectives would be to provide suitable nesting habitat for roseate, common, and Arctic terns and we anticipate that some vegetation management would be necessary on these islands. We would utilize the variety of vegetation management techniques to enhance conditions for nesting terns that were described under Alternative A. Management efforts would not be applied to the entirety of the islands, so that a diversity of vegetation communities and plant height would be available to the birds. When appropriate, roseate tern nest boxes would be provided on the new restoration islands. Enhancing habitat conditions for nesting roseate terns would likely increase productivity, improve their distribution, and eventually increase population numbers in coastal Maine. Our actions, if successful, would make an important contribution to the recovery of the roseate tern over the long-term.

### Impacts from Proposed Wildlife Populations Management

Under Alternative B, we would continue to implement both lethal and non-lethal predator management measures on the seabird restoration projects. Lethal measures would only be used when, based on available information, non-lethal measures would not produce the necessary reduction in an island's gull populations. In addition to the methods described in Alternative A, we would consider using the avicide DRC 1339 to remove breeding populations of herring and great black-backed gulls from seabird restoration islands. The avicide has typically been applied during the first one to two years of restoration efforts on an island. Only gulls with established nesting territories are affected by this technique. It allows us to lethally remove breeding gulls from an island in a few days. While this may alter the local abundance of herring or black-backed gulls, it would not affect regional or State population levels for either species.



*Avicide-treated bread cubes are used to remove targeted gulls*

USFWS photo

DRC 1339 (3 Chloro-4-methyl benzenamine hydrochloride) has been found to be highly toxic to gulls, but has low toxicity to non-target species, and decomposes rapidly. Laboratory tests showed DRC 1339 is lethal to gulls, starlings, and blackbirds, yet considerably less toxic to most other species of birds and relatively non-toxic to mammals. The product decomposes rapidly to harmless by-products, and, when applied properly, results in virtually no accidental take of non-target species. Secondary poisoning studies conducted on several raptors found no secondary ill effects to the birds, even when they consumed over 100 treated starlings. In fact, we have not observed any non-target species affected during our previous applications.

DCR 1339 is licensed only for use by Service and U.S. Department of Agriculture's Animal Damage Control applicators who are certified pesticide application masters in the State which it is used. The bait is prepared by mixing a small amount of 1339 (6 grams) with 1 lb. of margarine which is then spread on bread and cut into 9 individual cubes. The treated bread cubes are placed within the gull nest, and are frequently consumed within minutes of placement. Treatment occurs in spring when nesting gulls are aggressively defending their territories. This assures that non-target species do not consume the bait. Any unconsumed or regurgitated bait is collected within 12 hours of the application as an added safety measure. Once consumed, the toxicant causes kidney failure resulting in a humane death within 24 - 72 hours. Carcasses are collected from the island and buried or provided to educational institutions for research.

Through the use of DRC 1339, the Service and its partners have successfully restored seabirds to historic nesting sites at Petit Manan, Seal, Ship, and Pond islands. While other methods of gull control exist, the Service continues to support the use of DRC 1339 as the most effective and efficient means of removing a large number of breeding gulls from a restoration island.

The benefits of 20 years of active roseate tern management were described in Alternative A. While the overall population has increased by 276%, total number and distribution remain concerns. The number of pairs has somewhat stabilized over the past five years (255-285 pairs), and 95% of roseate terns breed on only two islands. New restoration projects are necessary for continued population growth and viability. We anticipate the six new restoration projects, continued predator control, and habitat management efforts would result in continued population growth and the establishment of additional roseate tern nesting colonies within Maine. These efforts would continue to reduce the number of individual predators in a local setting, but overall viability of regional or State predator populations would not be negatively impacted over the long term.

## **Alternative C**

### **Impacts from Proposed Land Acquisition and Protection**

Alternative C would include the benefits of Service acquisition related to bald eagle habitat protection and cooperative seabird restoration efforts identified in Alternative B. It would, however, further enhance the positive impacts by permanently protecting all 151 nationally significant nesting islands not currently in conservation ownership. The potential to dramatically improve the nesting populations and geographic distribution of roseate terns and bald eagles is substantial. Long-term protection of nesting sites has been identified as a high priority in the recovery effort for both bald eagles and roseate terns (MDIFW 2001 and USFWS 1998). Acquisition by the Service would remove all threats associated with development of the islands and uncontrolled public access. In addition, with permanent protection, these islands would continue to provide critical

nesting, foraging, and migratory habitat for a variety of other species of conservation concern.

### **Impacts from Proposed Public Use and Access Management**

Management of public access to bald eagle and roseate tern nesting would be similar to that detailed under Alternative B, although Alternative C allows for some modifications to the closure period on an island-specific basis, based on localized nesting conditions and species present. For example, where Leach's storm-petrel nest on an island, we would consider extending the closure period through November 15th, since these birds are known to be in their burrows until then. While much more labor intensive for us, all nesting birds would be protected to the maximum extent possible.

### **Impacts from Proposed Habitat and Vegetation Management**

Our habitat management objectives and techniques outlined under Alternative B would be expanded to 12 new restoration projects under Alternative C. Roseate terns would benefit directly from continued efforts to manage vegetation and predator population levels on the 6 current and 12 new restoration islands. With regards to bald eagles, maintaining mature forested conditions on coastal islands would ensure continued availability of nesting and roosting habitat for a growing population. As a result of implementing Alternative C, we would make a significant contribution towards both State and Federal recovery goals for the roseate tern and bald eagle.

### **Impacts from Proposed Wildlife Populations Management**

Under Alternative C, the predator management techniques and their impacts outlined for Alternative B would be implemented on the 12 new seabird restoration projects. Our goal in establishing additional restoration projects would be to increase the geographic distribution of the roseate tern and other seabird colonies. Similar to Alternative B, we do not predict that regional or Statewide populations of herring or black-backed gulls would be significantly affected by our control measures, while we would dramatically reduce local populations on restoration islands.

## **Alternative D**

### **Impacts from Proposed Land Acquisition and Protection**

Under Alternative D, land acquisition would be limited to the 467.1 acres currently within Petit Manan Refuge's approved boundary. While some of this includes potential bald eagle nesting habitat, no new active nest sites would be acquired. Under Alternative D, we would also not pursue ownership of any of the 151 unprotected nationally significant nesting islands. As such, no additional roseate tern nesting islands would be acquired by the Service and no new seabird restoration projects would be initiated. Instead, we would encourage protection of these islands by our conserva-

tion partners. Most islands requiring active management or enforcement would receive less protection under this alternative because many of our conservation partners do not have the staffing and resources to purchase the land and/or to fully engage in seabird management. Without Service acquisition or significant increases in our partners' ability to purchase and manage nesting islands, the State population of bald eagles and roseate terns could decline over the long-term. Roseate tern, in particular, would be at risk because the colonies are so few and so poorly distributed. A single catastrophic event could eliminate the population. In other words, their decline could be more dramatic without additional protection.

### Impacts from Proposed Public Use and Access Management

Under Alternative D, all Refuge islands would be closed to public access year round, thus minimizing all risk from human disturbance on nesting islands. However, since islands are currently closed during the most sensitive nesting period, we would not anticipate that closing the islands year round would result in a dramatic positive response by either bald eagles or roseate terns. In other words, we would not expect a significant increase in population for either species over the long-term.

### Impacts from Proposed Habitat and Vegetation Management

Under Alternative D, we would utilize a custodial approach to wildlife and habitat management, and minimize survey efforts and data collection. Monitoring efforts would be limited to a few high priority seabird species such as roseate tern. We would eliminate the use of sheep grazing, herbicides, mowing, and burning as habitat management tools. The resulting development of rank vegetation would exclude nesting terns over the long-

term. A reduction in predator control efforts would further negatively impact suitable nesting conditions for roseate terns.

There would be insufficient staff time and dollars to complete baseline surveys, map vegetation, conduct research programs, and census birds. This lack of information would limit our ability to monitor threats to endangered and threatened wildlife populations. In summary, this alternative would not provide us with the tools necessary to effectively protect the tern colonies, and, at a minimum, we would anticipate a reduction in roseate tern nesting distribution and possibly a reduction in population size.



*Common tern on nest with chick*  
Photo by Bill Silliker, Jr.



We would not anticipate any short-term effects to bald eagle nesting habitat since the mature conifer and conifer-mixed stands would be allowed to grow unimpeded, similar to Alternative A. However, the continued, incremental loss of unprotected coastal nesting areas to development expected under this alternative would significantly affect the long-term viability and growth of the State's population.

### **Impacts from Proposed Wildlife Populations Management**

Under Alternative D, we would be limited to non-lethal predator control measures. This change in management practices would significantly reduce our ability to manage and protect endangered roseate tern colonies along the coast of Maine. Past records indicate that when gull control measures have been reduced or eliminated, herring and great black-backed gulls have rapidly repopulated the tern islands. As observed on Petit Manan Island in the late 1970's, terns will completely abandon these islands when gulls reestablish nesting colonies. Over 90% of all terns nesting in Maine are nesting on islands with active gull control. In our experience, we would need the flexibility to employ any gull control techniques mentioned in Alternative B to be effective. Limits on gull control methods, as proposed in Alternative D, would significantly reduce our ability to contribute to the recovery efforts outlined in the Roseate Tern Recovery Plan (USFWS 1998) and would likely result in a decline in roseate tern distribution, productivity, and survival rates.

We do not anticipate that this use of only non-lethal methods would affect recovery efforts for bald eagles because predators are not the limiting factor in increasing bald eagle populations. Should a mammalian predator situation arise at a nest site, we would continue to utilize "flashing material" to prevent the mammal from climbing the nest tree and reaching the eaglets.

Under Alternative D there would be no direct loss to predator populations on a local, regional, or State level as no lethal control measures would be used.

### **Threatened and Endangered Species - Summary**

Alternatives A, B, and C would maintain the seasonal closures to protect nesting roseate terns and bald eagles on existing Refuge lands. Alternative D would close Refuge islands to public use year round. Roseate terns are nesting on two Refuge islands and bald eagles are nesting on four islands and the Gouldsboro Bay Division. Alternatives A, B and C would continue to manage the 6 seabird restoration projects which provide nesting and/or foraging sites for roseate tern. Alternative C, with the largest expansion proposal, would provide the greatest long-term benefits to roseate tern and bald eagles by protecting existing and potential future nesting sites. It would contribute the most to species' recovery goals. Alternative B would provide the second greatest long-term benefits, followed by Alternative A. Alternative D does not propose an expansion, and would provide the least support to recovery goals.

## Effects on Seabirds, Wading Birds, and Waterfowl

### Alternative A (Current Management)

#### Impacts from Proposed Land Acquisition and Protection

Service acquisition of the 467.1 acres currently within the approved Petit Manan Refuge boundary and 30 additional nationally significant seabird, wading bird, waterfowl, and bald eagle nesting islands would permanently protect these areas from one of the principle threats facing coastal habitats: habitat degradation resulting from development. We do not anticipate any active habitat management on the coastal islands acquired under this alternative. Existing habitat conditions would continue to provide suitable nesting habitat for seabirds, wading birds and waterfowl over the short-term, including: common eider, herring and great black-backed gulls, great blue heron, and Leach’s storm-petrel. Unfortunately, without active predator or habitat management, it is unlikely that significant numbers of terns or alcids would initiate nesting on any of these islands over the long-term.

The proposed acquisition would support the land protection objectives outlined in the USFWS Tern Plan and the MDIFW Species Assessment Plans for: Atlantic puffin, razorbill, common eider, and Leach’s storm-petrel. Permanent protection of additional seabird, wading bird, and waterfowl nesting islands would insure these sites continue to provide critical nesting, foraging, and migratory habitat for a variety of species of conservation concern. It would also improve the distribution of protected nesting islands.

Service acquisition of the 95 acre Sawyers Marsh, adjacent to the Refuge’s Sawyers Marsh Division, would ensure that this entire area permanently protects valuable nesting, feeding, and migratory habitat to a variety of waterfowl, wading bird, and shorebird species over the long-term.

#### Impacts from Proposed Public Use and Access Management

Under Alternative A, we would continue to close all seabird, waterfowl, and wading bird nesting islands to public visitation between April 1 - August 31. Minimizing human disturbance on nesting islands would

reduce the energy reserves these birds spend defending their nests, and would minimize the susceptibility of nests to predation from other seabirds (i.e. gulls). Closing islands to public visitation during the nesting season would also improve the nesting success of these colonies.

We would continue to conduct outreach and educate local rockweed harvesters about the importance of rockweed to wildlife and to explain Service regulations (50 CFR27.51(a)) that protect vegetation harvesting within national wildlife refuges. Rockweed, and the variety of invertebrates that can be found on the plants, provide a vitally important forage to nesting, migratory, and wintering populations



*Common eider hen on nest*  
USFWS photo

of waterfowl and shorebirds (Bannerman 1960, Mawhinney 1999, Mittelhauser 2000). Its continued availability to these species' diet helps them maintain or enhance their body conditions during critical times of the year, most importantly, during nesting and migration.

Available information indicates that human disturbance associated with hunting may cause waterfowl species to alter their feeding behavior and diet composition, change distribution patterns, and increase their energy expenditure as they flee these disturbances. The combined result may be a reduction in overall body condition of the birds. We would maintain no-hunting areas on Petit Manan Point Division and Bois Bubert Island, two areas frequented by waterfowl on the Refuge. These no-hunting areas would provide the birds with high security, high quality forage areas, and contribute to better overall body condition of waterfowl using this portion of the Refuge.

We would continue to allow waterfowl hunting on 22 Refuge islands. In addition, the inter-tidal areas surrounding all Refuge islands would remain open to hunting under Colonial Ordinance. As new islands are acquired, we would evaluate each island to determine if it should be open to hunting. Although we have not quantified the level of harvest associated with Refuge islands, we do not believe that many of the islands receive significant hunting pressure due to their distance from the mainland and availability of other hunting locations. We would not anticipate a significant number of waterfowl would be harvested from these new additions to the Refuge. Further, State and Federal regulations determine waterfowl harvest limits based on an analysis of the entire Atlantic flyway population. Our hunt program tiers to these regulations.

### **Impacts from Proposed Habitat and Vegetation Management**

Under Alternative A, vegetation on the majority of the Refuge islands would not be actively managed. Natural processes would be the dominant force resulting in any changes to the vegetation communities. Common eider would benefit from the development of rank vegetation and the seasonal closures of the islands. On the six restoration islands, we would continue efforts to enhance nesting habitat for common, Arctic, and roseate terns using the following methods:

**Open field/grassland:** On portions of our seabird restoration islands, we would continue to reduce rank vegetation in an effort to provide common and Arctic terns with suitable nesting habitat. Vegetation management techniques already described for Alternative A in the section: Effects to Vegetation and Habitat, would continue on all six restoration islands. To date, our management has been intermittent, but we have observed a positive response from seabirds, as nesting success and nest density have increased. We would not anticipate any significant change in the level of management intensity during the next 15 years, but we would anticipate

maintaining or increasing the number of tern nests and individual nest productivity.

We would continue to allow sheep to graze on two islands. Grazing results in a reduction in plant density and height, and potentially causes soil compaction and erosion. It is possible that sheep grazing could limit the availability of suitable nesting habitat for species which prefer rank vegetation (e.g. common eider and laughing gull), or burrow nesters such as Leach's storm-petrels. However, common and Arctic terns would benefit from reduction in rank vegetation, whether we use grazing or mechanical techniques. We would expect increased tern nesting densities in areas where vegetation is managed. We would minimize the adverse effects on species such as common eider and laughing gull by allowing rank vegetation to develop on portions of the restoration islands.

**Construction of artificial nest structures or boxes:** We would continue to provide artificial nest burrows on Petit Manan Island for nesting alcids. The burrows would provide the birds with increased nesting opportunity, and would hopefully result in continued population growth for both Atlantic puffins and razorbills. We would also provide nest boxes for roseate terns on Petit Manan and Metinic islands, which benefits common tern chicks who frequently use the boxes for shelter. We would anticipate increased chick survival at nest sites provided with nest boxes.

**Freshwater impoundments and saltmarshes:** We would continue to maintain the three existing freshwater impoundments on the Petit Manan Point Division. These areas would continue to provide foraging and roosting habitat for thousands of migrating waterfowl, shorebirds, and wading birds. In addition, our protection of saltmarshes on Gouldsboro Bay and Sawyers Marsh divisions would also maintain extensive foraging habitat for a variety of species of conservation concern, namely waterfowl, wading birds, and shorebirds.

### **Impacts from Proposed Wildlife Populations Management**

**Predator Management:** We would continue to use the predator management measures on the six seabird restoration projects previously discussed for Alternative A in the section: Effects on Threatened and Endangered Species. These measures include lethal and non-lethal techniques to control herring and black-backed gulls, mammals, and nocturnal avian predators. We would anticipate that all the seabirds nesting on the restoration islands would continue to benefit from these management actions, and would experience greater productivity and survival rates. Over the long-term various other factors would also contribute to a successful seabird colony (i.e. island protection, habitat management, seasonal closures, social attraction), predator management remains a significant component of the restoration process within Maine. Over 90% of the tern population, and all of the Atlantic puffin and laughing gull populations are nesting on islands where predators are managed.



*Atlantic puffin courtship*  
USFWS photo

Intensive, cooperative management by members of GOMSWG has reversed the tern and alcid population declines that occurred for much of the past century. Atlantic puffins, razorbills, common, Arctic, and roseate terns have all experienced significant population growth during the past 20 years. In the Gulf of Maine, the common tern population has increased 168% (2,543 to 6,806 pairs) and the State-threatened population of Arctic terns has increased 73% (1,720 to 2,975 pairs). In Maine, the roseate tern population has increased 278% (76 to 289 pairs). This level of population growth would not have been possible without active predator management efforts.

Although we cannot predict the population growth that would be achieved during the next 15 years of seabird restoration efforts on Refuge islands, it is reasonable to assume that we would continue major steps towards seabird recovery of historic population levels. Three island projects: Ship, Metinic, and Pond islands, have been established in the past 5-10 years and would be expected to experience considerable population growth in future years. We would not anticipate the establishment of any additional large tern colonies on islands without aggressive predator control measures, and no new restoration projects are proposed under this alternative. As a result, we would expect continued population growth for the three species of terns and several species of alcids on established colonies, but not an expansion in colony number or distribution.

**Herring and great black-backed gulls:** Despite gull control measures on the six restoration islands, we would continue to acquire and protect islands that support populations of nesting herring and great black-backed gulls. These gulls are important components of the Gulf of Maine ecosystem and contribute to overall seabird diversity. Based on past experience, only a small number of gulls (<10 individuals) would likely be lethally removed each season from the six restoration islands, and no gulls would be allowed to nest within the restoration areas. We do not anticipate any significant regional or State population level declines for either species of gull as a result of our management. Further, removal of individual, predatory gulls from the restoration islands would allow a variety of species of concern including common, Arctic, and roseate terns, Atlantic puffins, razorbills, common eider, and black guillemot to experience increased productivity and survival rates.

**Laughing gulls:** We would continue to limit the number and distribution of laughing gulls nesting on Petit Manan Island using non-lethal techniques. This management action would result in a reduction of laughing gulls nesting on the island, and an overall reduction in the number of gull chicks produced at the colony. No adult birds would be killed; we would

simply discourage or disrupt their nesting through a variety of harassment techniques. As experienced in 2002, tern nesting density, distribution, and productivity would be expected to increase as a result of this management action.

**Alternative B (Service's Preferred Alternative)**

**Impacts from Proposed Land Acquisition and Protection**

In addition to the 467.1 acres currently within the approved Petit Manan Refuge boundary, the Service would acquire 87 nationally significant bald eagle, wading bird, waterfowl, or colonial nesting seabird islands which lack permanent protection from habitat degradation caused by development. Specifically, this alternative would protect the remaining 55 seabird and wading bird islands currently lacking permanent protection in Maine. The remaining 32 islands proposed for acquisition support nesting bald eagles. As a result, Service acquisition of these 87 islands would provide permanent nesting, foraging, and migratory habitat for an incredible diversity of species of conservation concern. Permanent conservation ownership of nesting sites has been identified as a high priority by both the Service and MDIFW in meeting the recovery objectives for the seabirds, wading birds, and waterfowl species nesting on the islands. The Regional Waterbird Plan and the Atlantic Northern Forest Bird Conservation Plan also recommend that actions be taken to increase nesting opportunities for roseate tern, razorbill, and Atlantic puffin. Service acquisition would remove all threats associated with land development and uncontrolled public access. Through acquisition, seabird habitat restoration, and cooperative research, the Service would provide leadership in accomplishing the goals of the various regional conservation plans.

**Impacts from Proposed Public Use and Access Management**

Similar to Alternative A, all existing and proposed nesting islands would have seasonal public use restrictions to protect nesting birds. In an effort to increase opportunities for public access, we would modify current seasonal closure dates for all eider- and gull-only nesting islands to April 1 - July 31. There are 9 existing Refuge islands and 6 proposed acquisition islands that would have this shorter closure period. This modification recognizes the fact that common eider and most gull species nest earlier and therefore fledge young sooner than seabirds and bald eagles. We would allow earlier public access and not impact nesting birds. All other seabird and wading bird and waterfowl nesting islands would remain closed until August 31. Minimizing human disturbance at nest sites would reduce the energy reserves these birds spend defending their nests, would minimize the susceptibility of nests to predation from other seabirds (i.e. gulls), and should improve the nesting success for a variety of other birds of conservation concern.

On an annual basis, we would evaluate recently acquired islands for inclusion in our waterfowl hunting program. Alternative B includes the same waterfowl hunting program proposed in Alternative A and the impacts would be similar. Generally, we do not anticipate a significant increase in hunting pressure. In addition, the proposed expanded deer hunt on the Petit Manan Point Division would not impact seabirds, wading birds, and waterfowl. The area proposed for hunting is primarily upland, the hunt would occur outside the nesting season for these species, and the hunt area would be located to minimize disturbance to the migrating waterfowl and other birds using the impoundments. Further, with harvest levels set by Federal and State regulations, based on the entire flyway population, we would not expect to negatively affect waterfowl populations over the long-term.

### **Impacts from Proposed Habitat and Vegetation Management**

**Open Field:** Under Alternative B, we would continue to utilize the habitat management techniques outlined in Alternative A on the six existing and six proposed seabird restoration projects. We would anticipate that some level of vegetation management would be necessary on all of these islands within the next 15 years. Our efforts to reduce the amount of rank vegetation on portions of the islands would increase nesting opportunities for all three species of terns. Vegetation outside of the tern restoration area would be allowed to grow under natural conditions, and would therefore provide suitable nesting habitat for species such as common eider and laughing gulls. The habitat on the non-restoration islands would not be actively managed unless new information or major changes warranted actions to: 1) benefit threatened and endangered species; 2) promote biological diversity; 3) reduce hazardous fuels and debris; or, 4) control invasive or exotic species. Natural forces and plant succession patterns would be the prevailing factors dictating changes to the habitat conditions on the majority of the islands in the Refuge. Over the short-term, these islands would continue to provide important nesting habitat for species of concern. Under Alternative B, we would also continue to create nest burrows for alcids and utilize nest boxes as described in Alternative A to increase nesting habitat for roseate terns.

**Forested and Scrub-Shrub:** We would maintain forested and scrub-shrub conditions on a number of the islands to provide nesting habitat for wading birds. While we do not anticipate the need for active management in these habitat types over the next 15 years, long-term management may include mechanical and prescribed fire treatment to maintain the scrub-shrub community. This would ensure that the wading birds continue to have a diversity of nesting areas better distributed along coastal islands. These islands would be closed to public visitation during the nesting season, April 1 - August 31.

**Freshwater impoundments and saltmarshes:** Under Alternative B, we would maintain the existing saltmarsh and estuarine habitat located on Cross Island and Sawyers Marsh, Gouldsboro Bay and Petit Manan Point divisions, to ensure the quality and natural function of the marshes are sustained. Service acquisition of the marshes and the adjacent upland habitat protects these sites from the adverse effects associated with development of surrounding uplands. As a result, these areas would continue to provide a diverse group of waterfowl, shorebirds, and wading birds with high quality foraging and wintering habitat over the long-term.

We would continue to manage the three large wetland complexes (Meadow Brook, Mague Flowage, and Cranberry impoundment) on the Petit Manan Point Division. These areas would provide waterfowl and wading birds with open and shallow water marshes for nesting and foraging. We would evaluate opportunities to introduce additional wild rice into Mague Flowage to further enhance foraging for migrating waterfowl. These wetlands would not be open to hunting and would provide migrating waterfowl with additional high quality forage, in areas free from human disturbance. We would anticipate that enhancing forage quality in this area would contribute to improved body condition and survival rates of migrating waterfowl using this area of the Refuge.

### **Impacts from Wildlife Populations Management**

**Bald Eagle:** Increasing bald eagle nesting density and distribution along the Maine coast could adversely affect wading bird colonies and common eider nesting areas. Eagles routinely prey on adult and juvenile birds, and have been associated with great blue heron colony abandonment.

**Predator Management:** Similar to Alternative A, we would continue predator management efforts on all six existing seabird restoration islands. In addition, under Alternative B we would expand these efforts to the six proposed new restoration projects. Specific predator management techniques would be the same as those we described in Alternative A. These efforts would continue to reduce the number of individual predators in a local setting, but the viability of the State or regional predator populations would not be altered as a result of our management actions. The majority of our predator management efforts have been, and would continue to be, targeted at herring and great black-backed gulls on seabird restoration islands. While our control efforts have not significantly altered population levels of gulls, local control of nesting gulls has significantly enhanced population levels for common, Arctic, and roseate terns, Atlantic puffins and razorbills. Management for individual mammal and nocturnal avian predators would also be continued on the 12 restoration projects. Efforts to control individual mammalian and nocturnal avian predators might be extended to other islands as warranted to protect nesting colonies. Information gathered on the islands with predator management programs demonstrates significantly higher levels of site attendance,



population growth, and survival rates for both juvenile and adult seabirds. The species described below would all benefit from continued predator management.

**Alcids:** Under Alternative B, we would initiate steps to increase the number of active alcid colonies on Refuge islands through the establishment of six additional seabird restoration projects. Our goal would be to increase the number of Atlantic puffins and razorbills by 50% (using 2000 nesting season estimates as a baseline), and maintain a minimum productivity level of 0.5 fledged chicks/pair. We would continue island acquisition, predator control, and if necessary habitat manipulation. Increasing the population size, productivity, and distribution of Atlantic puffin and razorbill colonies would help to secure the long-term viability of these populations, contribute to the overall seabird diversity of the Gulf of Maine, and contribute to MDIFW recovery efforts for these State-threatened species (MDIFW 1999).

**Leach's storm-petrel:** Under Alternative B, our goal would be to maintain or increase the number of Leach's storm-petrels nesting on Refuge islands and initiate efforts to maintain a productivity level of 0.5 fledged chicks/pair. As warranted by monitoring, we would enhance nesting habitat on the islands by providing structures for petrels to burrow under. Currently, 75% of the petrels in Maine nest on two islands which lie approximately one mile apart (MDIFW 1999). As a result, the birds remain particularly susceptible to catastrophic events such as oil spills or disease. Increasing the population size, distribution, and productivity of the Leach's storm-petrels nesting on Refuge islands would significantly contribute to the long-term viability of this species within the Gulf of Maine.

**Laughing gulls:** In conjunction with our efforts to reduce the breeding population of laughing gulls on Petit Manan Island as described in Alternative A, we would explore methods to encourage these gulls to initiate nesting on other islands. This would allow the laughing gull population to continue to expand in Maine, without adversely affecting nesting terns. We anticipate this would require herring and great black-backed gull control, as laughing gulls are currently nesting only on islands with active predator management programs.

**Common eider:** Common eider would continue to benefit from our land protection efforts and "hands-off" approach to habitat management on the majority of the Refuge islands. Predator control efforts on the seabird restoration islands would significantly increase nesting success and duckling survival rates. On the tern restoration islands, efforts to maintain open field conditions for the nesting terns would be limited to portions of the island. This would allow rank vegetation to develop and provide eiders with appropriate nesting habitat.

**Common murre:** We would continue efforts to establish a common murre breeding colony within Maine. Murre have not bred in Maine for over 100

years and restoring a breeding population in Maine would represent a significant milestone in the effort to restore the biological diversity of the region. As with other seabirds, our management actions would continue to be island protection, predator management, and habitat manipulation as warranted. More information is needed on the limiting factor for this species.

## Alternative C

### **Impacts from Proposed Land Acquisition and Protection**

In addition to the 467.1 acres currently within the approved Petit Manan Refuge boundary, the Service would acquire all 151, or portions of larger (>200 acre) nationally significant bald eagle, wading bird, waterfowl, or colonial nesting seabird islands which lack permanent protection by a conservation organization. As a result, the islands would continue to provide long-term nesting, foraging, and migratory habitat for a variety of species of conservation concern. Permanent protection by a conservation organization of these nesting islands has been identified as a high priority in the recovery effort for a large number of these species. Service acquisition would remove all threats associated with development of the islands and uncontrolled public access.

### **Impacts from Proposed Public Use and Access Management**

Management of public access and the resulting impacts would be similar to that described under Alternative B.

### **Impacts from Proposed Habitat and Vegetation Management**

The habitat management objectives and techniques outlined under Alternative B would be expanded to 12 new restoration projects (e.g. 18 restoration projects total). We have not yet identified which islands would support the new restoration projects; therefore, it is not possible to thoroughly evaluate the habitat management requirements. We would strive to establish well-distributed sites which provide a diversity of habitats in an effort to accommodate the habitat requirements for these species of concern.

We anticipate that our combined predator control and habitat management efforts on the 18 total restoration projects would result in significant population growth and increased geographic distribution of colonies for common, Arctic, and roseate terns, Atlantic puffins, and razorbills. Generally, we predict common eider and laughing gulls would benefit as well (i.e. increased nesting success and juvenile survival) from our land protection and predator control efforts. On the other hand, the benefits to common eider on a few islands would be diminished by any extensive control of rank vegetation and increased level of human activity that might occur on restoration islands.

### **Impacts from Proposed Wildlife Populations Management**

Under Alternative C, we would continue to use the predator control measures outlined in Alternatives A and B, expanding the scope to include 12 new restoration projects. The consequences would be similar to those discussed in Alternative B. Despite an increased number of islands with gull control, the viability of the State population of herring and great black-backed gulls would not be affected by our actions. Gulls are nesting on hundreds of islands (231 islands for great black-backed and 183 islands for herring gulls) and our control efforts would only occur on the 18 seabird restoration islands. Our actions would be very limited in proportion to the overall state population. However, an individual island population of gulls could be markedly reduced if a new restoration project utilized DRC 1339. It is a very effective avicide specific to gulls, as we have previously discussed.

All of the benefits to specific seabird populations described in Alternative B would also result in Alternative C. This alternative provides permanent protection and management for all known, unprotected, naturally significant seabird nesting islands in Maine.

## **Alternative D**

### **Impacts from Proposed Land Acquisition and Protection**

Under Alternative D, Service acquisition would be limited to the 467.1 acres currently within Petit Manan Refuge's approved boundary. This would leave all 151 unprotected nationally significant bald eagle, wading bird, waterfowl, and nesting seabird islands without the permanent protection afforded by conservation ownership. Our hope would be that our conservation partners would be able to protect some of these islands, reducing the risk of development. Some coastal islands would remain vulnerable to development, and we would likely see gradual habitat loss for a variety of seabird, waterfowl, and wading bird species.

### **Impacts from Proposed Public Use and Access Management**

Under Alternative D, all Refuge islands would be closed to public access year round. Since we currently close the islands to public use during the most sensitive time of year, we would not anticipate that closing the islands to hunting and public access for the rest of the year would offer any significant benefit to most of these birds. Negligible benefits may be realized by migrating birds who would not encounter human disturbance, saving energy reserves.

### **Impacts from Proposed Habitat and Vegetation Management**

Under Alternative D, we would use a custodial approach to habitat management, and minimize surveys and monitoring to conducting only a few high priority seabird species. We would eliminate the use of sheep grazing,

herbicides, mowing, and burning as habitat management tools. The resulting development of rank vegetation and the elimination of lethal predator control measures would result in significant reductions in tern productivity and survival rates. We would not be able to contribute to Service and MDIFW recovery objectives for a diverse group of species. The laughing gull population nesting on Petit Manan Island would likely increase in number and distribution over the next 15 years as a result of increased availability of rank vegetation and decreased control efforts targeted at this species. However, over the long-term we would anticipate a decrease in nesting numbers for all three species of terns and laughing gulls due to the predicted increase in numbers of and predation by herring and great black-backed gulls.

### Impacts from Proposed Wildlife Populations Management

We would limit ourselves to non-lethal predator control measures under Alternative D. This change in management practices would significantly reduce our ability to manage and protect alcid and tern colonies along the coast of Maine. Past records indicate that when gull control measures have been eliminated, herring and great black-backed gulls have rapidly repopulated the tern islands. The result has been a reduction in tern productivity or complete abandonment of the island by the nesting terns. Within a short time period we would anticipate an overall reduction or elimination of tern populations on our managed islands. Currently, over 90% of all terns nesting in Maine are nesting on the 10 islands with active gull control. This alternative would significantly reduce our ability to contribute to the recovery efforts outlined in the Roseate Tern Recovery Plan (USFWS 1998), USFWS Tern Plan (USFWS 2002), and MDIFW Species Assessments. The Refuge tern and alcid colonies represent the largest colonies in Maine, and loss of these colonies would significantly affect the population size, geographic distribution, and recovery potential for these and a variety of other seabird species.

We would not manage the laughing gull population on Petit Manan Island. This management action, when combined with a “hands-off” approach to vegetation management, would allow the gull colony to continue expanding across the island. In the short-term, their predation on tern eggs and chicks would increase markedly. We would expect a significant reduction in tern productivity and nesting distribution as a result of this alternative. Over the long-term, we predict laughing gull numbers would also decrease as a result of increased herring and great black-backed gull numbers.

### Seabirds, Wading Birds, and Waterfowl - Summary

Alternatives A, B and C would maintain the public access restriction on Refuge islands during the seabird nesting season, which is inclusive of the nesting seasons for wading birds and waterfowl. Alternative D would close all Refuge islands to public use year round. All alternatives would maintain the freshwater impoundments on the Petit Manan Point Division which is important to thousands of migrating waterfowl and wading birds.

Alternative C, with the largest expansion proposal, and with 12 proposed new seabird restoration sites, would provide the greatest benefit to these species. It would also identify important wading bird and waterfowl habitats on the mainland in need of protection, and pursue Service acquisition under a separate authorization, as warranted. Alternative B, with the next largest expansion proposal and 6 proposed new seabird restoration projects, would provide the next greatest benefit, followed by Alternative A with a smaller expansion and continued management of 6 seabird restoration sites. Alternative D does not propose an expansion and would dramatically scale back current seabird restoration efforts on the 6 sites.

### Effects on Other Native Wildlife of Management Concern

The majority of our biological survey efforts to date have focused on bird species which breed or winter on the Refuge. Current information indicates that 218 species of birds breed in Maine (Gawler et. al. 1996), while 114 species have been confirmed breeding on the Refuge. In addition, we have recorded 320 species of birds on, or adjacent to, the Refuge during some portion of the year.

The Refuge islands stretch over 200 air-miles of the coastline, functioning as stepping stones along the Atlantic Coast migratory bird pathway. Preliminary data indicates that coastal islands may play a significant role as migratory stopover and feeding sites for many species of migratory birds (R. Suomala pers. comm. and Drury and Goodhue 1998).

### Alternative A (Current Management)

#### Impacts from Proposed Land Acquisition and Protection

Alternative A includes Service acquisition of the 467.1 acres currently within the approved Petit Manan Refuge boundary and 30 additional nationally significant unprotected nesting islands. Although the primary purpose for acquisition is to protect nesting habitat for seabirds, wading birds, waterfowl, and bald eagles, a wide variety of wildlife species would also benefit from this land protection effort. These include Neotropical migrants, shorebirds, raptors, mammals, reptiles, and amphibians. The migrating bird species, in particular, would benefit from reduced threat of development on coastal islands.

Acquisition of the 95 acre Sawyers Marsh, adjacent to the Refuge's Sawyers Marsh Division would ensure that this area would continue to provide valuable nesting, feeding, and migratory habitat to a variety of wetland-dependent species of concern. We have already acquired much of the surrounding upland habitat, and purchasing the saltmarsh secures the core of this valuable habitat area.

#### Impacts from Proposed Public Use and Access Management

The seasonal public access restriction to nesting islands would benefit many other island residents as well, namely nesting and migrating birds.

Other species, such as amphibians, reptiles, or small mammals, would likely be unaffected by the closures.

As we previously described for Alternative A, we would continue to educate local rockweed harvesters about Service regulations (50 CFR27.51(a)) and enforce regulations that protect vegetation within national wildlife refuges from harvesting. Protecting rockweed and the variety of invertebrates that can be found on the plants would provide migratory and wintering populations of waterfowl and shorebirds with a rich diversity of forage species (Bannerman 1960, Mawhinney 1999, Mittelhauser 2000). Maintaining intertidal plants and their associated invertebrates should help waterfowl and shorebird species maintain or enhance their body conditions during various stages of their annual cycles, and, most importantly, during migration.

Sawyers Marsh and Gouldsboro Bay divisions are open to hunting of migratory game birds and waterfowl, and small and big game. Bois Bubert Island is open to white-tailed deer hunting. Petit Manan Point Division would remain closed to all hunting. Based on observations by our staff and discussions with local hunters, the number of individuals hunting on these divisions is small. We believe that the number of animals harvested from the Refuge Complex is also small, and we would therefore not expect any significant regional or State population decline to result from our hunt program.

### **Impacts from Proposed Habitat and Vegetation Management**

Under Alternative A, we would not implement significant changes to habitat types. We expect that the diversity of habitats currently found on the Refuge would continue to maintain the wide array of avian species with the necessary breeding, foraging, roosting, migratory, or wintering habitat they require.

**Grassland Breeding Birds:** Under Alternative A, we would actively maintain open fields and blueberry barrens, benefitting grassland birds on Petit Manan Point Division through the use of prescribed fire and mowing as previously described for Alternative A in the section: Effects on Vegetation and Habitat. We would continue to utilize spring (April and May) and fall (September, October, and November) burning schedules in an effort to avoid the migratory bird nesting season. We would maintain 65 acres in early-successional open field habitat (i.e. blueberry barrens and native, cool season grasses) through a three- to five-year rotation of prescribed burning and mowing among the 11 units. This effort would stimulate blueberry production and nutrient recycling, rejuvenating grassland communities used by migratory and nesting songbirds, small mammals and white-tailed deer. Maintaining the open field/blueberry barren habitat on Petit Manan Point would provide nesting habitat for landbirds of conservation priority within PIF Area 28 such as bobolink, northern harrier, and eastern mead-

owlark, and provide spring “singing” habitat for American woodcock, another species of high conservation priority in this area. Grassland habitat would also be managed on the six seabird restoration islands, benefitting a diverse array of migratory bird species with nesting and foraging habitat.

**Neotropical migrants, Shorebirds, and Raptors:** Refuge islands play a significant role during Neotropical migrant, shorebird, and raptor migrations. The diversity of habitats and prey species provided by the coastal islands and the inter-tidal areas surrounding the islands offers an extensive foraging base for these species groups. Interestingly, the concentrations of Neotropical migrants and shorebirds feeding and roosting on the islands provide abundant foraging opportunities for raptors.

Our seasonal technicians working on the six seabird restoration islands monitor Neotropical migrant use of the islands, and have documented over 100 species during the brief seabird nesting season. The seabird crews also document raptor (i.e. peregrine falcons, bald eagles, and merlins) predation rates on the island and adjacent waters. Limited studies contracted by us indicate that a considerable number of raptors utilize offshore islands as foraging areas during their fall migrations (Drury and Goodhue 1998). Service acquisition and protection of coastal islands and mainland properties outlined in this alternative would assure these areas continue to provide a diverse group of Neotropical migrants, shorebirds, and raptors with critical foraging and roosting areas.

**Terrestrial and Marine Mammals:** We have not conducted a comprehensive inventory of mammals. When possible, we have live-trapped small mammals on some of our coastal islands as part of our baseline inventory efforts. As expected, terrestrial mammal diversity and abundance on the coastal islands is limited by the distance from the mainland and habitat provided by the islands. The marine waters adjacent to the Refuge provide abundant habitat for a diverse array of marine species, including gray and

harbor seals, harbor porpoise, and a variety of whales. Researchers at the University of Maine conduct periodic inventories of seal haul-out and pupping ledges, and then share with us the inventory results.

With the exception of species occurring at the geographic extreme of their range (i.e., lynx), we anticipate that the majority of mammals found in Maine would find suitable habitat on some portion of the Refuge. Generally, we do not predict significant changes to mammalian diversity or overall population levels, since we would not implement significant changes to habitat types. Maintaining the integrity of the upland habitat found across the large geographic span of



Harbor Seal  
USFWS photo

the Refuge and reducing the threats associated with development should help to maintain the variety of habitat and foraging conditions required by this diverse group of species. White-tailed deer would continue to benefit directly from our efforts to maintain open fields on Petit Manan Point Division; their browse is significantly improved by this management.

**Amphibians and Reptiles:** We have recently initiated efforts to document species diversity and abundance of reptiles and amphibians on the Refuge. In Maine, 17 species of reptiles and 17 species of amphibians are documented; however, many of these species reach the northern extreme of their range in southern Maine, and therefore are not found on the mainland portions of the Refuge. The habitat conditions and distance from the mainland limit the diversity of species found on coastal islands. We do not anticipate that any of our management actions on islands would adversely affect species diversity, distribution, or overall population viability. We also believe that this would be true for our mainland divisions. Our limited management of mainland grasslands is timed to avoid late spring and summer breeding seasons. The mosaic of habitat types found on the mainland divisions would continue to provide both the aquatic and terrestrial habitats required by many of the amphibians found in this region of Maine. Most importantly, Service acquisition and protection of coastal islands and mainland properties outlined in this alternative would assure these areas continue to support a diverse group of reptiles and amphibians over the long-term.

**Invertebrates:** Efforts to inventory invertebrate species on the Refuge have been recently initiated. A Refuge volunteer is currently conducting dragonfly and damselfly surveys on Petit Manan Point Division (Hildreth 2001 and Hildreth 2002). To date, 33 species of Odonates have been documented on the Refuge, several of which are considered rare or a special concern in Maine. Additional efforts have focused on surveying Lepidoptera (butterflies and moths), Diptera (two winged flies and true flies), and Cerambycidae (longhorned beetles) on Petit Manan Point. We have recently initiated extensive spider inventories of several mainland divisions and coastal islands (Jennings 2000, Jennings 2001, and Jennings 2002). To date, 178 species have been documented, including several new records for the state of Maine, and several previously un-described species have been recorded. Service acquisition and protection of coastal islands and mainland properties outlined in this alternative would continue to support a diverse group of invertebrates. Inter-tidal habitat surrounding the Refuge would continue to provide habitat to a diversity of aquatic invertebrates, which in turn provide foraging opportunities for waterfowl and shorebirds.

**Freshwater and Marine Fish:** We have not documented freshwater fish species in any of the freshwater wetlands found on the Refuge. Many of



these were originally small emergent wetlands that were converted to larger bodies of open water through beaver dam construction and more recently maintained by water control structures. It is unlikely that these wetlands support any significant populations of fish. As such, we predict there would be no impacts to freshwater fish from our management.

However, the marine waters adjacent to the Refuge support a tremendous diversity of marine invertebrates (e.g. lobster, blue mussels, and sea urchins) and fish species (e.g. Atlantic salmon, herring, and haddock). These highly productive waters of the Gulf of Maine are critical to our seabird restoration efforts, as all of the seabirds, wading birds, and waterfowl forage on either fish or invertebrates found in the marine environment. We do not expect that our management under Alternative A would directly impact marine species, except for our restrictions on rockweed harvests, which would be beneficial as rockweed supports aquatic invertebrates which are an important forage item for many waterfowl, shorebirds and seabirds.

### **Impacts from Proposed Wildlife Populations Management**

Under Alternative A, we would continue our limited predator management program targeted at mammalian (i.e. mink) and nocturnal avian predators (i.e. black crowned night heron or great horned owl). The presence of one of these predators on a seabird island can result in significant disruption of the nesting colony, decreased productivity, decreased survival rates for chicks and adults, or colony abandonment. In recent years, the numbers of mammals removed from the seabird colonies has been relatively low, with 0-5 individuals removed from the six combined restoration projects. We would not use live trapping and relocation of mammals, since it is not permitted in the State due to concern of spreading rabies. If possible, non-lethal measures and relocation would be our primary means of dealing with owls.

Under Alternative A, we would continue to respond quickly and efficiently to the presence of these predators on the restoration islands. Mink have been observed killing large number of terns and a single mink is believed responsible for the drastic reduction in the NAS Jenny Island colony that dropped from over 1,000 pairs of terns in 2000, to 59 pairs in 2001 (Hall pers. comm.). Capture and removal efforts are specifically designed to avoid capturing or injuring non-target species. Our predator control efforts would result in increased productivity and survival rates for a variety of seabird species. Since only selected individuals are removed, we would not predict a significant regional or State decline in predator populations.

**Alternative B (Service's Preferred Alternative)**

**Impacts from Proposed Land Acquisition and Protection**

In addition to the 467.1 acres currently within the approved boundary, the Service would acquire 87 nationally significant bald eagle, wading bird, waterfowl, or colonial nesting seabird islands which lack permanent protection by a conservation organization. These islands would continue to provide critical nesting, foraging, and migratory habitat for a variety of species of conservation concern. Service acquisition would remove all threats associated with development of the islands. The diversity of habitats protected under this alternative would continue to support a broad group of wildlife species including, but not limited to, Neotropical migrants, shorebirds, raptors, mammals, reptiles, and amphibians.

**Impacts from Proposed Public Use and Access Management**

With the exception of opening Petit Manan Point to white-tailed deer hunting, and the expansion of waterfowl hunting opportunities to newly acquired islands, the effects of public access on Refuge wildlife would remain similar to those outlined in Alternative A. Both deer and waterfowl hunting seasons and limits are established by State and Federal regulations which account for population trends and future expectations. These ensure that regional and State populations remain viable and self-sustaining. Our hunt programs and the anticipated hunter use would not significantly impact regional or State populations of deer or waterfowl.

**Impacts from Proposed Habitat and Vegetation Management**

The three Refuge mainland divisions are ecologically diverse, providing both food and shelter to a tremendous variety of resident and migratory species. One of our primary objectives would be to continue to protect and restore critical stopover points for Neotropical migrants, waterfowl, and shorebirds during the spring and fall migrations along the Maine coast.

We would focus management efforts on those habitats that would benefit species identified as priorities under one of the various conservation plans. As would be expected with any habitat action, some species of wildlife would likely benefit, while others may be adversely effected by our actions. Any adverse effects would likely be minimized by the short-term habitat changes (1-2 years) we generally experience with our habitat management actions. We would continue efforts to balance the needs of the diverse array of wildlife species which use the Refuge during some portion of their life cycle. We would continue efforts to document wildlife diversity and abundance on Refuge islands and mainland divisions. We anticipate that all of the species discussed in Alternative A would benefit from permanent protection of these coastal habitats.

In addition to the management actions and consequences described in Alternative A, we would manage the following cover types:

**Mature Conifer:** We would maintain mature conifer forest habitat on Refuge islands and mainland divisions to provide nesting habitat for bald eagles and landbirds of high conservation priority within PIF Area 28 such as bay-breasted warbler, Cape May warbler, and spruce grouse. Although conifers dominate a large percentage of Maine's forests, most are in commercial forests where the forest industry has favored shorter harvest rotations, creating younger, even-aged forested stands. Our management actions would result in greater structural and age-class diversity and more heterogenous stands than those under commercial harvesting conditions. These older, mixed-aged forests typically have a greater supply of downed and standing dead wood and more diverse vertical structure and canopy gaps (Elliott 1999). While some Neotropical migrant species may benefit from current commercial harvesting practices on private lands (i.e. Wilson's warbler and Lincoln's sparrow), the PIF species mentioned above may be adversely affected. Working with our conservation partners, we would evaluate the most appropriate habitat management actions for landbirds of high conservation priority within PIF 28.

**Northern Hardwood-mixed Forest:** Under Alternative B, we would maintain northern hardwood-mixed forest habitat to provide nesting habitat for landbirds of high conservation priority within PIF Area 28 such as black-throated blue warbler and Canada warbler. If warranted, our management actions would focus on maintaining a balance of forest age structures, including mid-successional and late-successional forest, and providing structural diversity (shrubs and treefall) within the forest. Managing the forest to provide structural and age-class diversity would also provide a variety of foraging substrates to benefit migrating birds.

**Early successional forest/scrub-shrub community:** Under Alternative B, we would maintain early successional forest/scrub-shrub habitat dominated by species such as alder and cherry approximately 2' to 10' tall. Our objective would be to provide nesting habitat for landbirds of high conservation priority within PIF Area 28 such as chestnut-sided warbler, American woodcock, and olive-sided flycatcher. In Maine, most land management practices strive to avoid the disturbances which typically create this habitat. As a result, this habitat type and many landbirds associated with it are in decline throughout PIF Area 28. Our management would contribute to reversing these trends, but in all likelihood, due to the size of the Refuge, the overall impact would be a negligible contribution to regional or State populations.

In addition to nesting habitat, these scrub-shrub communities would provide important foraging areas for migratory birds during spring and fall migration. Foraging habitat is considered a vital component of the overall habitat quality during the migration period.

**Maritime saltmarsh and estuary:** We would maintain the maritime saltmarsh and estuary habitat on Sawyers Marsh and Gouldsboro Bay divisions and Cross Island. These areas provide breeding habitat for species of conservation concern such as Nelson’s sharp-tailed sparrow, American black duck, and northern harrier. The saltmarshes and estuaries would also provide important migratory stopover sites for a variety of shorebirds and provide wintering habitat for American black ducks.

**Vernal pools:** We would continue to inventory and protect all vernal pool habitat identified on Refuge lands to maintain breeding habitat for amphibian species of conservation concern, such as wood frogs and spotted salamanders. Many of the amphibians of concern rely on vernal pool habitat during all or part of their life cycle. Unfortunately, we have not had the resources to complete our vernal pool surveys and document the presence of amphibians in these areas during the breeding season. None of our proposed management actions would adversely affect vernal pool habitat and the species that depend on them.

### **Impacts from Wildlife Populations Management**

Under Alternative B, we would expand our seabird restoration efforts to six new islands. Although the consequences would be similar to those outlined in Alternative A, the scope of the predator management effort would be expanded to include the new projects. Using our current predator removal levels as a baseline, we would anticipate that 5-10 predators/year could be removed from the 12 restoration islands. However, it is important to note that in some years, it may not be necessary to remove any mammalian predators from the islands. This level of predator management would not have any effect on predator population levels in the coastal region of Maine.

## **Alternative C**

### **Impacts from Proposed Land Acquisition and Protection**

In addition to the 467.1 acres currently within the approved boundary, the Service would acquire all, or portions of, 151 nationally significant bald eagle, wading bird, waterfowl, or colonial nesting seabird islands which lack permanent protection by a conservation organization. As a result, the islands would continue to provide valuable habitat for a variety of native species. Service acquisition would remove all threats associated with development of the islands and uncontrolled public access, maintaining habitat quality and minimizing human disturbance.

### **Impacts from Proposed Public Use and Access Management**

The actions and consequences of managing public access would be similar to those outlined in Alternative B. The primary difference is that we would open Petit Manan, Gouldsboro Bay, and Sawyers Marsh divisions, Cross and Bois Bubert Island to furbearer trapping. All trapping activities on the

Refuge would be conducted according to State and Refuge regulations. No trapping would be allowed on the mainland during the waterfowl migration season (September through November) to protect the large congregations of waterfowl building up reserves before they head south. We would not anticipate any regional or State population declines in furbearers resulting from opening the Refuge to trapping. State seasons and limits are based on population trends, including the expected future trends, and the need to maintain viable and self-sustaining populations within the estimated habitat capacity.

### **Impacts from Proposed Habitat and Vegetation Management**

The habitat management objectives and techniques outlined under Alternatives A and B would be expanded to 12 new restoration projects (e.g. 18 total projects) under Alternative C. We have not yet identified which islands would support the new restoration projects; therefore, it is not possible to identify specific habitat management actions. In general, we would strive to provide a diversity of habitats on each of the 12 islands in an effort to accommodate the habitat requirements of this diverse group of species. The majority of islands within the Refuge would not be actively managed. As such, we would not anticipate any adverse effects to the resident or migratory species which use the islands.

### **Impacts from Proposed Wildlife Populations Management**

Although the consequences would be similar to those outlined in Alternative B, the scope of the predator management effort would be expanded to include the 12 new projects proposed under Alternative C. Using our current predator removal levels as a baseline, we would anticipate that 10-15 predators/year could be removed from the 18 restoration islands. However, it is important to note that in some years it may not be necessary to remove any mammalian predators from the islands. This level of predator management would not have any effect on State or regional predator population levels.

## **Alternative D**

### **Impacts from Proposed Land Acquisition and Protection**

Under Alternative D, land acquisition would be limited to the 467.1 acres currently unacquired within Petit Manan Refuge's approved boundary. This would leave the nationally significant bald eagle, wading bird, waterfowl, and colonial nesting seabird islands without the permanent protection afforded by conservation ownership. It is possible that the anticipated impacts from development may be lessened through land protection efforts by our conservation partners, but we cannot assume this commitment. As such, some coastal islands would remain vulnerable to development, and we would likely see gradual habitat loss for seabirds, wading birds and waterfowl as these parcels are developed.

### **Impacts from Proposed Public Use and Access Management**

Under Alternative D, all Refuge islands would be closed to public access year round and no hunting would be permitted anywhere on the Refuge. Based on the current light hunting pressure our lands receive, we would not anticipate that closing the islands to hunting and public access would have any effect on the variety or populations of species which utilize the islands throughout the year. With regards to the hunted species such as deer and waterfowl, we also would not anticipate that closing the Refuge to hunting would significantly increase populations of these species. Natural predation rates, emigration to surrounding privately owned lands, and hunting on adjacent lands would be expected to keep the populations within their natural range of variability.

### **Impacts from Proposed Habitat and Vegetation Management**

Under Alternative D, we would utilize a custodial approach to wildlife and habitat management, and minimize survey efforts and data collection. Monitoring efforts would be limited to a few high priority seabird species. We would eliminate the use of sheep grazing, herbicides, mowing, and burning as habitat management tools. The laughing gull population on Petit Manan Island would likely increase in number and nest site distribution as a result of increased vegetative growth and decreased gull control measures.

There would be insufficient staff time and dollars to complete baseline surveys, vegetation mapping, and research programs addressing critical management issues. Without support of our volunteer program, we would be unable to inventory and monitor invertebrates, reptiles, and amphibians. Efforts to document wildlife use of the coastal islands would be limited to the six restoration islands, as little effort would be expended on the other Refuge islands.

### **Impacts from Proposed Wildlife Populations Management**

Under Alternative D, we would limit our efforts to non-lethal predator management techniques. This change in management practices would significantly reduce our ability to manage and protect seabird and wading bird colonies along the coast of Maine. The number of mammalian predators on the seabird islands would likely increase. This increase may be self limiting, however, as the number of seabirds available as prey would likely be substantially reduced. Implementing Alternative D would significantly reduce our ability to contribute to the recovery efforts outlined in the Roseate Tern Recovery Plan (USFWS 1998), USFWS Tern Plan (USFWS 2002), and MDIFW Species Assessments. Predator numbers may increase very slightly on the six intensively managed sites, but overall, we do not predict our actions would result in a significant regional or State population change for any predator species.

### Other Native Wildlife of Management Concern - Summary

All alternatives strive to protect native species and habitat diversity. No significant changes to vertebrate or invertebrate population viability or species distribution is predicted under any alternative, even after consideration of the public use, hunting, trapping and predator management proposed actions. Additional protection of native species would be afforded by the proposed Refuge expansions in Alternative, A, B, and C. Alternative C, with the largest expansion proposal, would afford the greatest benefits to native species, followed by Alternative B, then A. Alternative D does not propose an expansion.

### Effects of Wilderness Recommendations

Appendix D describes the wilderness review process we undertook for this CCP and how it relates to the management alternatives. In summary, we determined that 13 islands in the Refuge met the minimum criteria for wilderness character, and from these, we identified 8 WSAs. The following WSAs were further studied for their suitability to manage, preserve long-term, and designate as wilderness:

- Outer Heron Island WSA,
- Outer White Island WSA,
- Little Marshall WSA,
- John's Island WSA,
- Bois Bubert Island WSA,
- Inner Sand Island WSA,
- Halifax Island WSA, and
- Cross Island WSA Complex (includes Cross, Inner Double Head Shot, Outer Double Head Shot, Mink, Scotch, and Old Man islands).

In our wilderness study, we evaluated whether we could maintain, over the long-term, the quality of wilderness values and character, without compromising our ability to meet refuge purposes and the Refuge System mission. We considered the impacts from existing and planned resource and public use programs and activities.

It is only in Alternatives B and C that we recommend the eight WSAs for wilderness designation. Since Congress has reserved the authority to make final decisions on wilderness designation, our recommendations are preliminary administrative determinations that will receive further review and possible modification by our Director, the Secretary of the Interior, the President, or Congress. However, the following analysis of impacts is based on the assumption that Congress would accept the recommendation and designate all eight WSAs as wilderness.

Under Alternatives B and C, the eight WSAs would be designated wilderness and managed according to the provisions of the Wilderness Act and Service wilderness management regulations (50 CFR 35) and policy in the

Refuge Manual (6 RM 8). The islands would be managed to accomplish refuge purposes, the Refuge System mission, and to preserve wilderness character, natural values, and outstanding opportunities for solitude and primitive recreation for the use and enjoyment of future generations. We would adjust our refuge management strategies and techniques to comply with wilderness stewardship principles and prevent degradation of wilderness character.

The use of motorized vehicles, motorized equipment, and mechanical transport on WSA islands would be allowed only (1) for emergency purposes or (2) when necessary to meet minimum requirements for the administration of the area as wilderness and to accomplish refuge purposes. The islands, however, would continue to be accessible by motorboat. Proposed or new refuge management activities, including the need to use motorized vehicles, motorized equipment, or mechanical transport for administrative purposes, would be evaluated through a minimum requirements analysis and NEPA compliance to assess potential impacts and identify mitigating measures to protect wilderness character.

Under Alternatives A and D, the eight WSAs would not be recommended for wilderness designation. The islands would be managed to accomplish their original refuge purposes only, in accordance with legal and policy guidance for the Refuge System; the islands would no longer be labeled WSAs and would no longer be specifically managed to maintain wilderness character. The provisions of the Wilderness Act and Service wilderness regulations and policy would not apply.

### **Impacts of Refuge Management Activities and Refuge Uses on Wilderness Values**

In the following discussion, we describe how actions proposed in the alternatives for other Refuge programs would affect the wilderness character of the eight WSAs.

None of the alternatives propose actions that would directly or indirectly jeopardize the roadless character, size, naturalness, or outstanding ecological or scenic features of any of the eight WSAs. This is based on the fact that no actions are proposed which would alter the physical character of any of the islands. For example, no new or expanded administrative, research, or recreational infrastructure is proposed. No changes in land use or land ownership would occur. Further, no habitat manipulations are proposed that would physically change the landscape. Under all alternatives, the islands identified as WSAs would continue to be physically impacted primarily by natural forces.

There are no existing or planned refuge management or administrative activities on any of the WSAs requiring the use of motorized or mechanized equipment. Under Alternatives B and C, any future proposals to use



motorized or mechanized equipment would need to be evaluated through a “minimum requirements analysis.” This analysis would determine whether the project or activity is necessary to meet minimum requirements for the administration of the area as wilderness, or to accomplish refuge purposes or the Refuge System mission. If the project is “necessary”, further evaluation would identify the minimum tool to accomplish the job. This analysis would not be required in Alternatives A or D.

Under Alternatives A, B, and C, the islands’ outstanding opportunities for solitude and primitive recreation would be preserved and available consistent with the seasonal restrictions imposed on seabird and bald eagle nesting islands. Under Alternatives B and C, the establishment of a “limits of acceptable change” program to monitor camping use on Halifax and Bois Bubert Islands would enhance our ability to manage these islands to maintain the highest quality of solitude and primitive recreation. In addition, the implementation of a day-use permit system for groups larger than 6 people under Alternative C would further enhance our ability to manage the islands to maintain outstanding opportunities.

Alternative D would exclude public use and access year round on any Refuge island, including the WSAs. As such, opportunities for solitude and primitive and unconfined recreation could not be experienced by anyone. In other words, there would be no chance for anyone to have a first-hand wilderness island encounter under Alternative D.

Wilderness designation would provide long-term legislative protection for the islands’ wilderness character, natural values, and opportunities for solitude and primitive recreation. Under Alternatives B and C, the eight WSAs would be guaranteed this additional level of legislative protection and commitment from the Service to manage the islands to maintain wilderness character and values. The islands would be managed to accomplish refuge purposes, the Refuge System mission, and to preserve wilderness character, natural values, and outstanding opportunities for solitude and primitive recreation for the use and enjoyment of future generations. We would adjust our refuge management strategies and techniques to comply with the provisions of the Wilderness Act, Service wilderness management regulations (50 CFR 35) and policy (6 RM 8), to prevent degradation of wilderness character, natural values, and outstanding opportunities for solitude and primitive recreation.

In summary, under Alternative B or C, all management actions on these islands would be evaluated and modified as necessary to ensure no wilderness values are diminished or lost. In addition, if wilderness designation is approved, we would develop detailed wilderness management plans to sustain their wilderness values in perpetuity. Neither Alternatives A or D affords this additional level of wilderness management and permanent legislative protection.

### Impacts to Other Refuge Programs and Refuge Uses

There are impacts, both short and long-term, directly associated with recommending and designating wilderness areas which would occur only under Alternatives B and C. Conversely, there are impacts with not recommending the WSAs, which we describe below.

During our public scoping meetings, some individuals were concerned that formally designating wilderness would dramatically increase visitor use and result in physical impacts to islands. They felt that once these islands were identified on a map as such, their designation would attract a substantial increase in visitation by those outdoor enthusiasts who are drawn to the unique challenges wilderness areas offer. However, we do not predict that a notable increase would occur for several reasons:

1. Several of the islands are either too remote, too small, and/or have no landing sites so are not accessible;
2. For those that are accessible, several have seasonal access restrictions due to nesting seabirds or bald eagles during the peak visitor use season; and,
3. The assumption that if these WSAs are formally designated, visitation will necessarily increase, is not statistically valid according to a review of literature and wilderness studies.

Also during public scoping, some individuals asked whether existing, compatible public uses occurring on WSAs would have to change or be modified to adhere to wilderness management requirements. In particular, there was concern whether priority public uses (i.e. hunting, fishing, wildlife observation, nature photography, and environmental education and interpretation) would be affected. During our wilderness review, we evaluated each of these priority public uses occurring on WSAs and determined none would have to be modified, regardless of the alternative.

All of these programs are currently being implemented in ways that do not degrade wilderness character or values. In addition, the existing and planned programs in the WSAs adhere to the rules and regulations in 50 CFR §35.6 (f). The prohibitions on public use of motorized vehicles (e.g., ATVs) and equipment (e.g., chainsaws), and mechanized transport (e.g., bicycles and game carriers) would not affect any of the existing, compatible public uses. Motorized public access is not currently allowed on Refuge islands, and for all practical purposes, motor vehicles and bicycles are not feasible or even useful on the islands. For example, there is the difficulty in transporting the vehicle or bicycle by boat to the islands. There is also the fact that many of the islands have dense vegetation difficult to maneuver through and trails exist on only the two larger islands. Finally, the small size of most WSA islands precludes the need for these modes of transportation. Bois Bubert is the only proposed wilderness island open to deer hunting and the dense spruce-fir forest prevents the use of wheeled equipment. Also, the relatively short distances to the shoreline

from any point on the island (< 1/2 mile) makes the use of this equipment unnecessary.

Our WSA boundary on Cross and Bois Bubert Islands excludes private lands. In addition, the Bois Bubert WSA boundary excludes the existing rights-of-way, common boat landing, and Lily Pond. Further, all WSA boundaries are delineated at the mean high water mark since the Service has limited jurisdiction in the inter-tidal area.

There are no land uses or existing private or State rights in the WSAs known to us that would affect or limit our ability to manage the islands to maintain wilderness values and character. We have no plans, nor do we foresee a management need, for timber harvest or livestock grazing. There are no active mining claims, oil and gas leases, or other subsurface claims or rights that we have found on the WSAs, nor are we aware of any potential for these resources. Under Alternatives B and C, as the Service acquires the private lands or reserved rights on Cross and Bois Bubert islands, we would use administrative action to incorporate each exclusion into its respective WSA or designated wilderness area.

We do not anticipate that wilderness designation would affect existing aquaculture facilities or commercial fishing or lobstering activities in State jurisdictional waters. As we described in Chapter 1 and Chapter 4, our Maine Field Office would continue to recommend to the U.S. Army Corps of Engineers (ACOE) that a minimum 1/4 mile no-activity buffer be implemented around Federal-owned islands. However, there is no guarantee that these recommendations would be incorporated into the final permits. We do not know at this time whether the identification of WSAs, or their designation as formal wilderness areas, would guarantee that the ACOE would incorporate the Service buffer recommendation into permits.



*Purple sandpipers*  
USFWS photo

Under Alternatives B and C, wilderness designation of the 8 WSAs would directly support the CCP goals and objectives for protecting Federal trust wildlife and the diversity of coastal habitats in several ways. Wilderness designation establishes an additional refuge purpose of protecting wilderness character and values. It would strengthen the Refuge System mission and the refuges' purposes of protecting nesting seabirds and bald eagles and island habitats essential to migrating birds such as raptors, water birds, and shorebirds. It would further insure that the WSAs remain undeveloped and retain their naturalness in perpetuity.

Designation of the eight WSAs would make a unique and significant contribution to the National Wilderness Preservation System (NWPS). Within the current NWPS, the only designated wilderness island on the East Coast north of North Carolina includes North and South Monomoy islands, off of southern Cape Cod. These two islands comprise the 2,600 acre Monomoy Wilderness Area. The wilderness area evolved from a series of small sand-spit barrier islands which are constantly shifting, eroding, and drifting. It is influenced by the warmer saline waters, moderate tides, and moderate climates associated with the Gulf Stream. While some trees less than 15 feet tall occur on the islands, the majority is dune, saltmarsh, or freshwater marsh. The Monomoy Wilderness is noted for its large common and roseate tern nesting colonies, its large and diverse breeding waterfowl populations, and its shorebird migration. The wilderness area has a long history of settlement year round starting with Native Americans (6,000 to 8,000 years ago). This was followed by European settlements in the 18th century, culminating with a small town along the southern end until the 1930's.

The island WSAs recommended for wilderness designation on this Refuge are geologically, geographically, botanically, and culturally distinct from the Monomoy Wilderness. They are formed on igneous and metamorphic bedrock, often perched off the ocean surface creating up to 100 foot cliffs. The dramatic rocky coastlines, over 4,617 off-shore islands, and rich cultural heritage create a unique and incredibly diverse landscape incomparable in the United States. The islands lie in the Gulf of Maine, where cold water and air currents draw from the North Atlantic, and up to 50 foot tidal effects are experienced. Most of the WSA islands are forested with mature spruce-fir stands; the non-forested islands include plant communities more similar to northern boreal or Arctic types.

The Maine Coastal Islands Refuge WSA islands also contrast sharply to Monomoy Wilderness in their history of use and management. Limited human use and occupancy of these islands has occurred because of the challenges with accessing and landing on the islands. Our understanding is that early Native American use of the islands was seasonal, low impact, and mostly confined to near-shore, larger islands such as Bois Bubert and Cross islands. We know that only one of the WSA islands experienced sheep grazing historically, but only limited seasonal occupancy by humans would

have occurred associated with the grazing. In short, these islands have primarily been influenced only by the natural effects of climate and weather.

The Refuge WSAs that support nesting seabirds would also offer a unique opportunity within the NWPS to protect birds such as Atlantic puffin, razorbills, black guillemots, and common eider, which are on the southern geographic limit of their range and not found anywhere else in the United States. Designation would also support recovery of the Federal threatened bald eagle since active nesting occurs on four of the islands.

## Environmental Justice

In accordance with Executive Order 12898, Federal Actions to address Environmental Justice in Minority Populations and Low-Income Populations, Federal agencies must identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. After presenting the context of minority and low income populations in Maine coastal counties, we address environmental justice as it relates to the four Refuge programs predicted to have the biggest impact on resources. We obtained our information on minority and low income populations from the U.S. Census Bureau 2000, and used those statistics to assess impacts.

According to the Census Bureau website, “Poverty status is defined by family—either everyone in the family is in poverty or no one in the family is in poverty. The characteristics of the family used to determine poverty status are number of people, number of related children under 18, and whether the primary householder is over age 65. An income threshold is determined given a particular family’s set of characteristics; if that family’s income is below that threshold, the family is in poverty” (<http://www.census.gov/hhes/poverty/povdef.html>).

The Census Bureau website uses the term “minority populations” as inclusive of the following races: Black, Hispanic, Asian, Pacific Islander, or American Indian/Alaska Native. Those racial classifications conform to the October 30, 1997, Federal Register Notice entitled, “Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity” issued by the Office of Management and Budget (OMB). Those standards govern the categories used to collect and present federal data on race and ethnicity. The OMB requires five minimum categories for race: American Indian and Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and White. Some federal surveys include a sixth category, “Some other race,” added with OMB approval (<http://quickfacts.census.gov/qfd/states/23/23029.html>).

Maine's 1,286,670 residents are disproportionately white (96.9%) according to the U.S. 2000 Census (<http://quickfacts.census.gov>). This statistic remains fairly constant within the four largest counties in coastal Maine as depicted in Table 4-1 below. These are also the same four counties most affected by current or proposed Refuge management.

**Table 4-1. Percent\* of minority populations in four coastal counties in Maine.**

Minority	Hancock County	Knox County	Washington County	York County
Black or African American	0.3%	0.2%	0.3%	0.4%
American Indian and Alaska Native	0.4%	0.2%	4.4%	0.2%
Asian	0.4%	0.4%	0.3%	0.7%
Hispanic or Latino	0.6%	0.6%	0.8%	0.7%

\*Percentages are based on the percent of total county population

According to the 2000 national census, the percent of Maine residents living below the poverty level is 10.9%; the national average is 12.4%. In Table 4-2, we present the percent of residents below the poverty level in the same four coastal counties.

**Table 4-2. Percent of families and individual residents living below the poverty level in four coastal counties in Maine.**

Type of Resident	Hancock County	Knox County	Washington County	York County
Family	7.0%	5.9%	14.2%	5.9%
Individual	10.2%	8.2%	19.0%	8.2%

### Impacts from Proposed Land Acquisition and Protection

We are not aware of any adverse health or economic impacts to any specific populations associated with our land acquisition program since its inception. Since most of our proposed acquisition is off-shore islands, we predict no future health risks and no significant changes in industry, taxes, or revenues which might affect residents. As such, we do not expect that Service land acquisition would disproportionately impact the health or the environment of minority or low-income populations.

The two Passamaquoddy Tribes: Pleasant Point and Indian Township Reservation, have both expressed interest in improving relations with the Service and our staff. We are currently in discussions to determine how we can cooperate in the identification and protection of cultural and natural resources important to them. All alternatives would require that we develop a formal partnership agreement with these Tribes to further validate a mutually-beneficial working relationship.

We expect that there are lands we propose to acquire which contain cultural and natural resources important to these and other Indian Tribes in Maine. At this time, we do not know all lands which may be of special interest to them and/or lands they would like to acquire as Tribal lands. We have shared our land acquisition proposals for their review and comment. We would propose to resolve any conflicts locally or at the Regional Office level, but it is possible that some decisions may be elevated to the

Secretary of Interior. None of the lands in Alternative B, the Service's Preferred Alternative, have recorded pre-historic sites according to the Maine SHPO; although we acknowledge that the majority of these lands have not been surveyed. Alternatives B and C propose to increase our survey efforts at high probability sites, particularly those at risk of erosion. None of our proposed acquisition lands lie near Tribal reservation lands.

**Impacts from Proposed Public Use and Access Management**

We do not predict that our proposals for public use and access management would disproportionately affect minority or low-income residents, regardless of the alternative. None of the Refuge visitor activities that we propose to eliminate or seasonally restrict on Refuge lands are ones we expect minority or low-income populations would participate in greater proportion than other visitors.

**Impacts from Proposed Vegetation and Habitat Management**

As we described earlier in this chapter, use of herbicides and prescribed fire are management tools we might employ which could have health implications, and we predicted that neither would pose a risk to any population. Both are used on a limited basis in a given year, if at all, and occur under strict Service guidelines designed to minimize health and safety risks. Refuge visitors and local residents would be alerted to these activities, and since there are few adjacent residents, risks are negligible regardless of one's race or income status.

**Impacts from Proposed Wildlife Populations Management**

We do not predict impacts to any human populations from our proposed wildlife populations program. This program consists primarily of activities designed to restore seabirds to off-shore islands. These activities include using non-lethal and lethal methods to control wildlife that prey on seabirds. Gulls, mink, great-horned owls, and night herons are examples.

**Minority and Low-Income Populations - Summary**

Our analysis of environmental justice concludes that we do not predict any of our management alternatives would cause disproportionately high and adverse human health or economic impacts to minority or low-income populations in coastal Maine.

**Cumulative Impacts**

Cumulative impacts are those impacts on the physical, biological, and human environment resulting from the incremental impact of the proposed actions when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

This cumulative impacts assessment includes other agencies' or organizations' actions if they are inter-related and influence the same environment. Thus, this analysis considers the interaction of activities at the Refuge with other actions occurring over a larger spatial and temporal frame of reference. Potential cumulative impacts for the proposed alternatives are described below.

### **Air Quality**

None of the proposed alternatives are expected to have significant cumulative adverse impacts on air quality in coastal Maine or elsewhere in New England. Some short-term, local deterioration in air quality would be expected from management-ignited prescribed burns and from Refuge visitors' automobile emissions. However, management-ignited prescribed burns would only occur under the stipulations of the Fire EA (2002) completed by the Refuge. These stipulations are specifically designed to minimize air quality impacts. Further, while visitors would primarily access the Refuges by automobile, most would drive less than 50 miles. Most of these visitors are already in the area on vacation and seek out the Refuge for a half-day trip. It is rarely the primary destination for Maine coastal travelers. In other words, the presence of the Refuge should only be accountable for a very small percentage of vehicle emissions generated in this area. Importantly, we predict no additional cumulative impacts to Class 1 air sheds from our actions; the closest Class 1 area being Moosehorn Refuge Wilderness Area, approximately 25 miles to the north in Baring, Maine. We described the results of air quality monitoring studies in Moosehorn Wilderness Area and Acadia National Park in detail in Chapter 3. In summary, Refuge-related activities contribute insignificantly to poor air quality in coastal Maine, which is much more affected by power plants and pulp mills from industrial centers and automobile emissions from populated areas.

With our partners, we contribute to improving air quality through cooperative land protection and management of natural vegetation and wetlands. Protecting land from development, which is happening at an increasing rate in coastal Maine, and maintaining it in natural vegetation or as natural wetlands, assures these areas will continue to filter out many air pollutants harmful to humans and the environment.

### **Soils, Hydrology, Wetlands, and Water Quality**

The greatest past, present, and foreseeable future adverse impact on these watershed resources in coastal Maine is from increasing residential and commercial development. As development along the coast continues, the threats to these Refuge resources, namely coastal saltwater and freshwater wetlands, will increase dramatically. In particular, deteriorating water quality in coastal Maine has become a priority issue for State agencies and local communities. Chapter 3 describes many of these concerns. A cooperative, watershed-level approach to protecting and managing these resources offers the greatest opportunity to cumulatively improve conditions.



We work closely with our Gulf of Maine Coastal Program Office, who are active members of the Gulf of Maine Council on the Marine Environment. As described in Chapter 3, the mission of this international council and its publication, *The Gulf of Maine Times*, is to maintain and enhance environmental quality in the Gulf of Maine.

We can contribute to the Council's goals, and to improved watershed conditions in three ways: Service acquisition of uplands and wetlands threatened with development, cooperative land protection of important habitat, and technical information exchange with landowners throughout these watersheds.

Alternatives A, B, and C propose to increase Service land acquisition. Alternative C proposes the most ambitious land acquisition strategy, with a proposal to acquire from willing sellers all 151 nationally significant islands not in permanent protection and 153.3 acres of mainland. Alternatives A and B propose acquisition of 30 and 87 islands respectively and 153.3 acres of mainland. Appendix A describes in detail the land acquisition proposal for Alternative B, the Service's Preferred Alternative.

We also work with an impressive array of other conservation partners who are active in developing protection strategies for ecologically significant lands in coastal Maine. Chapter 3 describes 12 partnerships with whom the Service is engaged; all actively working to promote land and resource protection and/or cooperative land management near the Refuge.

Each of the alternatives proposes various levels of participation in ongoing, watershed-based land protection partnerships. All alternatives propose to increase private-public lands partnerships, primarily to share technical information on things like restoration and habitat management techniques. When combined with actions by other Federal, State, and local organizations working in coastal Maine, we expect all of the alternatives to have a positive cumulative effect on soils, hydrology, wetlands, and water quality within their respective watersheds.

## Biological Resources

All alternatives are intended to maintain or improve biological resources on the Refuge, in coastal Maine, and within the Gulf of Maine Ecosystem. The combination of our management actions with other organizations' actions could result in significant, beneficial cumulative effects by: (1) increasing protection and management for Federal and State-listed threatened and endangered species; (2) improving uplands and wetlands habitats that are regionally declining; and (3) reducing invasive, exotic plants and animals.

Our staff, the MDIFW, GOMP, National Audubon Society, Maine Audubon Society, and private individuals now cooperate in monitoring and/or managing all of the seabird nesting islands in coastal Maine. The alternatives propose varying levels of increased protection and management for those nesting sites which occur on the Refuge. As we described earlier

in Chapter 4, all of the nesting sites are vital to the continued presence of several nesting seabird species; any loss or degradation of these nesting areas would have a significant adverse cumulative effect on the overall Atlantic coast population. Loss of any island's nesting population would further isolate the remaining nesting areas making them more susceptible to catastrophic loss from such threats as hurricanes, oil spills, and/or disease.

Alternatives A, B, and C propose to manage at least 70 acres of open field and blueberry barrens, 226 acres of successional hardwood forest, and 219 acres of freshwater wetlands on Petit Manan Point Division to maintain the impressive diversity of landbirds, waterbirds, waterfowl, and shorebirds documented here. Alternatives A, B and C propose to establish interpretive, educational and outreach programs on Petit Manan Point to promote conservation and habitat restoration throughout coastal Maine. While the land we affect is very small compared to the entire Maine coast, our objective is to impress other landowners to take positive action as well.

### **Cultural Resources**

We expect none of the alternatives to have significant adverse cumulative impact on cultural resources in Maine. Beneficial impacts would occur at various levels, depending on the alternative, because of proposed environmental education and interpretation programs, and increased field surveys to identify and protect any discovered sites. In Alternatives B and C we would identify high probability sites to survey more intensely and focus on those threatened by erosion from wind and tides. We would also continue to maintain the historic lighthouses and associated structures on the Refuge to the best of our ability given funding levels. We plan to work with the Coast Guard and lighthouse preservation organizations, such as the American Lighthouse Foundation, to cooperate in the protection of historic structures.

Finally, we would also develop a formal partnership with the Passamaquoddy Tribes to establish a mutually beneficial relationship, and improving our knowledge of Tribal history. Acadia National Park is further along in developing a partnership with the Passamaquoddy Tribes. Their objective is to improve their interpretive and education programs on Tribal history and promote a respect for cultural resources in coastal Maine. These programs could potentially reach hundreds of thousands of visitors a year. Educating these Maine coastal visitors on the need to protect cultural resources will benefit our programs as well.

### **Human Resources**

We expect none of the alternatives to have a significant adverse cumulative impact on the economy of coastal Maine. Although Federal land acquisition reduces property tax revenue, affected towns are compensated with Refuge Revenue Sharing payments, and also should realize a reduction in cost of community services as we described earlier in Chapter 4. In

addition, the proposed acquisitions make up only a small portion of any town. We expect increased visitation to the Refuge to bring additional revenues to local communities through increased tourism, but we do not predict this will be a significant increase in overall revenue in any area.

Alternatives A, B and C would maintain the two Maine Island Trail camping sites on Refuge islands. This would ensure that no new gaps in the trail are created and allows this unique boating experience to continue. All other islands would remain open to public day use and access consistent with the established seabird and bald eagle nesting seasonal closures. As new islands are acquired by the Service, these seasonal nesting closures would be imposed and no new camping sites would be allowed. This could have implications to current users of islands proposed for Service acquisition. It is also true that we do not know whether current island owners actually allow public uses that we would restrict. However, from a cumulative impact standpoint, the most islands to be acquired by the Service is 151 under Alternative C. These islands are scattered from the New Hampshire border to Cutler, Maine and represent only 4% of the 4,617 islands along the Maine coast. No one area of the coast would be disproportionately impacted.

Alternatives A, B and C would cumulatively increase priority public use programs related to interpretation, environmental education, wildlife observation and photography in downeast Maine. Few public areas outside of Acadia National Park offer these programs, typically free to the public, and with accessible facilities. This would supplement the private recreational and educational programs offered along the coast and contribute to a diverse mix of opportunities.

**Relationship Between Short-term Uses of the Human Environment and Enhancement of Long-term Productivity**

This section evaluates the relationship between local, short-term uses of the human environment and maintaining long-term productivity of the environment. By long-term we mean that the impact would extend beyond the 15-year planning horizon of the final CCP. Short-term means less than 15 years.

All of the alternatives strive to maintain or enhance the long-term productivity and sustainability of natural resources on the Refuge. To varying degrees, the alternatives propose actions that promote watershed- or ecosystem-wide partnerships geared to identifying and protecting important coastal habitats. The alternatives strive to protect our Federal trust species and the habitats they depend on, as evidenced by the seasonal public use restrictions during the seabird nesting seasons. Alternatives A, B, and C would maintain the intensive seabird restoration projects that have resulted in important regional increases in these species. Outreach and environmental education are a priority in each alternative to encourage Refuge visitors to be better stewards of our environment.

All alternatives propose stepped-up outreach and enforcement to eliminate existing uses determined to be not appropriate and incompatible, such as ATV use and rockweed harvesting. The purpose is to reduce impacts on wildlife and habitats and enhance the long-term productivity of these sites. While the intent is the same, Alternatives A and D, would not provide the staffing or funding levels to insure these uses can be eliminated.

The dedication of certain areas to maintain arterial roads, trails, visitor facilities on the mainland divisions, and research facilities on the islands represents a loss of long-term productivity on very localized areas, but is not considered significant given the land base. Camping in designated areas would be allowed to continue in Alternatives A, B and C on two islands, but in the latter two alternatives we would monitor it closely, and we would establish thresholds of change which may trigger eliminating this use. Sheep grazing would also be allowed to continue in Alternatives A, B, and C, but similar to camping, we would monitor closely and develop specific operating prescriptions in a special use permit.

In summary, we predict that all alternatives would contribute positively to maintaining or enhancing the long-term productivity of the environment of coastal Maine.

### **Unavoidable Adverse Effects**

Unavoidable adverse effects are those actions which could cause significant harm to the human environment that cannot be avoided, even with mitigation measures. We considered property tax losses to towns, increased visitation and its effects, and prescribed fire as the principle activities that could have unavoidable effects. Actual losses in property tax revenue to towns was described in this chapter in the section: Effects on the Local and Regional Economy. While the impacts to individual coastal towns varies, none of the alternatives would contribute to a significant cumulative loss in any one town. Alternatives A, B, and C predict an increase in visitation at increasing levels, respectively. Enhanced services and facilities for Refuge visitors will draw more people to the area, in particular we are predicting more groups with increased environmental education and interpretive programs. Even under a carefully designed program, increased visitation would result in higher levels of disturbance to wildlife, although most of these would occur in localized areas. We intend to manage our visitor use programs to minimize these effects. The impacts from prescribed burning used in vegetation treatments would impact visual quality for a short time each year (< 7 days), but will be implemented under conditions that comply with State Clean Air Act and Federal EPA standards. As such, the effects would not be significant.

Finally, we will undertake biological monitoring as part of all alternatives, to enable our staff to adapt management actions and address any unforeseen situations. As a result, none of the alternatives would result in a significant unavoidable, adverse environmental impacts.

## Potential Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those which cannot be reversed, except perhaps in the extreme long term or under unpredictable circumstances. An example of an irreversible commitment is an action which contributes to a species' extinction. Once extinct, it can never be replaced.

In comparison, irretrievable commitments of resources are those which can be reversed, given sufficient time and resources, but represent a loss in production or use for period of time. An example of an irretrievable commitment is the maintenance of forest and shrubland as open field and grasslands. If for some reason grasslands were no longer an objective, it would gradually revert to shrub land and forest, or the process could be expedited with plantings.

Only a few actions proposed in the alternatives would result in an irreversible commitment of resources. One is committing land to the construction of the proposed new Refuge Administration and Coastal Education Center. All alternatives propose that we continue to pursue this action. A separate environmental assessment will evaluate the site-specific impacts of constructing this facility, once a location is selected.

Another irreversible commitment of resources impacting local communities is Service land acquisition. Alternatives, A, B, and C propose a Refuge expansion at increasing levels, respectively. Once these lands become part of the Refuge, it is unlikely they would ever revert back to private ownership.

The commitment of resources to maintain the freshwater impoundments, grasslands, blueberry barrens, and open fields (Alternatives, A, B, and C only) is very small compared to the benefits derived from the increased biodiversity. On the mainland, these wetlands, grasslands, and fields provide nesting, foraging, and migrating habitat for many migratory bird species of conservation concern. They also benefit Refuge visitors by providing wildlife observation opportunities. On the islands, maintaining grasslands and fields is vitally important to providing high quality seabird nesting habitat.



Black guillemots  
USFWS photo

Alternatives A, B, and C would maintain the seasonal, public access closures on nesting seabird islands. Alternative D would close the islands to public use year round. This represents an irretrievable loss of resources for some members of the public visiting the Refuge in the future. However, keeping in mind that the Refuge's primary purpose is to protect migratory bird habitat, the trade-off of reduced public access during the critical seabird nesting season is warranted. In addition, with over 4,617 islands off the coast of Maine, there are likely others that could provide recreational opportunities at times when the Refuge islands are closed.

Table 4-3 Summary of the effects of management alternatives on Refuge resources

Refuge Resources	Alternative A Current Management	Alternative B Service's Preferred	Alternative C	Alternative D
<b><u>Physical Resources</u></b>				
Water Quality and Soils	Service acquisition of 1,501 acres not in conservation ownership increases direct, permanent benefits to water quality and soils productivity	Service acquisition of 2,926 acres not in conservation ownership considerably increases direct, permanent benefits to water quality and soil productivity	Impacts resemble alternative B except:  Service acquisition of 6,930 acres not in conservation ownership greatly increases direct, permanent benefits to water quality and soil productivity	Service acquisition of 467 acres not in conservation ownership minimally increases direct, permanent benefits to water quality and soil productivity
	Negligible increase in negative impacts from estimated 10% rise in visitation, which would be offset by limited impact monitoring and "Leave No Trace" outreach program	Potential to improve water quality and soil productivity on high visitation and sheep-grazed islands increased monitoring and threshold standards and limits set; no significant negative impacts from estimated increases in visitation since most visitors would be on seabird viewing boat tours	Some low intensity, short duration negative effects from the annual use of herbicides and prescribed fire (~ 250 acres)	Increase in direct and permanent benefits to current refuge lands since they would be closed to all public uses; sheep grazing would be eliminated; and, the intensity of seabird restoration work would be greatly reduced
	Some low intensity, short duration negative effects from annual use of herbicides, and prescribed fire (~ 55 acres)	Some low intensity, short duration negative effects from annual use of herbicides, and prescribed fire (~110 acres)	Slight increase in localized soil compaction from construction of at least 2 photo blinds.	Some soil compaction from use on existing Petit Manan Point trails
	Some localized soil erosion along Metinic Island shoreline from sheep grazing	Some localized, permanent soil compaction from use on existing and planned trails on all 4 mainland divisions; however, designated trail would also reduce "unauthorized" trail use in more sensitive areas	No violations of Federal or State Clean Water Act standards	No violations of Federal or State Clean Water Act standards
	Some soil compaction from use on existing Petit Manan Point trails			
	No violations of Federal or State Clean Water Act standards	No violations of Federal or State Clean Water Act standards		

**Table 4-3 Summary of the effects of management alternatives on Refuge resources (cont'd)**

Refuge Resources	Alternative A Current Management	Alternative B Service's Preferred	Alternative C	Alternative D
<b>Physical Resources (cont'd)</b>				
Air Quality	<p>Potential for contributing direct and indirect short-duration air pollution from prescribed burning on up to 55 acres/year; however, implementation would adhere to stipulations in 2002 Fire Plan to minimize effects</p> <p>Increase in direct, long-term benefits from protecting and maintaining over 9,000 acres (existing and expanded Refuge lands) of natural vegetation and wetlands, which act as pollution filters</p> <p>Negligible contribution to air pollution from Refuge visitor vehicle emissions; however, Refuge visitation is mostly incidental to other primary destinations</p> <p>No violation of Federal or State Clean Air Act standards, including no impacts to Class I airshed over Moosehorn Wilderness Area</p>	<p>Same type of impacts as described for alternative A; however, the difference is in the increased levels and distribution of the impact. None of these impacts is considered significant:</p> <p>Prescribed burning would occur on up to 110 acres/year;</p> <p>Over 10,000 acres (existing and expanded Refuge lands) of natural vegetation and wetlands would be protected and functioning as pollution filters</p> <p>Slight increase in vehicle emissions predicted from increased visitation in summer and fall tourist seasons; however, Refuge visitation is mostly incidental to other primary destinations</p> <p>No violation of Federal or State Clean Air Act standards, including impacts to Class I airshed over Moosehorn Wilderness Area</p>	<p>Same type of impacts as described for alternative A; however, the difference is in the considerable increased levels and distribution of the impact. None of these impacts is considered significant:</p> <p>Prescribed burning would occur on up to 250 acres/year;</p> <p>Over 14,000 acres (existing and expanded Refuge lands) of natural vegetation and wetlands would be protected and functioning as pollution filters</p> <p>Greatest increase in vehicle emissions predicted from increased visitation in summer and fall tourist seasons; however, Refuge visitation is mostly incidental to other primary destinations</p> <p>No violation of Federal or State Clean Air Act standards, including impacts to Class I airshed over Moosehorn Wilderness Area</p>	<p>No prescribed burning would occur; no impacts to air pollution from this source</p> <p>No violation of Federal or State Clean Air Act standards, including impacts to Class I airshed over Moosehorn Wilderness Area</p>

Table 4-3 Summary of the effects of management alternatives on Refuge resources (cont'd)

Refuge Resources	Alternative A Current Management	Alternative B Service's Preferred	Alternative C	Alternative D
<b>Socioeconomic Resources</b>				
Local and Regional Economies	Proposed Refuge island expansion would result in an estimated total of \$31,000 property tax increase in affected towns; an overall average rate of 0.04% per town	Proposed Refuge island expansion would result in an estimated total of \$130,000 property tax increase in affected towns; an overall average rate of 0.05% per town	Proposed Refuge island expansion would result in the highest estimated total of \$225,000 property tax increase in affected towns; an overall average rate of 0.08% per town	No island expansion so no change to current contributions to local and regional economies over the short-term, including property taxes
	No new commercial seabird viewing opportunities, thus no additional economic outputs	Increased direct and indirect economic benefits over the long term from potential establishment of at least 1 new seabird viewing location	Highest increase in direct and indirect economic benefits over the long term from potential establishment of at least 2 new seabird viewing location	Over the long term, there would be reduced economic outputs from the reduced seabird viewing opportunities and elimination of hunting
	No appreciable increases in benefits to local economies from Refuge visitation; hunter-generated expenditures (e.g., equipment purchases, food, lodging, services, etc) would generate revenues estimated to be \$66,710/year	No appreciable increases in benefits to local economies from Refuge visitation; however, the new refuge hunt on Petit Manan Pt division would generate additional hunter - expenditures (e.g., equipment purchases, food, lodging, services, etc) in local communities of about \$6,540/year over current levels	No appreciable increases in benefits to local economies from Refuge visitation; however, hunter-generated benefits similar to alternative B	



**Table 4-3 Summary of the effects of management alternatives on Refuge resources (cont'd)**

Refuge Resources	Alternative A Current Management	Alternative B Service's Preferred	Alternative C	Alternative D
<b>Socioeconomic Resources (cont'd)</b>				
Public Access, Educational and Recreational Opportunities	Slight increase in visitation consistent with predictions of increased tourism in surrounding towns (~ 10%); current visitation is 47,000 visitor days annually (50% on seabird viewing boat tours)	Appreciable increase in visitation in response to increased visitor services programs; namely school groups participating in environmental education programs; visitation would increase to ~ 58,750 visitor days annually	Largest increase in annual visitation predicted, ~ 70,500 visitor days, due to considerable increase in refuge land base	Major decline in visitation over the long term; dramatic decrease in public access, educational, and recreational opportunities since all islands would be closed to public access year round; also, limited programs would be offered on mainland units
	Maintain current seasonal access restrictions on Refuge islands to protect nesting seabirds or bald eagles	Maintain seasonal access restrictions on Refuge islands; modified to allow earlier access on eider and gull-only islands	Impacts from compatible, priority public use programs resemble alternative B; except expanded environmental education and interpretive programs and 2 potential new seabird viewing sites would be established over the long term	Hunting and camping opportunities would be eliminated
	All 30 islands proposed for Service acquisition would have seasonal restrictions imposed; a likely change (but extent unknown) from current private ownership	All 87 islands proposed for Service acquisition would have seasonal access restrictions imposed; a change (but extent unknown) from access allowed by current private ownership	All 151 islands proposed for Service acquisition would have seasonal access restrictions imposed; a change (but extent unknown) from access allowed by current private ownership	
	No change to compatible, priority public use programs and infrastructure offered; camping would continue on 2 islands on MITA trail	Marked increase in wildlife observation and photographic opportunities with new trails on Gouldsboro Bay, Sawyers Marsh, and Corea Heath mainland division; also, one potential new seabird viewing site would be established over the long term	New opportunity offered for furbearer trapping in certain locations under refuge regulations	
		New hunting opportunity on Petit Manan Pt division and newly acquired islands; however, may occasionally impact use of area by other non-hunting visitors		
		Maintain camping on 2 islands on MITA trail with increased oversight and monitoring		

Table 4-3 Summary of the effects of management alternatives on Refuge resources (cont'd)

Refuge Resources	Alternative A Current Management	Alternative B Service's Preferred	Alternative C	Alternative D
<b>Socioeconomic Resources (cont'd)</b>				
Cultural resources	<p>Acquisition of 1,501 acres, including 30 islands not in conservation ownership, would afford permanent protection of cultural sites</p> <p>No violation of National or State Historic Preservation Act standards; however, only minimal maintenance on lighthouse structures</p> <p>Improved relations with Passamaquoddy and other Wabanaki Tribes through development of an MOU</p>	<p>Appreciable increase in permanent protection of cultural sites with proposed acquisition of 2,926 acres, including 87 islands, not in conservation ownership.</p> <p>No violation of National or State Historic Preservation Act standards; increased restoration of historic structures</p> <p>Improved relations with Passamaquoddy and other Wabanaki Tribes through development of an MOU</p>	<p>Greatest increase in permanent protection of cultural sites with proposed acquisition of 6,930, including all or portions of 151 islands, not in conservation ownership.</p> <p>No violation of National or State Historic Preservation Act standards; increased restoration of historic structures</p> <p>Improved relations with Passamaquoddy and other Wabanaki Tribes through development of an MOU</p>	<p>Provides fewest opportunities for additional cultural site protection; however, affords greatest protection from human disturbance on Refuge islands since no public access allowed year-round</p> <p>Improved relations with Passamaquoddy and other Wabanaki Tribes through development of an MOU</p>
Wilderness	No wilderness proposed	Recommends 13 islands in 8 wilderness study areas as part of the National Wilderness Preservation System	Recommends 13 islands in 8 wilderness study areas as part of the National Wilderness Preservation System	No wilderness proposed
<b>Biological Resources</b>				
Vegetation and Habitats	<p>No change from current habitat management priorities:</p> <p>1) maintain 6 seabird restoration projects on Refuge islands; continue to use mowing, prescribed burning, herbicides, and sheep grazing as management tools</p>	<p>Expand habitat and management priorities to include:</p> <p>1) maintain 12 seabird restoration projects on Refuge islands; continue to use mowing, prescribed burning, herbicides, and sheep grazing as management tools</p>	<p>Same as alternative B except:</p> <p>Expand to 18 seabird restoration projects on Refuge islands</p>	<p>Dramatic reduction in management of vegetation and habitats; allow vegetation succession to occur unimpeded. Grasslands and other early successional habitats would change to shrub and early forest habitats over the long-term on mainland. On seabird restoration projects, with reduced management, much would change to raspberry thickets</p>

Table 4-3 Summary of the effects of management alternatives on Refuge resources (cont'd)

Refuge Resources	Alternative A Current Management	Alternative B Service's Preferred	Alternative C	Alternative D
<b>Biological Resources (cont'd)</b>				
	<p>2) maintain up to 70 acres of open field habitat on Petit Manan Pt division; continue to use mowing and prescribed burning as management tools</p> <p>3) maintain 3 freshwater impoundments (~ 112 acres) on Petit Manan Pt division</p>	<p>2) maintain up to 100 acres of early successional and open field habitat on Petit Manan Pt division</p> <p>3) maintain 3 freshwater impoundments (~ 112 acres) on Petit Manan Pt division</p> <p>4) control invasive plants before they can become established</p> <p>5) increase protection of rare plant sites by developing site management and monitoring plans</p> <p>6) increase protection of salt marsh habitats through increased inventories and monitoring</p> <p>7) maintain forested habitats for species of conservation concern</p>		
Threatened and Endangered Species	<p>Maintain permanent protection of active and historic bald eagle and roseate tern nesting sites on current Refuge lands, including predator control and seasonal closures</p>	<p>Maintain permanent protection of active and historic bald eagle and roseate tern nesting sites on current Refuge lands, including predator control and seasonal closures</p>	<p>Maintain permanent protection of active and historic bald eagle and roseate tern nesting sites on current Refuge lands, including predator control and seasonal closures</p>	<p>Maintain permanent protection of active and historic bald eagle and roseate tern nesting sites on current Refuge lands; however, lack of lethal predator control would likely adversely affect nesting roseate tern</p>

Table 4-3 Summary of the effects of management alternatives on Refuge resources (cont'd)

Refuge Resources	Alternative A Current Management	Alternative B Service's Preferred	Alternative C	Alternative D
<b>Biological Resources (cont'd)</b>				
Seabirds, Wading birds, and Waterfowl	Protect an additional active bald eagle site, and historic bald eagle and roseate tern nesting sites through proposed expansion	Appreciably increase protection of active bald eagle sites; 37 islands in expansion proposal are bald eagle nesting sites, and 2 two are historic roseate tern nesting sites.	Appreciably increase protection of active bald eagle sites; 101 islands in expansion proposal are bald eagle nesting sites, and 2 are historic roseate tern nesting sites.	No new sites protected; no new restoration projects
	Increased, long-term benefits from habitat and vegetation management noted above; nesting and migration habitats to be maintained; predators would continue to be managed at 6 intensively managed seabird restoration sites	Refuge expansion proposal provides for bald eagles and roseate terns to expand to new areas	Refuge expansion proposal provides for bald eagles and roseate terns to expand to new areas	Affords the least benefits to nesting terns as habitat quality would decrease with reduced management at seabird restoration projects
	Increased protection of nesting and migration habitat, through proposed acquisition, including 30 islands	Direct, long-term benefits from habitat and vegetation management noted above; nesting and migration habitats to be maintained; predators would be managed at 12 intensively managed seabird restoration sites	Direct, long-term benefits from habitat and vegetation management noted above; nesting and migration habitats to be maintained; predators would be managed at 18 intensively managed seabird restoration sites	Lack of lethal predator control, and fewest acres proposed for acquisition, would likely adversely affect nesting birds
		Populations and productivity levels to be sustained or increased over baseline year 2000 levels; improved distribution and #'s of seabird colonies over the long-term through proposed acquisition, including 87 islands not in conservation ownership	Populations and productivity levels to be sustained or increased over baseline year 2000 levels; affords greatest opportunity to improve the distribution and #'s of seabird colonies over the long-term through proposed acquisition, including all or portions of, 151 islands not in conservation ownership	
		Birds would also benefit from seasonal closures and laughing gull control	Birds would also benefit from seasonal closures and laughing gull control	

**Table 4-3 Summary of the effects of management alternatives on Refuge resources (cont'd)**

Refuge Resources	Alternative A Current Management	Alternative B Service's Preferred	Alternative C	Alternative D
<b>Biological Resources (cont'd)</b>				
Other Native Wildlife of Concern	<p>No appreciable changes to numbers and distribution of native wildlife of concern on existing Refuge lands; however, some loss of individual native wildlife, which are predating on nesting seabirds, and/or are hunted during our regulated hunting seasons</p> <p>No expectation that Refuge management would result in a loss in population viability for any native species of concern</p> <p>Increased, permanent protection of habitat supporting a wide diversity of native wildlife through proposed acquisition, including 30 islands</p>	<p>Same as alternative A except:</p> <p>Appreciable increase in permanent protection of habitat supporting a wide diversity of native wildlife through proposed acquisition, including 87 islands</p> <p>Some additional loss of white-tailed deer with new hunting program on Petit Manan Point; however hunting would not reduce population viability in the State's wildlife management district</p>	<p>Same as alternative B except:</p> <p>Affords the greatest permanent protection of habitat supporting native wildlife through proposed acquisition proposal, including all or portions of 151 islands</p> <p>Some loss of individual animals through furbearer trapping program; however, trapping program would adhere to State seasons</p>	<p>Same as alternative A except:</p> <p>No loss of individual animals to hunting or predator control as these activities would not occur</p> <p>Provides fewest acres of additional permanent protection of habitat through Refuge acquisition (467 acres)</p>



## Chapter 5



*Public meeting*  
USFWS photo

# Consultation and Coordination with Others

- 1995-1998 Environmental Impact Statement for Protecting Maine Coastal Nesting Islands and Managing Petit Manan Refuge
- 1999-2004 Comprehensive Conservation Plan and Environmental Impact Statement for Petit Manan Refuge Complex

# 1995-1998 Environmental Impact Statement for Protecting Maine Coastal Nesting Islands and Managing Petit Manan Refuge

October 1995

**Outreach activity:** Newsletters: Issues Workbook (October 1995)

**Purpose:** To collect people's ideas, thoughts and concerns regarding important issues associated with Maine coastal nesting islands

**Number of non-Service participants:** 1,100 copies of workbook distributed either through mailings or handed out at Public Open Houses; 140 completed workbooks were returned

**Audience:** Any individual, group, Federal or State agency interested in Maine coastal nesting islands

**Topics discussed:** The Issues Workbook newsletter was a series of questions directed to readers to solicit comments on what they value most about the islands, their vision for the future of the islands, and the Service's role in helping to protect them.

Summer-Fall 1995

**Outreach activity:** Four public forums

**Purpose:** To promote protection of Maine coastal islands

**Number of non-Service participants:** 250

**Audience:** Meetings were co-sponsored by the Service and 33 conservation groups; invitees included seabird experts, aquaculture and fishery industry representatives, land trust representatives, and local agency officials

**Topics discussed:** To discuss the significance of Maine coastal islands, and to solicit input on what people value about these islands and what they think should be done to protect them

November 1995

**Outreach activity:** Six public Open House meetings; Ellsworth, Machias, Rockport, Brunswick, Wells, and Augusta, ME

**Purpose:** To let people know what the Service was doing and share what we have learned with regards to Maine coastal nesting islands, and to solicit input on what people value about these islands and what they think should be done to protect them.

**Number of non-Service participants:** 60

**Audience:** Any interested public, organization, State or Federal agency personnel



**Topics discussed:** Biological information describing the importance of wildlife and habitats on Maine coastal islands, current island protection efforts, and potential future protection by the Service, State agencies, National Park Service, and conservation organizations.

May 1996

**Outreach activity:** Newsletter; summary of Issues Workbook Responses

**Purpose:** To share the comments received from the Issues Workbooks

**Number of non-Service participants:** 1,100 entries on the mailing list

**Audience:** Any individual, group, Federal or State agency interested in Maine coastal nesting islands

**Topics discussed:** A summary of the 140 workbooks received

May 1996

**Outreach activity:** 2-day facilitated workshop

**Purpose:** To work with stakeholders and identify potential management actions and strategies for protecting, managing, and restoring coastal nesting islands

**Number of non-Service participants:** 24

**Audience:** Participants included island owners, local land trusts, conservation organizations, town officials, sea kayaking companies, tour boat operators, representatives from the aquaculture industry, property rights supporters, and State and Federal agencies.

**Topics discussed:** The latest information gathered on seabird, wading bird, and eagle populations and current island ownership and protection status. Also discussed was the results of public scoping, including the main issues identified. Work groups were formed to identify potential management actions and strategies available for protecting, managing, and restoring coastal nesting islands.

# 1999-2004 Comprehensive Conservation Plan and Environmental Impact Statement for Petit Manan Refuge Complex

February 2000

**Outreach activity:** Briefing paper and presentation for Gulf of Maine Ecosystem Team

**Purpose:** To describe why a new planning process was started, provide an overview of the CCP process, identify the potential issues to be addressed, the requirement for a wilderness review, and State involvement, and to solicit input as to what additional issues, concerns, and opportunities to address.

**Number of non-Service participants:** 20

**Audience:** Interagency (Federal and State) Gulf of Maine Ecosystem Team

**Topics discussed:** CCP process, the range of potential issues to be addressed in the CCP, specific issues the CCP team has already identified, potential Refuge Complex expansion, potential wilderness designation, MDIFW involvement.

March 24, 2000

**Outreach activity:** Newsletter; request for involvement in planning process

**Purpose:** To notify interested individuals, organizations and State and Federal agencies that we initiated the CCP process (a new start from the 1995-1998 effort); share some preliminary issues identified by the CCP team, and invite them to the public Open Houses in Augusta (April) and in along the coast (June)

**Number of non-Service participants:** 1,500 entries on mailing list

**Audience:** Any interested public, organization, State or Federal agency personnel

**Topics discussed:** The Open House meeting dates, preliminary issues identified by the team, and requests for comments on land acquisition and wilderness designation.

April 12, 2000

**Outreach activity:** Public Open House; Augusta, ME

**Purpose:** To provide an overview of the CCP process and solicit input as to what public issues, concerns, and opportunities to address

**Number of non-Service participants:** 25

**Audience:** Any interested public, organization, State or Federal agency personnel

**Topics discussed:** CCP process, the range of potential issues to be addressed in the CCP, specific issues the CCP team has already identified, potential Refuge Complex expansion, potential wilderness designation.

**June 2000**

**Outreach activity:** Newsletter; request for involvement in planning process

**Purpose:** To notify (remind) interested individuals, organizations and State and Federal agencies that we started the CCP process; share some preliminary issues identified by the CCP team, and invite them to the public Open Houses later in the month

**Number of non-Service participants:** 1,500 entries on mailing list

**Audience:** Any interested public, organization, State or Federal agency personnel

**Topics discussed:** The June Open House meeting dates, preliminary issues identified by the team, and requests for comments on land acquisition and wilderness designation.

**June 27, 2000**

**Outreach activity:** Public Open House; Milbridge, ME

**Purpose:** To provide an overview of the CCP process and solicit input as to what public issues, concerns, and opportunities to address

**Number of non-Service participants:** 45

**Audience:** Any interested public, organization, State or Federal agency personnel

**Topics discussed:** CCP process, the range of potential issues to be addressed in the CCP, specific issues the CCP team has already identified, potential Refuge Complex expansion, potential wilderness designation.

**June 28, 2000**

**Outreach activity:** Public Open House; Rockport, ME

**Purpose:** To provide an overview of the CCP process and solicit input as to what public issues, concerns, and opportunities to address

**Number of non-Service participants:** 8

**Audience:** Any interested public, organization, State or Federal agency personnel

**Topics discussed:** CCP process, the range of potential issues to be addressed in the CCP, specific issues the CCP team has already identified, potential Refuge Complex expansion, potential wilderness designation.

June 29, 2000

**Outreach activity:** Public Open House; Brunswick, ME

**Purpose:** To provide an overview of the CCP process and solicit input as to what public issues, concerns, and opportunities to address

**Number of non-Service participants:** 11

**Audience:** Any interested public, organization, State or Federal agency personnel

**Topics discussed:** CCP process, the range of potential issues to be addressed in the CCP, specific issues the CCP team has already identified, potential Refuge Complex expansion, potential wilderness designation.

November 2000

**Outreach activity:** Newsletter; summary of public scoping comments

**Purpose:** To notify interested individuals, organizations and State and Federal agencies of the results of our initial public scoping; share the list of significant issues to be addressed in the CCP team, and to present the next steps in the process, including developing alternatives and a wilderness review

**Number of non-Service participants:** 1,390 entries on mailing list

**Audience:** Any interested public, organization, State or Federal agency personnel

**Topics discussed:** The Open House meeting dates, preliminary issues identified by the team, and requests for comments on land acquisition and wilderness designation.

May 2, 2001

**Outreach activity:** Meeting with partners at Refuge Complex Rockport Office

**Purpose:** Discussions on developing a Project Identification Document (PID) for a mid-coast Environmental Education Center

**Number of non-Service participants:** 6

**Audience:** Maine Coast Heritage Trust, Maine Audubon Society, National Audubon Society, Maine Island Trails Association, Maine Bureau of Public Lands, Coastal Mountains Land Trust, interested individual

**Topics discussed:** a vision for environmental education in the mid-Coast area, each organizations respective role in that vision, local resources available, the components of a PID, and discussions on an interpretive philosophy, mission and goals, building and site needs, and some general interpretive themes.

May 15, 2001

**Outreach activity:** Open House/Public Information Meeting at Camden Hills Regional High School, Rockport

**Purpose:** To solicit feedback from the general public on ideas for a mid-coast environmental education center, and to describe the PID process

**Number of non-Service participants:** 8

**Audience:** General public

**Topics discussed:** Concepts of a mid-coast environmental education center, ideas for location and building needs, the components of a PID.

June 20, 2001

**Outreach activity:** Information meeting with Congresspersons

**Purpose:** To inform Senators Snowe and Collins and Representative Allen of issues at all three Maine National Wildlife Refuges: Petit Manan Refuge Complex, Rachel Carson Refuge, and Moosehorn Refuge

**Number of non-Service participants:** 3

**Audience:** Dan Demerit, Legislative Assistant for Senator Collins; Ginny Worrest, Legislative Assistant for Senator Snowe; and, Shawna Friedman, Legislative Assistant for Representative Allen.

**Topics discussed:** Current issues faced by all 3 refuges in Maine, including: visitor facilities, invasive plant control, wetland restoration, threatened and endangered species, funding for land acquisition, and Comprehensive Conservation Planning. An update on the Petit Manan CCP was provided, including the alternatives for land acquisition. Handouts on the CCP process, and CCP planning update newsletters (June 2001 Congressional Update) were left with the staffers.

September 2001

**Outreach activity:** Newsletter presenting Highlights of the Draft CCP/EIS alternatives

**Purpose:** To notify interested individuals, organizations and State and Federal agencies of the vision, goals, and five management alternatives to be fully analyzed in the Draft CCP/EIS. Specific actions and strategies associated with each alternative were presented and the Service's Preferred Alternative was identified. Questions and comments on the proposals were solicited.

**Number of non-Service participants:** 1,390 entries on mailing list

**Audience:** Any interested public, organization, State or Federal agency personnel

**Topics discussed:** The Open House meeting dates, preliminary issues identified by the team, and requests for comments on land acquisition and wilderness designation.

November 2001

**Outreach activity:** Distributed Environmental Education Facility Project Identification Document (PID) for review

**Purpose:** To solicit feedback on the draft PID document

**Number of non-Service participants:** 20

**Audience:** Everyone attending previous PID meetings and other interested individuals

**Topics discussed:** Recommended changes to PID which were considered in the development of the final PID, completed December 2001 (but not yet approved).

February 7, 2002

**Outreach activity:** Informational exchange

**Purpose:** To share the process for and status of a land protection plan for the Refuge Complex

**Number of non-Service participants:** 3

**Audience:** Maine Coast Heritage Trust

**Topics discussed:** We presented an overview of the CCP process and how potential land acquisition and refuge expansions are incorporated into the process. We discussed lands currently approved for acquisition, but not yet acquired by the Service, and some new islands being considered by the Service for acquisition.

April 27, 2002; August 16, 2002; January 8, 2003; March 12, 2003

**Outreach activity:** Presentation/discussion

**Purpose:** To update the Friends of Maine Seabird Islands Executive Board and their membership of the status of the CCP

**Number of non-Service participants:** at least 11

**Audience:** The Friends Group's eleven-member Executive Board consisting of:

- Thomas Arter - Damiscotta River Association
- Kathleen Blanchard, PhD - Director, Quebec Labrador Foundation
- David Cadbury - Vice President Cadbury Consultants
- Donald Hudson Jr., PhD - Director, The Chewonki Foundation
- Christopher Hamilton - Director of Communications, Maine Coast Heritage Trust
- Susan March - Development Officer, University of Maine System
- Rachel Nixon - Trail Manager, Maine Island Trail Association
- Dennis Schultz - Outdoor Photographer
- William Silliker - Wildlife Photographer
- Theresa Torrent-Ellis - Director, Maine Coastal Program
- Hank Tyler - Maine State Planning Office

**Topics discussed:** Provided updates on the status of the CCP; the latest developments and highlights of the Preferred Alternative.

September 23, 2002

**Outreach activity:** Informational exchange

**Purpose:** To report to the Northeast Region of The Wilderness Society the status of Wilderness reviews being worked on in conjunction with CCP.

**Number of non-Service participants:** 2

**Audience:** A Northeast Regional Associate and Research Associate with The Wilderness Society (TWS)

**Topics discussed:** We presented an overview of the CCP process and how wilderness reviews are incorporated into the process. We talked about specific CCP projects, including Petit Manan Refuge Complex, and the results of the wilderness inventory. In the case of Petit Manan Refuge Complex CCP, we let TWS know that 13 islands met the minimum criteria for wilderness and that we would be evaluating these for wilderness designation in the Draft CCP/EIS.

October 19, 2002

**Outreach activity:** Informational exchange/symposium

**Purpose:** To share the status of seabirds and seabird restoration in Maine

**Number of non-Service participants:** 50

**Audience:** Members of the Friends of Maine Seabird Islands, non-governmental conservation organizations, university contacts

**Topics discussed:** Both Refuge Complex and MDIFW staff presented information on seabird population trends, current restoration activities, and future restoration activities including long term goals and objectives evaluated in the CCP.

January 17, 2003

**Outreach activity:** Discussion on Draft CCP/EIS alternatives

**Purpose:** To present the goals, objectives, actions and strategies related to the Draft CCP/EIS alternatives, with emphasis on the Preferred Alternative actions

**Number of non-Service participants:** 4

**Audience:** MDIFW

**Topics discussed:** We presented and discussed in detail the objectives, actions and strategies in the Draft CCP/EIS Service's Preferred Alternative. We highlighted the seabird restoration work, Refuge expansion, wilderness recommendations, and new public use infrastructure proposed in the alternative.

April 2, 2003

**Outreach activity:** Informational meeting with Tribal natural resource coordinators in Maine

**Purpose:** To describe the CCP process, the status of CCP planning on Maine refuges, and discuss cooperative planning opportunities.

**Number of non-Service participants:** 6

**Audience:** Trevor White (Passamaquoddy Tribe: Indian Township Reservation); Steve Crawford (Passamaquoddy Tribe: Pleasant Point Reservation), John Banks (Penobscot Nation); Sharri Venno (Houlton Band of the Maliseet); and, Fred Corey and Dave Macek (Aroostook Band of the Micmac).

**Topics discussed:** Presented the steps in the CCP process, gave an update on where each of the Maine refuges are in the planning process and their schedules for completion, discussed ways to improve communication and cooperation with the Tribes during the planning process and in other Refuge programs.

April 10, 2003

**Outreach activity:** Presentation to Gulf of Maine Ecosystem Team

**Purpose:** To provide an update on the status of the CCP

**Number of non-Service participants:** 10

**Audience:** Service personnel on the Gulf of Maine Ecosystem Team

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS including the seabird restoration work, Refuge Complex expansion, wilderness recommendations, and proposed public use infrastructure.

July 18, 2003

**Outreach activity:** Briefing to Senators Snowe and Collins staffers

**Purpose:** To provide an update on the status of the CCP, including land acquisition

**Number of non-Service participants:** 2

**Audience:** Gail Kelly, Senator Snow's Office; Judy Cutty, Senator Collin's Office

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS including land acquisition and wilderness recommendations.



August 28, 2003

**Outreach activity:** Information meeting and field visit with Tribal natural resource coordinators in Maine.

**Purpose:** To provide an update on the status of the Petit Manan CCP, specifically highlighting the Service's Preferred Alternative, and to visit an active seabird restoration site on Petit Manan Island

**Number of non-Service participants:** 6

**Audience:** Trevor White (Passamaquoddy Tribe: Indian Township Reservation); Steve Crawford (Passamaquoddy Tribe: Pleasant Point Reservation), John Banks (Penobscot Nation); Sharri Venno (Houlton Band of the Maliseet); Fred Corey (Aroostook Band of the Micmac); Donald Soctomah, Cultural and Historic Preservation Officer for the two Passamaquoddy Tribes.

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition and developing an MOU with interested Tribes.

March 10, 2004

**Outreach activity:** Briefing on the CCP

**Purpose:** To provide an update on the status of Petit Manan CCP, specifically highlighting the Service's preferred Alternative, including land acquisition

**Number of Non-Service participants:** 10

**Audience:** Friends of Maine Seabird Islands Board of Directors

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition

March 17, 2004

**Outreach activity:** Briefing on the CCP

**Purpose:** To provide an update on the status of the CCP

**Number of Non-Service participants:** 20

**Audience:** Gulf of Maine Seabird Working Group

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition, and timelines for completion

April 21, 2004

**Outreach activity:** Briefing on the CCP

**Purpose:** To provide an update on the status of the CCP

**Number of Non-Service participants:** 6

**Audience:** Maine Coast Heritage Trust

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition, and timelines for completion

**May 16, 2004**

**Outreach activity:** Briefing on the CCP

**Purpose:** To provide an update on the status of the CCP

**Number of Non-Service participants:** 10

**Audience:** Friends of Maine Seabird Islands Board of Directors

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition, and timelines for completion

**June 1, 2004**

**Outreach activity:** Informational Meetings and Public Hearings

**Location:** Rockland Public Library, Rockland, ME

**Purpose:** To receive comments on the Draft EIS/CCP

**Number of Non-Service participants:** 28

**Topics discussed:** Proposed actions, land acquisition, hunting on Petit Manan Point, environmental education, Coastal Education Center.

**June 2, 2004**

**Outreach activity:** Informational Meetings and Public Hearings

**Location:** Milbridge Town Hall, Milbridge, ME

**Purpose:** To receive comments on the Draft EIS/CCP

**Number of Non-Service participants:** 35

**Topics discussed:** Proposed actions, land acquisition, hunting on Petit Manan Point, environmental education, and Coastal Education Center.

**June 8, 2004**

**Outreach activity:** Informational Meetings and Public Hearings

**Location:** Pine Tree State Arboretum, Augusta, ME

**Purpose:** To receive comments on the Draft EIS/CCP

**Number of Non-Service participants:** 9

**Topics discussed:** Proposed actions, land acquisition, hunting on Petit Manan Point, environmental education, Coastal Education Center.

**June 9, 2004**

**Outreach activity:** Informational Meetings and Public Hearings

**Location:** Falmouth Public Library, Falmouth, ME

**Purpose:** To receive comments on the Draft EIS/CCP

**Number of Non-Service participants:** 13

**Topics discussed:** Proposed actions, land acquisition, hunting on Petit Manan Point, environmental education, Coastal Education Center.

**July 13, 2004**

**Outreach activity:** Briefing on the CCP

**Purpose:** To provide an update on the status of the CCP

**Number of Non-Service participants:** 70

**Audience:** Boothbay Land Trust hosted a boat tour of the Boothbay region as a fund-raising event and invited Charlie Blair, Refuge Manager, to brief the audience on the CCP

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition, and timelines for completion

**August 12, 2004**

**Outreach activity:** Briefing on the CCP

**Purpose:** To provide an update on the status of the CCP

**Number of Non-Service participants:** 75

**Audience:** Gulf of Maine Seabird Working Group

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition, and timelines for completion

**September 15, 2004**

**Outreach activity:** Briefing on the CCP

**Purpose:** To provide an update on the status of the CCP

**Number of Non-Service participants:** 10

**Audience:** Friends of Maine Seabird Islands Board of Directors

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition, and timelines for completion

**September 23, 2004**

**Outreach activity:** Briefing on the CCP

**Purpose:** To provide an update on the status of the CCP

**Number of Non-Service participants:** 1

**Audience:** Ken Elowe, Director of Resource Management for MDIFW

**Topics discussed:** Presented highlights of the Service's Preferred Alternative in the Draft CCP/EIS, including proposed land acquisition, and timelines for completion



## Chapter 6



*Inner and Outer Double Head Shot Islands*  
USFWS photo

## List of Preparers

- Core Planning Team
- Assisting in Land Protection Strategies
- Other Service Personnel Contributing to Plan
- Others Who Contributed to Plan

**Core Planning Team**

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**Leon Latino (formerly with Region 5 as Assistant Regional Planner)**

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**Assisting in Land  
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**Other Service  
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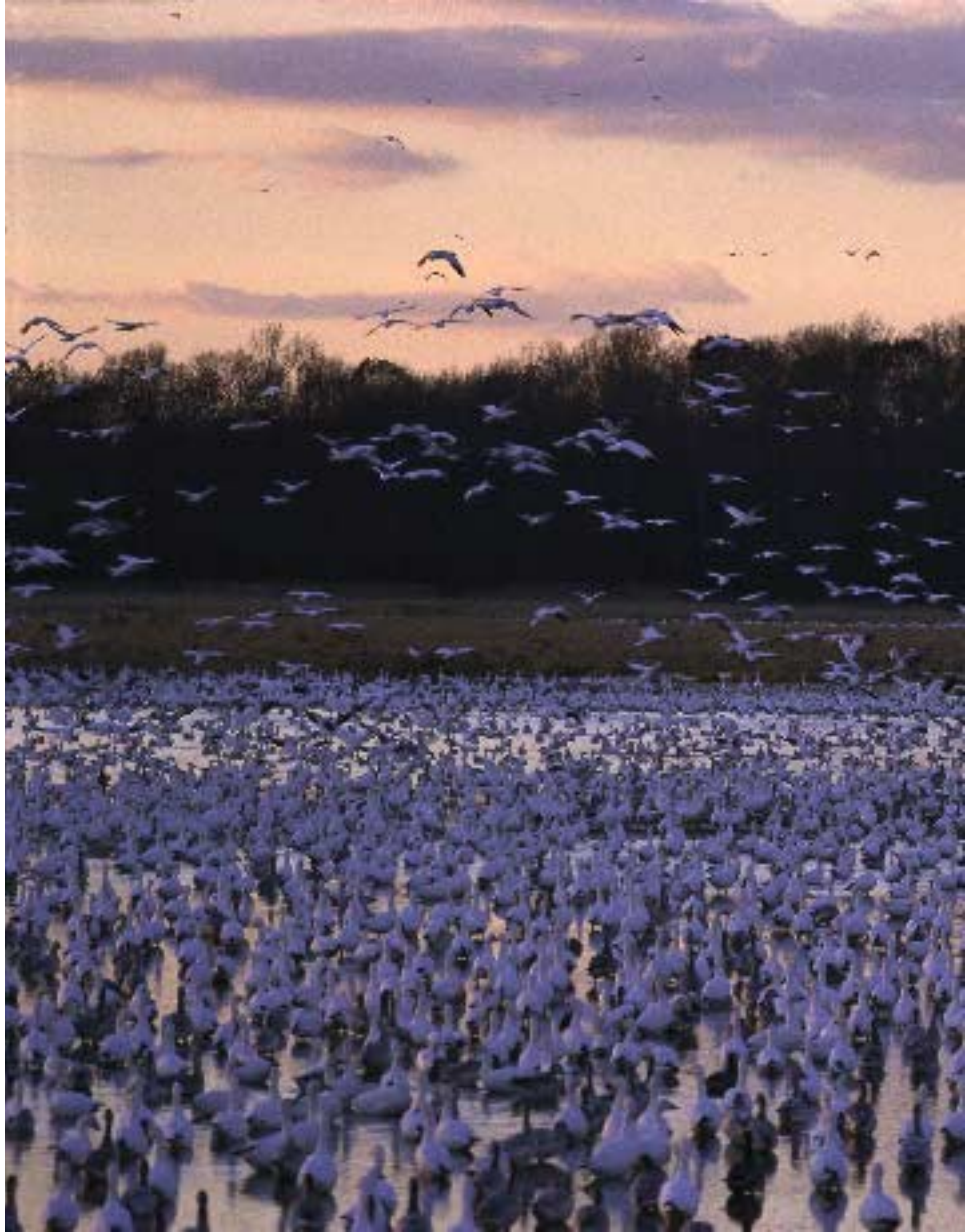
**Others Who  
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## Glossary



*Snow geese*  
USFWS photo

## Glossary of Terms and Acronyms

- Terms
- Acronyms

**accessibility** — the state or quality of being easily approached or entered, particularly as it relates to complying with the Americans With Disabilities Act

**accessible facilities** — structures accessible for most people with disabilities without assistance; facilities that meet UFAS standards; ADA-accessible [e.g., parking lots, trails, pathways, ramps, picnic and camping areas, restrooms, boating facilities (docks, piers, gangways), fishing facilities, playgrounds, amphitheaters, exhibits, audiovisual programs, and wayside sites.] Also referred to as “barrier-free”

**aggregate** — many parts considered together as a whole

**agricultural land** — nonforested land (now or recently orchards, pastures, or crops)

**alternative** — a reasonable way to fix an identified problem or satisfy a stated need [40 CFR 1500.2 (cf. “management alternative”)]

**amphidromous fish** — fish that can migrate from fresh water to the sea or the reverse, not only for breeding, but also regularly at other times during their life cycle

**appropriate use** — a proposed or existing use on a refuge that meets at least one of the following three conditions:

1. the use is a wildlife-dependent one;
2. the use contributes to fulfilling the refuge purpose(s), the System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the National Wildlife Refuge System Improvement Act was signed into law; or
3. the use has been determined to be appropriate as specified in section 1.11 of the act.

**approved acquisition boundary** — a project boundary that the Director of the U.S. Fish and Wildlife Service approves upon completion of the planning and environmental compliance process. An approved acquisition boundary only designates those lands which the Service has authority to acquire or manage through various agreements. The approval of an acquisition boundary does not grant the Service jurisdiction or control over lands within the boundary, and it does not make lands within the refuge boundary part of the National Wildlife Refuge System. Lands do not become part of the System until the Service buys them or they are placed under an agreement that provides for their management as part of the System.

**anadromous fish** — from the Greek, literally “up-running”; fish that spend a large portion of their life cycle in the ocean and return to freshwater to breed

**aquatic** — growing in, living in, or dependent upon water

**aquatic barrier** — any obstruction to fish passage

**aquifer** — a formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs

**area of biological significance** — cf. “special focus area”

**area-sensitive species** — species that require large areas of contiguous habitat

**assemblage** — in conservation biology, a predictable and particular collection of species within a biogeographic unit (e.g., ecoregion or habitat)

**barrens** — a colloquial name given to habitats with sparse vegetation or low agricultural productivity

**barrier-free** — cf. “accessible facilities”

**basin** — the land surrounding and draining into a water body (cf. “watershed”)

**benthic** — living at, in, or associated with structures on the bottom of a body of water

**best management practices** — land management practices that produce desired results [n.b. Usually describing forestry or agricultural practices effective in reducing non-point source pollution, like reseeding skidder trails or not storing manure in a flood plain. In their broader sense, practices that benefit target species.]

**biological diversity or biodiversity** — the variety of life and its processes and includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur

**biological integrity** — biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms and communities

**bog** — a poorly drained area rich in plant residues, usually surrounded by an area of open water, and having characteristic flora

**breeding habitat** — habitat used by migratory birds or other animals during the breeding season

**buffer zones** — land bordering and protecting critical habitats or water bodies by reducing runoff and nonpoint source pollution loading; areas created or sustained to lessen the negative effects of land development on animals, plants, and their habitats

**candidate species** — species for which we have sufficient information on file about their biological vulnerability and threats to propose listing them

**catadromous fish** — fish that spend most of their lives in fresh water, but migrate to sea to reproduce

**categorical exclusion**[CE, CX, CATEX, CATX] — pursuant to the National Environmental Policy Act (NEPA), a category of Federal agency actions that do not individually or cumulatively have a significant effect on the human environment [40 CFR 1508.4]

**CFR** — the Code of Federal Regulations

**Challenge Grant Cost Share Program** — a Service-administered grant program that provides matching funds for projects supporting natural resource education, management, restoration, or protection on Service lands, other public lands, and private lands

**citizen monitoring projects** — projects coordinated locally to conduct environmental inventories; their data expand what agencies know, and are available to anyone interested

**community** — the locality in which a group of people resides and shares the same government

**community type** — a particular assemblage of plants and animals, named for its dominant characteristic

**compatible use** — “The term ‘compatible use’ means a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.”—National Wildlife Refuge System Improvement Act of 1997 [Public Law 105-57; 111 Stat. 1253]

**compatibility determination** — a required determination for wildlife-dependent recreational uses or any other public uses of a refuge

**Comprehensive Conservation Plan** — mandated by the Improvement Act, a document that provides a description of the desired future conditions and long-range guidance for the project leader to accomplish purposes of the refuge system and the refuge. CCPs establish management direction to achieve refuge purposes. [P.L. 105-57; FWS Manual 602 FW 1.4]

**concern** — cf. “issue”

**conifer** — a tree or shrub in the phylum Gymnospermae whose seeds are borne in woody cones. There are 500–600 species of living conifers (Norse 1990)

**conservation** — managing natural resources to prevent loss or waste [n.b. Management actions may include preservation, restoration, and enhancement.]

**conservation agreements** — written agreements among two or more parties for the purpose of ensuring the survival and welfare of unlisted species of fish and wildlife or their habitats or to achieve other specified conservation goals. Participants voluntarily commit to specific actions that will remove or reduce threats to those species.

**conservation easement** — a legal agreement between a landowner and a land trust (e.g., a private, nonprofit conservation organization) or government agency that permanently limits the uses of a property to protect its conservation values

**cool-season grass** — introduced grass for crop and pastureland that grows in spring and fall and is dormant during hot summer months

**cooperative agreement** — a usually long-term habitat protection action, which can be modified by either party, in which no property rights are acquired. Lands under a cooperative agreement do not necessarily become part of the National Wildlife Refuge System

**critical habitat** — according to U.S. Federal law, the ecosystems upon which endangered and threatened species depend

**cultural resource inventory** — a professional study to locate and evaluate evidence of cultural resources within a defined geographic area [n.b. Various levels of inventories may include background literature searches, comprehensive field examinations to identify all exposed physical manifestations of cultural resources, or sample inventories for projecting site distribution and density over a larger area. Evaluating identified cultural resources to determine their eligibility for the National Register follows the criteria in 36 CFR 60.4 (cf. FWS Manual 614 FW 1.7).]

**cultural resource overview** — a comprehensive document prepared for a field office that discusses, among other things, project prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement of how program objectives should be met and conflicts resolved [An overview should reference or incorporate information from a field offices background or literature search described in section VIII of the Cultural Resource Management Handbook (FWS Manual 614 FW 1.7).]

**database** — a collection of data arranged for ease and speed of analysis and retrieval, usually computerized

**dedicated open space** — land to be held as open space forever

**degradation** — the loss of native species and processes due to human activities such that only certain components of the original biodiversity persist, often including significantly altered natural communities

**designated wilderness area** — an area designated by Congress as part of the National Wilderness Preservation System [FWS Manual 610 FW 1.5 (draft)]

**diadromous** — fish that migrate from freshwater to saltwater or the reverse; a generic term that includes anadromous, catadromous, and amphidromous fish

**digitizing** — the process of converting maps into geographically referenced electronic files for a geographic information system (GIS)

**disturbance** — any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment

**donation** — a citizen or group may wish to give land or interests in land to the Service for the benefit of wildlife. Aside from the cost factor, these acquisitions are no different than any other means of land acquisition. Gifts and donations have the same planning requirements as purchases.

**drumlin** — a ridge or oval hill with a smooth summit composed of material deposited by a glacier

**easement** — an agreement by which landowners give up or sell one of the rights on their property [e.g., landowners may donate rights-of-way across their properties to allow community members access to a river (cf. “conservation easement”).]

**ecological processes** — a complex mix of interactions among animals, plants, and their environment that ensures maintenance of an ecosystem’s full range of biodiversity. Examples include population and predator-prey dynamics, pollination and seed dispersal, nutrient cycling, migration, and dispersal

**ecoregion** — a territory defined by a combination of biological, social, and geographic criteria, rather than geopolitical considerations; generally, a system of related, interconnected ecosystems.

**ecosystem** — a natural community of organisms interacting with its physical environment, regarded as a unit

**ecosystem service** — a benefit or service provided free by an ecosystem or by the environment, such as clean water, flood mitigation, or groundwater recharge

**ecotourism** — visits to an area that maintains and preserves natural resources as a basis for promoting its economic growth and development

**ecosystem approach** — a way of looking at socio-economic and environmental information based on the boundaries of ecosystems like watersheds, rather than on geopolitical boundaries

**ecosystem-based management** — an approach to making decisions based on the characteristics of the ecosystem in which a person or thing belongs [n.b. This concept considers interactions among the plants, animals, and physical characteristics of the environment in making decisions about land use or living resource issues.]

**emergent wetland** — wetlands dominated by erect, rooted, herbaceous plants

**endangered species** — a Federal- or State-listed protected species in danger of extinction throughout all or a significant portion of its range

**endemic** — a species or race native to a particular place and found only there

**environmental education** — curriculum-based education aimed at producing a citizenry that is knowledgeable about the biophysical environment and its associated problems, aware of how to help solve those problems, and motivated to work toward solving them

**environmental health** — the composition, structure, and functioning of soil, water, air, and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment

**Environmental Assessment** — (EA) a public document that discusses the purpose and need for an action, its alternatives, and provides sufficient evidence and analysis of its impacts to determine whether to prepare an environmental impact statement or a finding of no significant impact (q.v.) [cf. 40 CFR 1508.9]

**Environmental Impact Statement** — (EIS) a detailed, written analysis of the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources [cf. 40 CFR 1508.11]

**estuaries** — deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from land

**estuarine wetlands** — “The Estuarine system consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open,

partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land.”—Cowardin et al. 1979

**exemplary community type** — an outstanding example of a particular community type

**extinction** — the termination of any lineage of organisms, from subspecies to species and higher taxonomic categories from genera to phyla. Extinction can be local, in which one or more populations of a species or other unit vanish but others survive elsewhere, or total (global), in which all the populations vanish (Wilson 1992)

**extirpated** — status of a species or population that has completely vanished from a given area but that continues to exist in some other location

**exotic species** — a species that is not native to an area and has been introduced intentionally or unintentionally by humans; not all exotics become successfully established

**Federal land** — public land owned by the Federal Government, including national forests, national parks, and national wildlife refuges

**Federal-listed species** — a species listed either as endangered, threatened, or a species at risk (formerly, a “candidate species”) under the Endangered Species Act of 1973, as amended

**Federal-recognized Native American Tribe** — A group of Native American Indians recognized by the United States as an Indian Tribe. This recognition establishes a tribe as an entity with the capacity to engage in government-to-government relations with the United States, or individual states, and also as one eligible to receive federal services. Federal recognition is established as a result of historical and continued existence of a tribal government; by Executive Order or Legislation; and through the federal recognition process recently established by Congress.

**fee-title acquisition** — the acquisition of most or all of the rights to a tract of land; a total transfer of property rights with the formal conveyance of a title. While a fee-title acquisition involves most rights to a property, certain rights may be reserved or not purchased, including water rights, mineral rights, or use reservation (e.g., the ability to continue using the land for a specified time period, such as the remainder of the owner’s life).

**Finding of No Significant Impact (FONSI)** — supported by an environmental assessment, a document that briefly presents why a Federal action will have no

significant effect on the human environment, and for which an environmental impact statement, therefore, will not be prepared [40 CFR 1508.13]

**fire regime** — the characteristic frequency, intensity, and spatial distribution of natural fires within a given ecoregion or habitat

**fish passage project** — providing a safe passage for fish around a barrier in the upstream or downstream direction

**floodplain** — flat or nearly flat land that may be submerged by floodwaters; a plain built up or in the process of being built up by stream deposition

**focus areas** — cf. “special focus areas”

**forbs** — flowering plants (excluding grasses, sedges, and rushes) that do not have a woody stem and die back to the ground at the end of the growing season

**forest association** — the community described by a group of dominant plant (tree) species occurring together, such as spruce-fir or northern hardwoods

**forested land** — land dominated by trees [For impacts analysis in CCP’s, we assume all forested land has the potential for occasional harvesting; we assume forested land owned by timber companies is harvested on a more intensive, regular schedule.]

**forested wetlands** — wetlands dominated by trees

**fragmentation** — the disruption of extensive habitats into isolated and small patches. Fragmentation has two negative components for biota: the loss of total habitat area; and, the creation of smaller, more isolated patches of habitat remaining.

**GAP analysis** — the use of various remote sensing data sets to build overlaid sets of maps of various parameters (e.g., vegetation, soils, protected areas, species distributions) to identify spatial gaps in species protection and management programs

**geographic information system** — (GIS) a computerized system to compile, store, analyze and display geographically referenced information [e.g., GIS can overlay multiple sets of information on the distribution of a variety of biological and physical features.]

**glade** — an open space surrounded by forest

**grant agreement** — the legal instrument used when the principal purpose of the transaction is the transfer of money, property, services, or anything of value to a recipient in order to accomplish a public purpose of support or stimulation authorized by Federal statute and substantial

involvement between the Service and the recipient is *not* anticipated (cf. “cooperative agreement”)

**grassland** — a habitat type with landscapes dominated by grasses and with bio-diversity characterized by species with wide distributions, communities being relatively resilient to short-term disturbances but not to prolonged, intensive burning or grazing. In such systems, larger vertebrates, birds, and invertebrates display extensive movement to track seasonal or patchy resources

**grassroots conservation organization** — any group of concerned citizens who act together to address a conservation need

**groundwater** — water in the ground that is in the zone of saturation, from which wells and springs and groundwater runoff are supplied

**guild** — a group of organisms, not necessarily taxonomically related, that are ecologically similar in characteristics such as diet, behavior, or microhabitat preference, or with respect to their ecological role in general

**habitat block** — a landscape-level variable that assesses the number and extent of blocks of contiguous habitat, taking into account size requirements for populations and ecosystems to function naturally. It is measured here by a habitat-dependent and ecoregion size-dependent system

**habitat fragmentation** — the breaking up of a specific habitat into smaller, unconnected areas [n.b. A habitat area that is too small may not provide enough space to maintain a breeding population of the species in question.]

**habitat conservation** — protecting an animal or plant habitat to ensure that the use of that habitat by the animal or plant is not altered or reduced

**habitat** — the place where a particular type of plant or animal lives [n.b. An organism’s habitat must provide all of the basic requirements for life, and should be free of harmful contaminants.]

**historic conditions** — the composition, structure and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgement, were present prior to substantial human-related changes to the landscape

**hydrologic or flow regime** — characteristic fluctuations in river flows

**hydrology** — the science of waters of the earth: their occurrences, distributions, and circulations; their physical and chemical properties; and their reactions with the environment, including living beings

**important fish areas** — the aquatic areas identified by private organizations, local, state, and federal agencies that meet the purposes of the Conte Act

**impoundment** — a body of water, such as a pond, confined by a dam, dike, floodgate, or other barrier, which is used to collect and store water for future use

**indicator species** — a species used as a gauge for the condition of a particular habitat, community, or ecosystem. A characteristic or surrogate species for a community or ecosystem

**indigenous** — native to an area

**indigenous species** — a species that, other than a result as an introduction, historically occurred or currently occurs in a particular ecosystem

**informed consent** — “the grudging willingness of opponents to go along with a course of action that they actually oppose.”—Bleiker

**interjurisdictional fish** — populations of fish that are managed by two or more States or national or tribal governments because of the scope of their geographic distributions or migrations

**interpretive facilities** — structures that provide information about an event, place, or thing by a variety of means, including printed, audiovisual, or multimedia materials [e.g., kiosks that offer printed materials and audiovisuals, signs, and trail heads.]

**interpretive materials** — any tool used to provide or clarify information, explain events or things, or increase awareness and understanding of the events or things [e.g., printed materials like brochures, maps or curriculum materials; audio/visual materials like video and audio tapes, films, or slides; and, interactive multimedia materials, CD-ROM or other computer technology.]

**interpretive materials projects** — any cooperative venture that combines financial and staff resources to design, develop, and use tools for increasing the awareness and understanding of events or things related to a refuge

**introduced invasive species** — non-native species that have been introduced into an area and, because of their aggressive growth and lack of natural predators, displace native species

**invasive species** — an alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health

**invertebrate** — any animal lacking a backbone or bony segment that encloses the central nerve cord

**issue** — any unsettled matter that requires a management decision [e.g., a Service initiative, an opportunity, a management problem, a threat to the resources of the unit, a conflict in uses, a public concern, or the presence of an undesirable resource condition.] [n.b. A CCP should document, describe, and analyze issues even if they cannot be resolved during the planning process (FWS Manual 602 FW 1.4).]

**kettle hole** — a generally circular hollow or depression in an *outwash plain* or *moraine*, believed to have formed where a large block of subsurface ice has melted

**keystone species** — species that are critically important for maintaining ecological processes or the diversity of their ecosystems

**lacustrine wetlands** — “The Lacustrine system includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage; and (3) total area exceeds eight ha (20 acres).”—Cowardin et al. 1979

**Land Protection Plan (LPP)** — a document that identifies and prioritizes lands for potential Service acquisition from a willing seller, and also describes other methods of providing protection. Landowners within project boundaries will find this document, which is released with environmental assessments, most useful.

**land trusts** — organizations dedicated to conserving land by purchase, donation, or conservation easement from landowners

**landform** — the physical shape of the land reflecting geologic structure and processes of geomorphology that have sculpted the structure

**landscape** — an aggregate of landforms, together with its biological communities

**late-successional** — species, assemblages, structures, and processes associated with mature natural communities that have not experienced significant disturbance for a long time

**limiting factor** — an environmental limitation that prevents further population growth

**limits of acceptable change** — a planning and management framework for establishing and maintaining acceptable and appropriate environmental and social conditions in recreation settings

**local land** — public land owned by local governments, including community or county parks or municipal watersheds

**local agencies** — generally, municipal governments, regional planning commissions, or conservation groups

**long-term protection** — mechanisms like fee title acquisition, conservation easements, or binding agreements with landowners that ensure land use and land management practices will remain compatible with maintaining species populations over the long term

**macroinvertebrates** — invertebrates large enough to be seen with the naked eye (e.g., most aquatic insects, snails, and amphipods)

**management alternative** — a set of objectives and the strategies needed to accomplish each objective [FWS Manual 602 FW 1.4]

**management concern** — cf. “issue” and “migratory nongame birds of management concern”

**management opportunity** — cf. “issue”

**management plan** — a plan that guides future land management practices on a tract [n.b. In the context of an environmental impact statement, management plans may be designed to produce additional wildlife habitat along with primary products like timber or agricultural crops (cf. “cooperative agreement”).]

**management strategy** — a general approach to meeting unit objectives [n.b. A strategy may be broad, or it may be detailed enough to guide implementation through specific actions, tasks, and projects (FWS Manual 602 FW 1.4).]

**mesic soil** — sandy-to-clay loams containing moisture-retentive organic matter, well drained (no standing matter)

**migratory nongame birds of management concern** — species of nongame birds that (a) are believed to have undergone significant population declines; (b) have small or restricted populations; or (c) are dependent upon restricted or vulnerable habitats

**mission statement** — a succinct statement of the purpose for which the unit was established; its reason for being

**mitigation** — actions to compensate for the negative effects of a particular project [e.g., wetland mitigation usually restores or enhances a previously damaged wetland or creates a new wetland.]

**moraine** — a mass or ridge of earth scraped up by ice and deposited at the edge or end of a glacier

**National Environmental Policy Act of 1969 (NEPA)** — requires all Federal agencies to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in planning and implementing environmental actions [Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making (cf. 40 CFR 1500).]

**National Wildlife Refuge Complex (Complex)** — an internal Service administrative linking of refuge units closely related by their purposes, goals, ecosystem, or geopolitical boundaries

**National Wildlife Refuge System (System)** — all lands and waters and interests therein administered by the Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish and wildlife, including those that are threatened with extinction

**native** — a species that, other than as a result of an introduction, historically occurred or currently occurs in a particular ecosystem

**Native American Tribe** — see “Federal-recognized Native American Tribe.”

**native plant** — a plant that has grown in the region since the last glaciation, and occurred before European settlement

**natural disturbance event** — any natural event that significantly alters the structure, composition, or dynamics of a natural community: e.g., floods, fires, and storms

**natural range of variation** — a characteristic range of levels, intensities, and periodicities associated with disturbances, population levels, or frequency in undisturbed habitats or communities

**Neotropical migrant** — birds, bats, or invertebrates that seasonally migrate between the Nearctic and Neotropics

**non-consumptive, wildlife-oriented recreation** — wildlife observation and photography and environmental education and interpretation (cf. “wildlife-oriented recreation”)

**non-native species** — See “exotic species.”

**non-point source pollution** — a diffuse form of water quality degradation in which wastes are not released at one specific, identifiable point but from a number of points that are spread out and difficult to identify and control (Eckhardt 1998)

**nonforested wetlands** — wetlands dominated by shrubs or emergent vegetation

**nonpoint source** — a diffuse form of water quality degradation produced by erosion of land that causes sedimentation of streams, eutrophication from nutrients and pesticides used in agricultural and silvicultural practices, and acid rain resulting from burning fuels that contain sulfur (Lotspeich and Platts 1982)

**Notice of Intent** — (NOI) an announcement we publish in the Federal Register that we will prepare and review an environmental impact statement [40 CFR 1508.22]

**objective** — cf. “unit objective”

**obligate species** — a species that must have access to a particular habitat type to persist

**occurrence site** — a discrete area where a population of a rare species lives or a rare plant community type grows

**old fields** — areas formerly cultivated or grazed, where woody vegetation has begun to invade [n.b. If left undisturbed, old fields will eventually succeed into forest. Many occur at sites marginally suitable for crops or pasture. They vary markedly in the Northeast, depending on soil and land use and management history.]

**outdoor education project** — any cooperative venture that combines financial and staff resources to develop outdoor education activities like labs, field trips, surveys, monitoring, or sampling

**outdoor education** — educational activities that take place in an outdoor setting

**outwash plain** — the plain formed by deposits from a stream or river originating from the melting of glacial ice that are distributed over a considerable area; generally coarser, heavier material is deposited nearer the ice and finer material carried further away

**palustrine wetlands** — “The Palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0%.”—Cowardin et al. 1979

**Partners for Wildlife Program** — a voluntary, cooperative habitat restoration program among the Service, other government agencies, public and private organizations, and private landowners to improve and protect fish and wildlife habitat on private land while leaving it in private ownership

**partnership** — a contract or agreement among two or more individuals, groups of individuals, organizations, or agencies, in which each agrees to furnish a part of the capital or some service in kind (e.g., labor) for a mutually beneficial enterprise



**payment in lieu of taxes** — cf. Revenue Sharing Act of 1935, Chapter One, Legal Context

**pelagic** — living in the water column, well above the bottom and some distance from land, as do oceanic fish or birds (contrast *demersal* and *benthic*)

**phytoplankton** — the ensemble of tiny plants that float or drift in marine waters. These tiny plants can produce such dense blooms in the Gulf of Maine that they turn our waters green. Phytoplankton are the base of the food chain on which ultimately most shellfish, fish, birds, and marine mammals depend (the exceptions being those that feed mostly on detritus from benthic plants). (See also *Zooplankton*.)

**point source** — a source of pollution that involves discharge of waste from an identifiable point, such as a smokestack or sewage-treatment plant (Eckhardt 1998)

**population monitoring** — assessing the characteristics of populations to ascertain their status and establish trends on their abundance, condition, distribution, or other characteristics

**prescribed fire** — the application of fire to wildland fuels, either by natural or intentional ignition, to achieve identified land use objectives [FWS Manual 621 FW 1.7]

**priority general public use** — a compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation

**private land** — land owned by a private individual or group or non-government organization

**private landowner** — cf. “private land”

**private organization** — any non-government organization

**proposed wilderness** — an area of the Refuge System that the Secretary of the Interior has recommended to the President for inclusion in the National Wilderness Preservation System

**protection** — mechanisms like fee title acquisition, conservation easements, or binding agreements with landowners that ensure land use and land management practices will remain compatible with maintaining species populations at a site (cf. “long-term ~”)

**public** — individuals, organizations, and non-government groups; officials of Federal, State, and local government agencies; Native American tribes, and foreign nations—includes anyone outside the core planning team, those who may or may not have indicated an interest in the issues, and those who do or do not realize that our decisions may affect them

**public involvement** — offering an opportunity to interested individuals and organizations whom our actions or policies may affect to become informed; soliciting their opinions. We thoroughly study public input, and give it thoughtful consideration in shaping decisions about managing refuges.

**public involvement plan** — long-term guidance for involving the public in the comprehensive planning process

**public land** — land owned by the local, State, or Federal Government

**rare species** — species identified for special management emphasis because of their uncommon occurrence within a watershed

**rare community types** — plant community types classified as rare by any State program; includes exemplary community types

**recharge** — refers to water entering an underground aquifer through faults, fractures, or direct absorption

**recommended wilderness** — areas studied and found suitable for wilderness designation by both the Director (FWS) and Secretary (DOI), and recommended by the President to Congress for inclusion in the National Wilderness System [FWS Manual 610 FW 1.5 (draft)]

**Record of Decision** — (ROD) a concise public record of a decision by a Federal agency pursuant to NEPA [n.b. A ROD includes:

- the decision;
- all the alternatives considered;
- the environmentally preferable alternative;
- a summary of monitoring and enforcement, where applicable, for any mitigation; and,
- whether all practical means have been adopted to avoid or minimize environmental harm from the alternative selected (or if not, why not).]

**refuge goals** — “...descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but do not define measurable units.”—Writing Refuge Management Goals and Objectives: A Handbook

**refuge purposes** — “The terms ‘purposes of the refuge’ and ‘purposes of each refuge’ mean the purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit.”—National Wildlife Refuge System Improvement Act of 1997

**refuge lands** — lands in which the Service holds full interest in fee title or partial interest like an easement

**relatively intact** — the conservation status category indicating the least possible disruption of ecosystem processes. Natural communities are largely intact, with species and ecosystem processes occurring within their natural ranges of variation.

**relatively stable** — the conservation status category between *vulnerable* and *relatively intact* in which extensive areas of intact habitat remain, but local species declines and disruptions of ecological processes have occurred

**restoration** — management of a disturbed or degraded habitat that results in the recovery of its original state [e.g., restoration may involve planting native grasses and forbs, removing shrubs, prescribed burning, or reestablishing habitat for native plants and animals on degraded grassland.] See also “seabird restoration.”

**restoration ecology** — the process of using ecological principles and experience to return a degraded ecological system to its former or original state

**riparian** — referring to the interface between freshwater habitats and the terrestrial landscape

**riparian agricultural land** — agricultural land along a stream or river [n.b. We normally base our CCP analysis of impacts on an estimated 50' of land on both banks, unless otherwise stated.]

**riparian forested land** — forested land along a stream or river

**riparian habitat** — habitat along the banks of a stream or river [cf. note above]

**riverine** — within the active channel of a river or stream

**riverine wetlands** — generally, all the wetlands and deepwater habitats occurring within a freshwater river channel not dominated by trees, shrubs, or persistent emergents

**runoff** — water from rain, melted snow, or agricultural or landscape irrigation that flows over a land surface into a water body (cf. “urban runoff”)

**sandplain grassland** — dry grassland that has resisted succession due to fire, wind, grazing, mowing, or salt spray [n.b. Characterized by thin, acidic, nutrient-poor soils over deep sand deposits, sandplains primarily occur on the coast and off-coast islands, or inland, where glaciers or rivers have deposited sands.]

**scale** — the magnitude of a region or process. Refers to both spatial size—for example, a (relatively small-scale) patch or a (relatively large-scale) landscape; and a temporal rate—for example, (relatively rapid) ecological succession or (relatively slow) evolutionary speciation

**seabird restoration** — the process of re-establishing populations of colonial nesting seabirds through a combination of predator control, both lethal and non-lethal, social attraction techniques, and other management actions. Objectives are to increase species diversity, population size, and the geographic distribution of colonies.

**Service presence** — Service programs and facilities that it directs or shares with other organizations; public awareness of the Service as a sole or cooperative provider of programs and facilities

**shrublands** — habitats dominated by various species of shrubs, often with many grasses and forbs

**site improvement** — any activity that changes the condition of an existing site to better interpret events, places, or things related to a refuge [e.g., improving safety and access, replacing non-native with native plants, refurbishing footbridges and trailways, and renovating or expanding exhibits.]

**source population** — a population in a high-quality habitat where the birth rate greatly exceeds the death rate, and the excess individuals emigrate

**special focus area** — an area of high biological value [n.b. We normally direct most of our resources to SFA’s that were delineated because of:

1. the presence of Federal-listed endangered and threatened species, species at risk (formerly, “candidate species”), rare species, concentrations of migrating or wintering waterfowl, or shorebird stopover habitat;
2. their importance as migrant landbird stopover or breeding habitat;
3. the presence of unique or rare communities; or
4. the presence of important fish habitat.]

**special habitats** — wetlands, vernal pools, riparian habitat, and unfragmented rivers, forests and grasslands [n.b. Many rare species depend on specialized habitats that, in many cases, are being lost within a watershed.]

**special riparian project** — restoring, protecting, or enhancing an aquatic environment in a discrete riparian corridor within a special focus area

**species assemblage** — the combination of particular species that occur together in a specific location and have a reasonable opportunity to interact with one another

**species at risk** — a species being considered for Federal listing as threatened or endangered (formerly, a “candidate species”)

**species of concern** — species not Federal-listed as threatened or endangered, but about which we or our partners are concerned

**species diversity** — usually synonymous with “species richness,” but may also include the proportional distribution of species

**species richness** — a simple measure of species diversity calculated as the total number of species in a habitat or community (Fiedler and Jain 1992)

**State agencies** — natural resource agencies of State governments

**State land** — State-owned public land

**State-listed species** — cf. “Federal-listed species”

**step-down management plan** — a plan for dealing with specific refuge management subjects, strategies, and schedules, e.g., cropland, wilderness, and fire [FWS Manual 602 FW 1.4]

**stopover habitat** — habitat where birds rest and feed during migration

**strategy** — a specific action, tool, technique, or combination of actions, tools, and techniques for meeting unit objectives

**succession** — the natural, sequential change of species composition of a community in a given area

**surface water** — all waters whose surface is naturally exposed to the atmosphere, or wells or other collectors directly influenced by surface water

**sustainable development** — the attempts to meet economic objectives in ways that do not degrade the underlying environmental support system. Note that there is considerable debate over the meaning of this term... we define it as “human activities conducted in a manner that respects the intrinsic value of the natural world, the role of the natural world in human well-being, and the need for humans to live on the income from nature’s capital rather than the capital itself.”

**telecommunications** — communicating via electronic technology

**telecommunications project** — any cooperative venture that combines financial and staff resources to develop and use computer-based applications for exchanging information about a watershed with others

**terrestrial** — living on land

**threatened species** — a Federal-listed, protected species that is likely to become an endangered species in all or a significant portion of its range

**tiering** — incorporating by reference the general discussions of broad topics in environmental impact statements into narrower statements of environmental analysis by focusing on specific issues [40 CFR 1508.28]

**tributary** — a stream or river that flows into a larger stream, river, or lake, feeding it water

**trust resource** — a resource that the Government holds in trust for the people through law or administrative act [n.b. A Federal trust resource is one for which responsibility is given wholly or in part to the Federal Government by law or administrative act. Generally, Federal trust resources are nationally or internationally important no matter where they occur, like endangered species or migratory birds and fish that regularly move across state lines. They also include cultural resources protected by Federal historic preservation laws, and nationally important or threatened habitats, notably wetlands, navigable waters, and public lands like state parks and national wildlife refuges.]

**turbidity** — refers to the extent to which light penetrates a body of water. Turbid waters are those that do not generally support net growth of photosynthetic organisms

**unfragmented habitat** — large, unbroken blocks of a particular type of habitat

**unit objective** — desired conditions that must be accomplished to achieve a desired outcome [n.b. Objectives are the basis for determining management strategies, monitoring refuge accomplishments, and measuring their success. Objectives should be attainable, time-specific, and stated quantitatively or qualitatively (FWS Manual 602 FW 1.4).]

**upland** — dry ground (i.e., other than wetlands)

**upland meadow or pasture** — upland pastures are areas maintained in grass for livestock grazing; upland meadows are hay production areas [n.b. Meadows may occur naturally in tidal marshes and inland flooded river valleys or, more frequently, at upland sites where vegetation has been cleared and grasses planted. Eventually, meadows will revert to old fields and forest if they are not mowed, grazed, or burned. Grasses in both managed meadows and pastures usually are similar, but pasture herbs often differ because of selective grazing.]

**upwelling** — a process whereby nutrient-rich waters from the ocean depths rise to the surface; it commonly occurs along continental coastlines

**urban runoff** — water from rain, melted snow, or landscape irrigation flowing from city streets and domestic or commercial properties that may carry pollutants into a sewer system or water body

**vernal pool** — depressions holding water for a temporary period in the spring, and in which various amphibians lay eggs

**vision statement** — a concise statement of what the unit could achieve in the next 10 to 15 years

**warm-season grass** — native prairie grass that grows the most during summer, when cool-season grasses are dormant

**watchable wildlife** — all wildlife is watchable [n.b. A watchable wildlife program is one that helps maintain viable populations of all native fish and wildlife species by building an active, well informed constituency for conservation. Watchable wildlife programs are tools for meeting wildlife conservation goals while at the same time fulfilling public demand for wildlife-dependent recreational activities (other than sport hunting, sport fishing, or trapping).]

**watershed** — the geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.

**watershedwide education networks** — systems for sharing educational information, like curriculum development projects, student activities, and ongoing data gathering; a combination of telecommunications and real-life exchanges of information

**well protected** — in CCP analysis, a rare species or community type is considered well protected if 75 percent or more of its occurrence sites are on dedicated open space

**wet meadows** — meadows located in moist, low-lying areas, often dominated by large colonies of reeds or grasses [n.b. Often they are created by collapsed beaver dams and exposed pond bottoms. Saltmarsh meadows are subject to daily coastal tides.]

**wetlands** — lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. These areas are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted to life in saturated soil conditions.

“Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.”— Cowardin et al 1979

**wilderness study areas** — lands and waters identified by inventory as meeting the definition of wilderness and being evaluated for a recommendation they be included in the Wilderness System (cf. “recommended wilderness”) [n.b. A wilderness study area must meet these criteria:

1. generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable;
2. has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
3. has at least 5,000 contiguous, roadless acres, or sufficient size to make practicable its preservation and use in an unimpaired condition. (FWS Manual 610 FW 1.5 (draft)).]

**wilderness** — cf. “designated wilderness”

**wildfire** — a free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands [FWS Manual 621 FW 1.7]

**wildland fire** — every wildland fire is either a wildfire or a prescribed fire [FWS Manual 621 FW 1.3]

**wildlife-dependent recreational use** — a use of a national wildlife refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation (National Wildlife Refuge System Administration Act of 1966).

**wildlife management** — manipulating wildlife populations, either directly by regulating the numbers, ages, and sex ratios harvested, or indirectly by providing favorable habitat conditions and alleviating limiting factors

**wildlife-oriented recreation** — recreational activities in which wildlife is the focus of the experience [“The terms ‘wildlife-dependent recreation’ and ‘wildlife-dependent recreational use’ mean a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.”— National Wildlife Refuge System Improvement Act of 1997]

**working landscape** — the rural landscape created and used by traditional laborers [n.b. Agriculture, forestry, and fishing all contribute to the working landscape of a watershed (e.g., keeping fields open by mowing or by grazing livestock).]

## LIST OF ACRONYMS

<b>ACOE</b> — Army Corps of Engineers	<b>MDOT</b> — Maine Department of Transportation
<b>ADA</b> — Americans with Disabilities Act	<b>MITA</b> — Maine Island Trail Association
<b>ANP</b> — Acadia National Park	<b>MMS</b> — Management Maintenance System
<b>ARPA</b> — Archaeological Resources Protection Act	<b>MOA</b> — Memorandum of Agreement
<b>ATV</b> — all-terrain vehicle	<b>MOU</b> — Memorandum of Understanding
<b>BBS</b> — Breeding Bird Survey	<b>NAP</b> — Natural Areas Program
<b>BCR</b> — bird conservation region	<b>NAS</b> — National Audubon Society
<b>BMP</b> — best management practices	<b>NAWCP</b> — North American Waterbird Conservation Plan
<b>CCP</b> — Comprehensive Conservation Plan	<b>NAWMP</b> — North American Waterfowl Management Plan
<b>CIREG</b> — Coastal Island Registry number	<b>NEPA</b> — National Environmental Policy Act
<b>CWS</b> — Canadian Wildlife Service	<b>NHPA</b> — National Historic Preservation Act
<b>DMR</b> — Department of Marine Resources	<b>NMFS</b> — National Marine Fisheries Service
<b>DEP</b> — Department of Environmental Protection	<b>NPS</b> — National Park Service
<b>EA</b> — Environmental Assessment	<b>NRCS</b> — Natural Resources Conservation Service
<b>EIS</b> — Environmental Impact Statement	<b>NRPA</b> — Natural Resource Protection Act
<b>EPA</b> — Environmental Protection Agency	<b>NWPS</b> — National Wilderness Preservation System
<b>FAA</b> — Federal Aeronautics Administration	<b>NWR</b> — National Wildlife Refuge
<b>FONSI</b> — Finding of No Significant Impact	<b>PID</b> — Project Information Document
<b>FY</b> — Fiscal Year	<b>PIF</b> — Partners in Flight
<b>GIS</b> — Geographic Information System	<b>PMNWR</b> — Petit Manan National Wildlife Refuge
<b>GOMP</b> — Gulf of Maine Program	<b>RONS</b> — Refuge Operations Needs System
<b>GOMSWG</b> — Gulf of Maine Seabird Working Group	<b>RRP</b> — Refuge Roads Program
<b>GPS</b> — Geographic Positioning System	<b>RRS</b> — Refuge Revenue Sharing
<b>HIOBS</b> — Hurricane Island Outward Bound School	<b>SMART Objectives</b> — Specific, Measurable, Achievable, Results-oriented, Time-fixed
<b>HMP</b> — Habitat Management Plan	<b>TNC</b> — The Nature Conservancy
<b>HSIMP</b> — Habitat and Species Inventory and Monitoring Plan	<b>UNB</b> — University of New Brunswick
<b>LE</b> — Law Enforcement	<b>USCG</b> — U.S. Coast Guard
<b>LPP</b> — Land Protection Plan	<b>USDI</b> — U.S. Department of the Interior
<b>LWCF</b> — Land and Water Conservation Fund	<b>USFWS</b> — U.S. Fish and Wildlife Service
<b>MAPS</b> — Monitoring Avian Productivity and Survivorship	<b>USGS</b> — U.S. Geological Survey
<b>MCHT</b> — Maine Coast Heritage Trust	<b>WSA</b> — wilderness study area
<b>MDIFW</b> — Maine Department of Inland Fisheries & Wildlife	



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*Buffleheads*  
USFWS photo

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