

## Chapter 1



USFWS

*Upper Peeverly Pond*

# Purpose of, and Need for, Action

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## Introduction

The U.S. Fish and Wildlife Service (Service, we, our) established Great Bay National Wildlife Refuge (Great Bay Refuge, the refuge) in 1992. It is located in the town of Newington in southeastern New Hampshire, on the eastern shore of the tidally influenced Great Bay Estuary. This 1,103-acre refuge includes 2 miles of rocky shoreline and is the largest parcel of protected land on the estuary (map 1.1). Great Bay Refuge was established to protect the natural diversity of fish, wildlife, and plants within its boundaries; protect federally listed species; preserve and enhance water quality and aquatic habitats; and fulfill the U.S.'s international treaty obligations relating to fish and wildlife resources. In the three decades prior to refuge establishment, the refuge lands were part of the former Pease U.S. Air Force (Air Force) Base. Despite this intensive land use, and its earlier use as a farm, the refuge has a rich diversity of habitat types including oak-hickory forests, grasslands, shrub thickets, freshwater and saltwater wetlands, and open water.

Great Bay Refuge also includes a 29-acre conservation easement in remnant pine barrens along the Merrimack River in Concord, New Hampshire. The easement lies approximately 45 miles west of the refuge and abuts the Concord Airport. The pine barrens on easement lands are managed for the federally listed endangered Karner blue butterfly. The easement is part of a fragmented, but important, complex of remnant pine barrens that supports rare moths and butterflies. The habitat primarily consists of a mix of open pitch pine-scrub, pine-hardwood, and other shrubland (map 1.2).

## Purpose of, and Need for, Action

This draft Comprehensive Conservation Plan (CCP) and the accompanying Environmental Assessment (EA) combines two documents required by Federal law:

- A CCP, required by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Pub. L. 105-57; 111 Stat. 1253) (Refuge Improvement Act)
- An EA, required by the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4321 *et seq.*, 83 Stat. 852)

We propose to develop a CCP for the refuge that, in our professional judgment, best

- achieves the purposes, goals, and vision of the refuge;
- contributes to the National Wildlife Refuge System's (Refuge System) mission;
- adheres to Service's policies and other mandates;
- addresses key issues; and
- incorporates sound principles of fish and wildlife science.

NEPA regulations require us to evaluate a reasonable range of alternatives, including our preferred action and no action. The no action alternative can mean either

- (1) not managing the refuge, or
- (2) not changing its present management.

In this plan, alternative A is the latter and describes our current refuge programs.





A CCP's *purpose* is to provide strategic management direction on a refuge 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.

There are many reasons the refuge presently needs a CCP. First, Great Bay Refuge lacks a master plan to fulfill its obligations especially as administrative, environmental, economic, and social conditions have changed since the refuge was first established in 1992. Prior to 2005, the refuge employed an onsite refuge manager and an administrative assistant. In 2006, the Service made a decision to destaff Great Bay Refuge after budget cuts led to a new regional strategic staffing plan. Great Bay Refuge and the Karner blue butterfly conservation easement are now administered by the refuge manager at Parker River National Wildlife Refuge in Newburyport, Massachusetts.

Second, in the last few decades, development has increased around the refuge. In response, land protection efforts have also increased. The refuge is an integral part of the network of conserved lands throughout the region. Great Bay Refuge has the potential to provide opportunities for environmental education and outreach that have not yet been fully realized. This CCP is a valuable tool to help us articulate our management priorities to the State of New Hampshire (State) natural resource agencies, refuge partners, other conservation organizations, local communities, and the public. Through this CCP, we hope that we will strengthen our existing partnerships, and forge new ones, to help achieve our refuge purposes and goals and support the Refuge System mission.

Third, the 1997 National Wildlife Refuge System Improvement Act (Refuge Improvement Act) requires that all national wildlife refuges have a CCP in place by 2012 to help fulfill the mission of the Refuge System.

Finally, the CCP is needed to address key issues identified through the planning process by the public, partners, other agencies, and refuge staff. A primary concern is those issues that are adversely affecting the populations and habitats of fish, wildlife, and plants within the refuge. These key issues are described in detail below in the section titled, “Issues, Concerns, and Opportunities.”

Following the public review of this draft CCP/EA, the Service's Northeast Regional Director will decide on the components of a final CCP to guide refuge management decisions over the next 15 years. This CCP/EA evaluates and compares three alternatives for managing Great Bay Refuge and the Karner blue butterfly conservation easement, and their effects on key biological, physical, social, and cultural resources: Alternative A, “Current Management,” Alternative B, “Habitat Diversity and Focal Species Emphasis,” and

Alternative C, “Emphasis on Natural Processes.” Alternative B represents the proposed action and the Service-preferred alternative. It was selected as the Service-preferred alternative because the CCP planning team believes it best achieves refuge purposes, vision, and goals; contributes to the Refuge System mission; addresses the issues and relevant mandates; and is consistent with sound principles of fish and wildlife management.

Chapter 1 explains the purpose of, and need for, preparing a CCP/EA, and sets the stage for the 4 subsequent chapters and 10 appendixes. Specifically, it

- defines our planning analysis area;
- presents the mission, policies, and mandates affecting the development of the plan;
- identifies other conservation plans we used as references;
- lists the purposes for which the refuge was established and its land acquisition history;
- clarifies the vision and goals that drive refuge management;
- describes our planning process and its compliance with NEPA regulations; and
- identifies public issues or concerns that surfaced as we developed the plan.

Chapter 2, “Affected Environment,” describes the refuge’s physical, biological, and human environments.

Chapter 3, “Alternatives, Including the Service-preferred Alternative,” presents three management alternatives for Great Bay Refuge, and two management alternatives for the Karner blue butterfly conservation easement. Each alternative presents a set of objectives and array of strategies for meeting refuge goals and addressing public issues. It also describes the activities that we expect to occur regardless of the alternative selected for the final CCP.

Chapter 4, “Environmental Consequences,” assesses the environmental consequences of implementing each of the management alternatives. It predicts the foreseeable benefits and consequences affecting the socioeconomic, physical, cultural, and biological environments described in chapter 2.

Chapter 5, “Consultation and Coordination,” summarizes how we involved the public and our partners in the planning process, and credits the contributors to this plan. Public and partner involvement is vital for the future management of this refuge and all national wildlife refuges.

Ten appendixes, a glossary with a list of acronyms and species scientific names, and a bibliography provide additional documentation and references to support our narratives and analysis. The appendixes include:

- Appendix A: Species and Habitats of Concern Known, or Potentially Occurring, on Great Bay National Wildlife Refuge and Karner Blue Butterfly Easement
- Appendix B: Process for Establishing Focal Species and Priority Habitats
- Appendix C: Findings of Appropriateness and Compatibility Determinations

- Appendix D: Refuge Operations Needs System (RONS) and Service Asset Maintenance Management System (SAMMS)
- Appendix E: Wilderness Review
- Appendix F: Staffing Charts
- Appendix G: Fire Management Program Guidance
- Appendix H: Forest Health Assessment
- Appendix I: Contaminants Review of Peverly Stream System
- Appendix J: Refuge Headquarters/Visitor Contact Station Proposed Under Alternatives A and B



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*Woodman Point looking west*

## Service Policies, Legal Mandates, and Other Policies Guiding the Planning Process

This section presents highlights of Service policy, legal mandates and regulations, and existing resource plans and conservation initiatives that directly influenced development of this draft CCP/EA.

### U.S. Fish and Wildlife Service

The Service, part of the Department of the Interior (Department), administers the Refuge System. The mission of the Service is:

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

Congress entrusts to the Service the conservation and protection of the following national natural resources: migratory birds, federally listed endangered or threatened species, migratory and interjurisdictional fish, wetlands, certain marine mammals, and national wildlife refuges. The Service also enforces Federal wildlife laws and international treaties on importing and exporting wildlife, assists states with their fish and wildlife programs, and helps other countries develop conservation programs.

The Service Manual, available online at: <http://www.fws.gov/policy/manuals> (accessed May 2011), contains the standing and continuing directives on fulfilling our responsibilities. The 600 series of the Service Manual addresses land use management, and sections 601-609 specifically address management of national wildlife refuges.

We publish special directives that affect the rights of citizens or the authorities of other agencies separately in the Code of Federal Regulations (CFR); the Service Manual does not duplicate them (see 50 CFR 1–99 online at: <http://www.gpoaccess.gov/cfr/index.html> (accessed May 2011)).

### The National Wildlife Refuge System

The Refuge System is the world’s largest network of public lands and waters set aside specifically for conserving wildlife and protecting ecosystems. From its inception in 1903, the Refuge System has grown to over 150 million acres, encompassing more than 550 national wildlife refuges and other units of the Refuge System, plus 37 wetland management districts. More than 40 million visitors annually hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretive activities on these refuges.

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.”*  
—National Wildlife Refuge System Improvement Act of 1997

The fundamental focus of the Refuge System is wildlife conservation. The goals of the Refuge System are to

- fulfill our statutory duty to achieve refuge purposes and further the Refuge System mission;
- conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered;

- perpetuate migratory bird, interjurisdictional fish, and marine mammal populations;
- conserve a diversity of fish, wildlife, and plants;
- conserve and restore, where appropriate, representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems; and
- foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public uses including hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

### **Refuge Planning and Management Guidance**

This Service policy (602 FW 1, 2, 3) establishes the requirements and guidance for Refuge System planning, including CCPs and step-down management plans. It states that we will manage all refuges in accordance with an approved CCP that, when implemented, will help

- achieve refuge purposes;
- fulfill the Refuge System mission;
- maintain and, where appropriate, restore the ecological integrity of each refuge and the refuge System;
- achieve the goals of the National Wilderness Preservation System and the National Wild and Scenic Rivers System; and
- conform to other applicable laws, mandates, and policies.

Service planning policy provides step-by-step directions and identifies the minimum requirements for developing all CCPs. Among them, we are to review any existing special designation areas such as Wilderness Areas and Wild and Scenic Rivers designations, address the potential for any new special designations, conduct a wilderness review, and incorporate a summary of that review into each CCP (602 FW 3). Appendix D summarizes



*Raccoon*

Dave Menke/USFWS

the results of our wilderness review. Based on our findings, Great Bay Refuge does not meet the minimum requirement for wilderness, and we are not recommending it for inclusion in the National Wilderness Preservation System. At this time, we do not see the potential for any other special designations on the refuge.

### **Policy on Maintaining Biological Integrity, Diversity, and Environmental Health**

Service policy (601 FW 3) provides guidance on maintaining and restoring the biological integrity, diversity, and environmental health of the Refuge System, including the protection of a broad spectrum of fish, wildlife, and habitat resources in refuge ecosystems. The policy provides the following definitions:

- Biological diversity is the “variety of life and its processes, including the variety of living organisms, the genetic differences among them, and communities and ecosystems in which they occur.”
- Biological integrity is the “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.”
- Environmental health is 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.”

The policy provides refuge managers with a process for evaluating the best management direction to prevent additional degradation of environmental conditions and restore lost or severely degraded components of the environment. It also provides guidelines for dealing with external threats to the biological integrity, diversity, and environmental health of a refuge and its ecosystem.

### **Habitat Management Planning**

In collaboration with other refuges in the region, Great Bay Refuge staff prepared a draft Habitat Management Plan (HMP) in 2006 based on the guidelines set out in the Service’s HMP policy (620 FW 1). The HMP describes the process that the refuge used to identify priority resources of concern and to set habitat management priorities to benefit those resources. The HMP includes a set of goals, objectives, and strategies for habitat management on the refuge and provides the biological foundation for this CCP. Appendix A lists the species of conservation concern at Great Bay Refuge identified during the HMP process. Appendix B details the process used to select these species of concern. A final HMP will be developed after the completion of the CCP.

### **Policy on the Appropriateness of Refuge Uses**

Federal law and Service policy provide the direction and planning framework for protecting the Refuge System from inappropriate, incompatible, or harmful human activities and ensuring that all visitors can enjoy its lands and waters. This Service policy (603 FW 1) provides a national framework for determining appropriate refuge uses to prevent or eliminate those that should not occur in the Refuge System. It describes the initial decision process the refuge manager follows when first considering whether to allow a proposed use on a refuge. An appropriate use must meet at least one of the following four conditions:

- (1) The use is a wildlife-dependent recreational use, as identified in the Improvement Act.
- (2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act became law.
- (3) The use involves the take of fish or wildlife under state regulations.
- (4) The use has been found to be appropriate after concluding a specified findings process using the 10 specific criteria included in the policy.

Appendix C includes the findings of appropriateness for Great Bay Refuge. You may view the appropriateness policy on the Web at: <http://www.fws.gov/policy/603fw1.html> (accessed May 2011).

### **Policy on Compatibility**

This Service policy (603 FW 2) complements the appropriateness policy and provides guidance on how to prepare a compatibility determination. The refuge

manager first must find a use appropriate before undertaking a review of that use to determine if it compatible. According to this policy, 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." If the proposed use is found not appropriate, a compatibility determination is unnecessary and the use is not allowed. If the refuge manager finds a use appropriate, it is further evaluated through a compatibility determination. Other guidance in that chapter follows:

- The Refuge Improvement Act and its regulations require an affirmative finding by the refuge manager on the compatibility of a public use before we allow it on a national wildlife refuge.
- The act defines six wildlife-dependent uses that are to receive enhanced consideration on refuges: hunting, fishing, wildlife observation, photography, environmental education, and interpretation.
- The refuge manager may authorize these six priority uses on a refuge when they are compatible and consistent with public safety.
- When the refuge manager publishes a compatibility determination, it will specify the required maximum reevaluation dates: 15 years for wildlife-dependent recreational uses; or, 10 years for other uses.
- However, the refuge manager may reevaluate the compatibility of a use at any time: for example, sooner than its mandatory date, or even before we complete the CCP process, if new information reveals unacceptable impacts or incompatibility with refuge purposes (603 FW 2.11, 2.12).
- The refuge manager may allow or deny any use, even one that is compatible, based on other considerations such as public safety, policy, or available funding.

Appendix C includes the draft compatibility determinations for Great Bay Refuge.

#### **Policy on Wildlife-dependent Public Uses**

This Service policy (605 FW 1) presents specific guidance about wildlife-dependent recreation programs within the Refuge System. We develop our wildlife-dependent recreation programs in consultation with state fish and wildlife agencies and stakeholder input based on the following criteria:

- Promotes safety of participants, other visitors, and facilities
- Promotes compliance with applicable laws and regulations and responsible behavior
- Minimizes or eliminates conflict with fish and wildlife population or habitat goals or objectives in an approved plan
- Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation
- Minimizes conflicts with neighboring landowners
- Promotes accessibility and availability to a broad spectrum of the American people
- Promotes resource stewardship and conservation

- Promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources
- Provides reliable/reasonable opportunities to experience wildlife
- Uses facilities that are accessible to people and blend into the natural setting
- Uses visitor satisfaction to help to define and evaluate programs

#### **Other Mandates**

While Service and Refuge System policies and each refuge's purpose(s) 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 on the conservation and protection of natural and cultural resources. The "Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service" lists them and can be accessed at: <http://www.fws.gov/laws/Lawsdigest.html> (accessed August 2011).

Chapter 4, "Environmental Consequences," specifically evaluates compliance with the Clean Water Act, Clean Air Act, and the Endangered Species Act (ESA). This draft CCP/EA is written to comply with NEPA.

#### **Historic Resources**

Federal laws require the Service to identify and preserve its important historic structures, archaeological sites, and artifacts. NEPA mandates our consideration of cultural resources in planning Federal actions. The Refuge Improvement Act requires that the CCP identify the refuge's archaeological and cultural values. The following four Federal laws also cover historic and archaeological resources on national wildlife refuges:

- The Archaeological Resources Protection Act (ARPA) (16 U.S.C. § 470aa–470ll; Pub.L. 96–95), approved October 31, 1979 (93 Stat.721). ARPA establishes detailed requirements for issuance of permits for any excavation for, or removal of, archaeological resources from Federal or Native American lands. It also establishes civil and criminal penalties for the unauthorized excavation, removal, or damage of those resources; for any trafficking in those resources removed from Federal or Native American land in violation of any provision of Federal law; and for interstate and foreign commerce in such resources acquired, transported, or received in violation of any state or local law.
- The Archaeological and Historic Preservation Act (AHPA) (16 U.S.C. § 469–469c; Pub.L. 86–523), approved June 27, 1960 (74 Stat. 220), as amended by Pub.L. 93–291 approved May 24, 1974 (88 Stat. 174). AHPA carries out the policy established by the Historic Sites Act (see below). It directs Federal agencies to notify the Secretary of the Interior whenever they find that a Federal or federally assisted licensed or permitted project may cause the loss or destruction of significant scientific, prehistoric, or archaeological data. The act authorizes the use of appropriated, donated, or transferred funds for the recovery, protection, and preservation of that data.
- The Historic Sites, Buildings, and Antiquities Act (16 U.S.C. § 461–462, 464–467; 49 Stat. 666) of August 21, 1935, popularly known as the Historic Sites Act, as amended by Pub.L. 89–249, approved October 9, 1965 (79 Stat. 971). This Historic Sites Act declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provides procedures for designating, acquiring, administering, and protecting these sites and objects. Among other things, National Historic and Natural Landmarks are designated under the authority of this act.

- The National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. § 470–470b, 470c–470n), Pub.L. 89–665, approved October 15, 1966 (80 Stat. 915), and repeatedly amended. The NHPA provides for the preservation of significant historical features (buildings, objects, and sites) through a grant-in-aid program to the states. It establishes the National Register of Historic Places (National Register) and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. § 468–468d). This act establishes an Advisory Council on Historic Preservation, which became a permanent, independent agency in Pub.L. 94–422, approved September 28, 1976 (90 Stat. 1319). The act created the Historic Preservation Fund. It directs Federal agencies to take into account the effects of their actions on items or sites listed or eligible for listing on the National Register. The Margeson-Hawkridge-Loomis Estate (Margeson Estate) on Great Bay Refuge is on the National Register.

The Service also owns and cares for museum properties. The most common are archaeological, zoological, and botanical collections, and historical photographs, objects, and art. Each refuge maintains an inventory of its museum property. Our regional museum property coordinator in Hadley, Massachusetts, guides the refuges in caring for that property, and helps us comply with the Native American Grave Protection and Repatriation Act and Federal regulations governing Federal archaeological collections. Our program ensures that those collections will remain available to the public for learning and research.

## National and Regional Plans and Conservation Initiatives

To the extent possible, a CCP assists in meeting the conservation goals established in existing national and regional conservation plans, state fish and wildlife conservation plans, and other landscape-scale plans covering the same watershed or ecosystem in which the refuge resides. The following plans were consulted in the development of this draft CCP.

## Birds of Conservation Concern 2008 Report

The 1988 amendment to the Fish and Wildlife Conservation Act mandates 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 ESA. *Birds of Conservation Concern 2008* (BCC) is the most recent effort to carry out this mandate (USFWS 2008). The overall goal of this report is to accurately identify the migratory and nonmigratory bird species, beyond those already federally listed as threatened or endangered, that represent our highest conservation priorities.

BCC 2008 encompasses three distinct geographic scales—North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs), Service Regions, and National—and is primarily derived from three major bird conservation plans: the Partners in Flight (PIF) North American Landbird Conservation Plan, the U.S. Shorebird Conservation Plan, and the North American Waterbird Conservation Plan. All three bird conservation plans identify species of concern based on several factors, including population trends, threats, distribution, abundance, and relative density.

The goal of the BCC 2008 report is to encourage Federal, state, and private agencies to coordinate, develop, and implement integrated approaches for conserving and managing the birds deemed most in need of conservation. The report is available online at: <http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf> (accessed May 2011). These birds of conservation concern are incorporated into Appendix A, “Species and Habitats of Conservation Concern on Great Bay Refuge.”

## North American Bird Conservation Initiative

The North American Bird Conservation Initiative (NABCI) brings together the individual landbird, shorebird, waterbird, and waterfowl plans described below into a coordinated effort to protect and restore all native bird populations and their habitats in North America. It uses BCRs to guide landscape-scale, science-based approaches to conserving birds and their habitats. Visit: <http://www.nabci-us.org/> (accessed May 2011) for more information on NABCI.



Les Brooks

*Baltimore oriole*

Great Bay Refuge is located in the New England/Mid-Atlantic Coast BCR (BCR 30). BCR 30 has the densest human population of any region in the country (<http://www.nabci-us.org/bcr30.htm> [accessed May 2011]) (map 1.3). A draft BCR 30 plan was developed in September 2002 and a meeting in December 2004 at Cape May, New Jersey produced a list of priority bird species and draft actions. An updated BCR 30 draft plan was developed in 2006 (Steincamp 2006, draft). We used these documents, as well as information in the four additional bird conservation plans described below, to identify focal species and habitat management goals and objectives for the refuge.

### Partners in Flight Landbird Conservation Plans

In 1990, 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 landbird conservation is a series of scientifically and geographically based bird conservation plans.

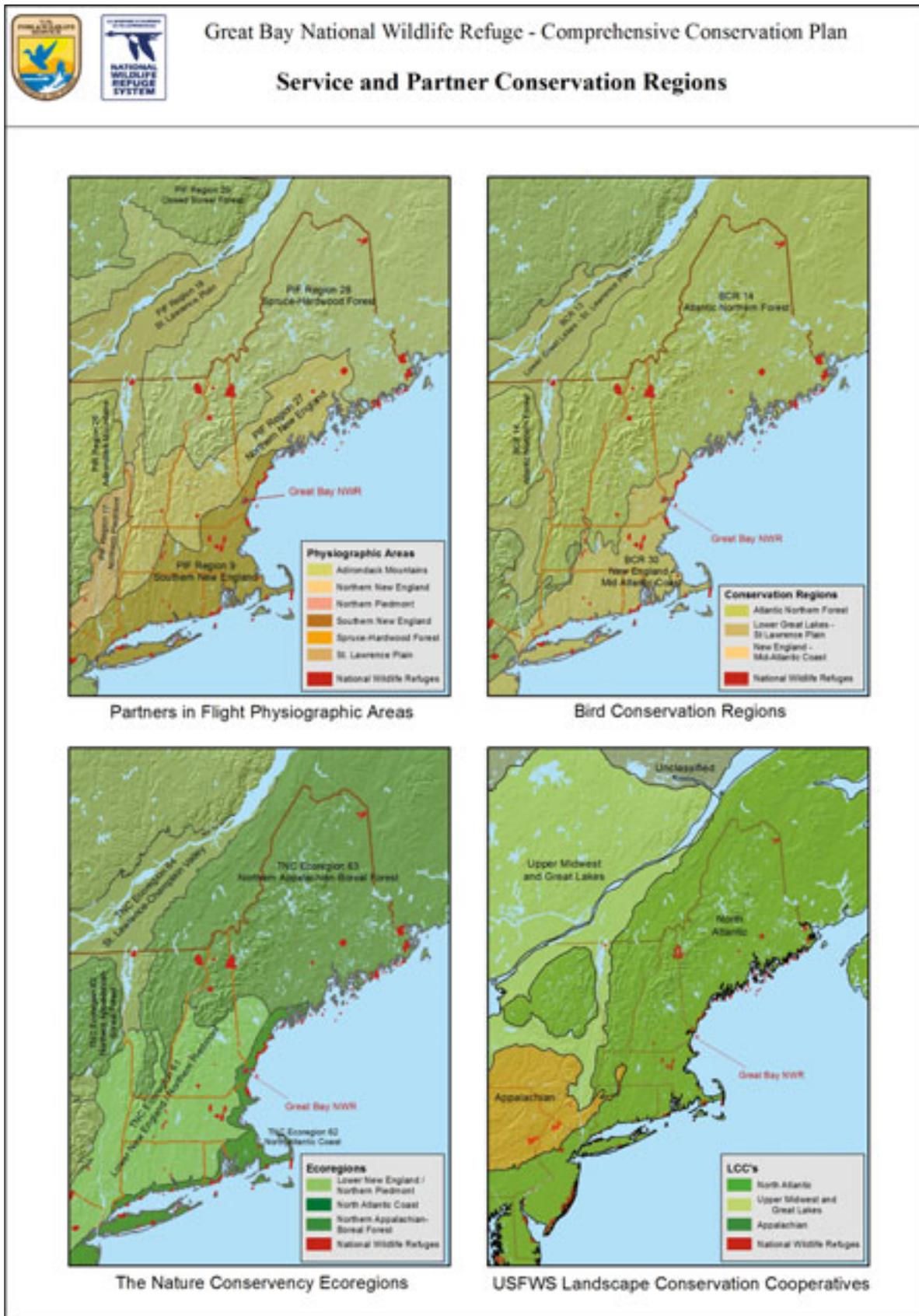
Initially, PIF developed draft conservation plans within “physiographic areas.” PIF developed a set of science-based rules to evaluate the conservation status of all bird species using a species’ population size, distribution, population trend, threats, and regional abundance to objectively identify regional and continental conservation priorities. These rules were adapted and are now being used at the BCR level to identify bird conservation priorities and opportunities. Great Bay Refuge lies within PIF Area 09–Southern New England (Dettmers and Rosenberg 2000). The Karner blue butterfly conservation easement is within PIF Area 27–Northern New England (Hodgman and Rosenberg 2000) (map 1.3).

### U.S. Shorebird Conservation Plan and Northern Atlantic Regional Shorebird Plan

The U.S. Shorebird Conservation Plan (Brown et al. 2001) is a partnership across 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, nongovernmental organizations, businesses, researchers, educators, and policymakers. The plan was closely coordinated with North American Waterfowl Management Plan and Joint Venture staff, as well as the PIF 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, identify critical habitat and research needs, and propose education and outreach programs to increase awareness of shorebirds and the threats they face.

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

- Develop 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.
- Identify the principles and practices upon which local, regional, and national management plans can effectively integrate shorebird habitat conservation with multiple species strategies.



- Design an integrated strategy for increasing public awareness and information concerning wetlands and shorebirds.

Regional plans, including the North Atlantic Regional Shorebird Plan, were developed as part of the overall strategy (Clark and Niles 2000). We used both the U.S. and North Atlantic Regional Shorebird Plans to develop the species of concern list (appendix A) and in considering the value of the refuge to migrating shorebirds.

The national plan can be accessed at: <http://www.fws.gov/shorebirdplan/USShorebird.htm> (accessed May 2011) and the regional plan at: <http://www.fws.gov/shorebirdplan/regionalshorebird/regionalplans.htm> (accessed May 2011).

### **North American Waterbird Conservation Plan**

This conservation plan for waterbirds is an independent partnership among individuals and institutions with interest and responsibility for conserving waterbirds and their habitats. The primary goal of the plan is to ensure that the distribution, diversity, and abundance of populations and habitats of breeding, migratory, and nonbreeding 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 and promotes continentwide planning and monitoring, national-state-provincial conservation action, regional coordination, and local habitat protection and management (Kushlan et al. 2002). You can access the plan online at: <http://www.pwrc.usgs.gov/nacwcp/nawcp.html> (accessed May 2011).

A partnership of organizations and individuals working to facilitate waterbird conservation in the Mid-Atlantic, New England, and Maritimes (MANEM) region of the U.S. and Canada has developed a regional waterbird conservation plan. Over 200 partners, comprising the MANEM Waterbird Working Group, have compiled and interpreted technical information on the region's waterbird populations and habitats, assessed conservation status of these natural resources, developed strategies to ensure the persistence of sustainable waterbird populations in the region, and identified near-term priorities. MANEM partners include wildlife managers, scientists, policymakers, educators, and funders.

The MANEM region consists of BCR 30 (New England/Mid-Atlantic Coast), BCR 14 (Atlantic Northern Forest), and Pelagic Bird Conservation Regions 78 (Northeast U.S. Continental Shelf) and 79 (Scotian Shelf). The MANEM Waterbird Conservation Plan is being implemented within the context and framework of the North American Waterbird Conservation Plan (<http://www.waterbirdconservation.org> [accessed May 2011]).

Seventy-four waterbird species use habitats in MANEM for breeding, migrating, and wintering. Avian families include loons, grebes, shearwaters, storm-petrels, boobies, pelicans, cormorants, herons, ibises, rails, gulls, terns, skuas, jaegers, and alcids. Partners in 4 subregions of MANEM selected 43 focal species for immediate conservation action. In addition, 55 of MANEM's waterbirds are identified in state wildlife action plans as Species of Greatest Conservation Need. You can access information on MANEM Regional planning at: <http://www.fws.gov/birds/waterbirds/MANEM/> (accessed May 2011).

We used these waterbird plans to help develop objectives and strategies for goals 1 and 2, and to create Appendix A, "Species and Habitats of Concern at Great Bay Refuge."

### **North American Waterfowl Management Plan: Atlantic Coast Joint Venture**

The North American Waterfowl Management Plan (NAWMP), signed by the U.S. and Canada in 1986 and by Mexico in 1994, provides a strategy to protect North America's remaining wetlands and to conserve waterfowl populations through habitat protection, restoration, and enhancement (USFWS and CWS 1986). The plan was updated in both 1998 and 2004 with an emphasis on strengthening its biological foundation, using a landscape planning approach, and expanding partnerships (USFWS and CWS 2004). Implementation of this plan is accomplished at the regional level within 16 joint venture areas in the U.S. and Canada. Partnerships involve Federal, state, and local governments; Tribal nations; local businesses; conservation organizations; and individual citizens for the purpose of protecting habitat. By 2004, NAWMP partners had invested more than \$3.2 billion to protect, restore, or enhance more than 13.1 million acres of habitat. More information on the NAWMP is available at: <http://www.fws.gov/birdhabitat/nawmp/nawmphp.htm> (accessed May 2011).

Great Bay Refuge lies within the Atlantic Coast Joint Venture (ACJV), one of the original joint ventures formed under the NAWMP. The ACJV was initially focused on protecting and restoring habitat for the American black duck and other waterfowl species in the Atlantic Coast region of the U.S. While maintaining this strong focus on waterfowl, the ACJV mission has evolved to include the conservation of habitats for all birds. The ACJV is working on integrated planning efforts in eight BCRs. Focus areas, which are specific, important geographic areas with joint venture regions, were identified and mapped for waterfowl and are being developed for other migratory birds within each BCR. These focus areas are discrete and distinguishable habitats or habitat complexes that are regionally important for one or more priority waterfowl species during one or more life history stages.

The Great Bay Estuary is a major wintering area for American black duck, and supports over 80 percent of all waterfowl populations wintering in New Hampshire. The area has been recognized as a waterfowl focus area in the ACJV Waterfowl Implementation Plan. Visit: <http://www.acjv.org> (accessed May 2011) for more information on the ACJV.

### **The State of New Hampshire's Birds: 2009**

This report provides an overview of the conservation status of New Hampshire's bird species, including their population trends, the major threats they face, and proposed strategies for their conservation (Hunt 2009). Overall, the report finds that nearly 47 percent of the 186 birds species in New Hampshire are declining, particularly grassland, shrubland, and ground-nesting forest species. For an additional 38 percent of species, too little information exists to determine trends. The major threats to the conservation of New Hampshire's birds identified in the report include forest fragmentation; conversion of natural habitats to urban, commercial, and residential development; loss of late successional forest; climate change; and impacts to breeding, migration, and wintering habitats outside of the region. To counteract declining trends and reduce these threats, the report suggests six major strategies:

- Improve and enhance monitoring of species of concern.
- Maintain intact forests.
- Prioritize conservation of early successional habitats.
- Protect sensitive habitats by minimizing human disturbances.
- Work at a regional scale.

We used this report to help create Appendix A, "Species and Habitats of Conservation Concern at Great Bay Refuge."

## Karner Blue Butterfly Recovery Plan

The Karner blue butterfly formerly occurred in a band extending across 12 states from Minnesota to Maine, as well as Ontario, Canada. Currently, the species only occurs in seven states: Minnesota, Wisconsin, Indiana, Michigan, New York, New Hampshire, and Ohio. Currently, Wisconsin and Michigan support the greatest number of Karner blue butterflies and habitat sites. The majority of the populations in the remaining states are small and several are at risk of extirpation from habitat degradation or loss. Based on the decline of the Karner blue butterfly across its historic range, it was listed as federally endangered in 1992. Since listing, two populations have been extirpated and are being reintroduced to Concord, New Hampshire, and West Gary, Indiana. A third population is being reintroduced to Ohio (USFWS 2003).

The final recovery plan for the species was prepared in September 2003 (USFWS 2003). The objective of the recovery plan is to restore viable metapopulations of Karner blue butterflies across the species extant range so that it can be reclassified from federally endangered to threatened. The long-range goal is to remove it from the Federal list of endangered and threatened wildlife and plants. An update to the recovery plan was added in February 2011 to include a new potential recovery unit, the Michigan Oak Openings Unit. Both the 2003 plan and its update can be accessed at: <http://www.fws.gov/midwest/endangered/insects/kbb/index.html> (accessed May 2011).



Phil Delphey/USFWS

*Karner blue butterfly*

### Additional Background on the Karner Blue Butterfly

The Karner blue butterfly is dependent on wild lupine—its only known larval food plant—and on nectar plants. These plants historically occurred in savanna and barrens habitats typified by dry sandy soils, and now occur in remnants of these habitats. The primary factor limiting Karner blue butterfly recovery is loss of habitat due to development and increased forest canopy closure due to natural succession.

By 2003, no native Karner blue butterfly populations remained in New England. The last native New England population occurred in the Concord pine barrens in Concord, New Hampshire, and was extirpated in 2000. This last population, which existed in a power line right-of-way and along the grassy safeways of the Concord Airport Industrial Park, had declined from 3,700 estimated butterflies in 1983, to 219 butterflies in 1991, and to less than 50 in 1994. This decline made this site's population at extreme risk for extinction (Peteroy 1998). A reintroduction program was started in 2001 in Concord with a donor population from the Saratoga Airport in New York. For 5 years in a row (2005 to 2009) biologists have observed and documented Karner blue butterflies surviving on their own in the wild at the Concord pine barrens. The Karner blue butterfly conservation easement, administered by Great Bay Refuge, is central to this success (see discussion in this chapter under the section "Refuge Purposes and Land Acquisition History). New Hampshire Fish and Game (NHFG) coordinates habitat management, lupine propagation and planting, and captive rearing and introduction of the Karner blue butterfly on the easement.

## New England Cottontail Spotlight Action Plan

Great Bay Refuge is within the historic range of New England's only native rabbit species, the New England cottontail. The New England cottontail is listed as endangered in the State of New Hampshire and is also currently a candidate species for listing on the Federal list of threatened and endangered species due to population decline. Candidate species are plant and animal species for which the Service has sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened, but that have yet to be listed due to higher priorities. Since candidate species are not yet listed, there is still the opportunity that proactive conservation actions can prevent the need for listing.

The New England Cottontail Spotlight Action Plan identifies the threats to New England cottontails, goals and actions to reduce and mitigate these threats, and measures to monitor the success of the plan (USFWS 2009). The plan identifies habitat fragmentation and habitat loss as the major threats to New England cottontail recovery. The species is dependent upon early successional habitats, such as old fields, shrub thickets, young regenerating forests, and other shrubby areas. These types of early successional habitats are currently declining throughout New England as they naturally succeed to forest. Human development has also eliminated and fragmented habitat for the New England cottontail. Although there are currently no known occurrences of New England cottontails on the refuge, there are opportunities on the refuge to create and maintain the early successional habitats that benefit the species, as well as other shrub-dependent wildlife (Arbuthnot 2008).

The Spotlight Action Plan is available online at: <http://www.fws.gov/northeast/endangered/pdf/NE%20Cottontail%20SSAP.pdf> (accessed May 2011).

**U.S. Fish & Wildlife  
Service Fisheries Program,  
Northeast Region Strategic  
Plan 2009–2013**

The Service's Fisheries Program is committed to working with partners to

- protect the health of aquatic habitats;
- restore fish and other aquatic resources; and
- provide opportunities to enjoy the many benefits of healthy aquatic resources.

In the Service's Northeast Region, fishery management offices and national fish hatcheries work with states and other partners to restore and protect a variety of fish and other aquatic species. The Service's Fisheries Programs' primary focus is on maintaining healthy, self-sustaining populations of coastal, anadromous, and interjurisdictional fish, as well as other threatened and endangered aquatic animal species.

In 2002, the Fisheries Program completed a strategic vision document: "Conserving America's Fisheries, U.S. Fish and Wildlife Service Fisheries Program Vision for the Future" (vision). This vision document includes goals, objectives, and action items on a national scale. The Regional Fisheries Program Strategic Plan is an extension of the national vision document and describes more specifically the tactics to be implemented by the Northeast Region to fulfill the goals and objectives identified in the vision. The current strategic plan covers 2009 to 2013 and can be viewed at: <http://www.fws.gov/northeast/fisheries/> (accessed May 2011) (USFWS 2009a).

In addition to the strategic plan, the Fisheries Program also identified and ranked the level of conservation concern of fish and other aquatic species by hydrologic unit. We used this ranking and have consulted with the Fisheries Program staff in developing aquatic objectives and strategies under goal 2, and in creating Appendix A, "Species and Habitats of Conservation Concern on Great Bay Refuge."

**North American Bald Eagle  
Management Guidelines**

In July 2007, the Service issued a final ruling to officially remove the bald eagle from the Federal list of endangered and threatened species due to its successful recovery throughout its range in the lower 48 States. The bald eagle continues to be protected by the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). The Service developed the National Bald Eagle Management Guidelines to advise landowners, land managers, and others who share public and private lands with bald eagles, when and under what circumstances the protective provisions of the Eagle Act may apply to their activities (USFWS 2007).

These guidelines are intended to help people minimize such impacts to bald eagles, particularly where they may constitute “disturbance,” which is prohibited by the Eagle Act. The guidelines are intended to

- (1) publicize the provisions of the Eagle Act that continue to protect bald eagles, in order to reduce the possibility that people will violate the law;
- (2) advise landowners, land managers, and the general public of the potential for various human activities to disturb bald eagles; and
- (3) encourage additional nonbinding land management practices that benefit bald eagles.

The document is intended primarily as a tool for landowners and planners who seek information and recommendations regarding how to avoid disturbing bald eagles. You can view these management guidelines at: <http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf> (accessed May 2011). We referred to these guidelines as we developed management objectives and strategies for bald eagles.

### **The Land Conservation Plan for New Hampshire’s Coastal Watersheds**

In 2006, The Nature Conservancy (TNC), Society for the Protection of New Hampshire Forests (SPNHF), and the Rockingham and Strafford Regional Planning Commissions published *The Land Conservation Plan for New Hampshire’s Coastal Watersheds* (Coastal Plan) (Zankel et al. 2006). New Hampshire’s coastal watersheds span 990 square miles (approximately 633,000 acres) and 46 towns. The plan identified 75 conservation focus areas that comprise over 190,000 acres of the coastal watersheds that are of exceptional significance for living resources and water quality.

Each conservation focus area is comprised of a core area that contains the primary natural features and habitat for which the focus area was identified. Some focus areas also include a “supporting natural landscape,” which is comprised of natural lands that helps safeguard the core area while also providing habitat for many common species.

A portion of Great Bay Refuge is located within the Fabyan Point Conservation Focus Area. This area was included as a focus area in the coastal plan for the following ecological features:

- Estuarine shoreline along Great Bay
- Presence of tidal rivers, including Peverly Brook
- Extensive salt marsh
- Presence of rare plants and animals: large bur-reed, salt marsh sparrow, osprey, and purple martin
- Significant wildlife habitats: grassland, marsh
- Exemplary natural community: mesic Appalachian oak-hickory forest
- Presence of prime farmland soils

### **New Hampshire Wildlife Action Plan**

In 2002, Congress created the State Wildlife Grant Program (SWG), and appropriated \$80 million in state grants. The purpose of the program is to help state and Tribal fish and wildlife agencies conserve fish and wildlife species

of greatest conservation need. The funds appropriated under the program are allocated to each state according to a formula that takes into account its size and population.

To be eligible for additional Federal grants, and to satisfy the requirements for participating in the SWG program, each state was charged with developing a statewide “Comprehensive Wildlife Conservation Strategy” and submitting it to the National Advisory Acceptance Team by October 1, 2005. Each plan must address eight required elements and identify and focus on “species of greatest conservation need.” Each plan must also address the “full array” of wildlife and wildlife-related issues, and how to “keep common species common.”

In response to that charge, NHFGE, with support from partners, developed the “New Hampshire Wildlife Action Plan” (NHWAP) (NHFGE 2005). The NHFGE is the chief agency responsible for the implementation and revision of the NHWAP. The plan creates a vision for conserving New Hampshire’s wildlife and encourages other states, Federal agencies, and conservation partners to think strategically about their individual and coordinated roles in prioritizing conservation.

The NHWAP helps supplement the information we gathered on species and habitat occurrences and their distribution in our area analysis, and helps us identify conservation threats and management strategies for species and habitats of conservation concern in the CCP. The development of this plan involved invaluable input from experts, partners, and the public. We used the NHWAP in developing our list of species of concern in appendix A, and the management objectives and strategies for goals 1 through 3.

You may view the NHWAP at: [http://www.wildlife.state.nh.us/Wildlife/wildlife\\_plan.htm](http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm) (accessed May 2011).

**Piscataqua Region  
Estuaries Partnership’s  
Comprehensive  
Conservation and  
Management Plan**

The Piscataqua Region Estuaries Partnership (PREP), formerly known as the “New Hampshire Estuaries Project,” is part of the U.S. Environmental Protection Agency’s (EPA) National Estuaries Program. This program is a joint local/State/Federal program established under the Clean Water Act. Its goal is to protect and enhance nationally significant estuarine resources. PREP receives its funding from the EPA and is administered by the University of New Hampshire (UNH).

PREP strives to

- improve the water quality and overall health of New Hampshire’s estuaries;
- support regional development patterns that protect water quality, maintain open spaces and important habitat, and preserve estuarine resources;
- track environmental trends through the implementation of a long-term monitoring program to assess indicators of estuarine health; and,
- develop broad-based popular support for the implementation of the management plan by encouraging involvement of the public, local government, and other interested parties in its implementation.

PREP’s priorities were established by local stakeholders and include water quality improvements, shellfish resources, land protection, and habitat restoration. Projects addressing these priorities are undertaken throughout New Hampshire and southern Maine’s coastal watersheds.

PREP's Comprehensive Conservation and Management Plan (CCMP) for the region's estuaries was completed in 2000 and updated in 2010 (PREP 2010). The management plan outlines key issues related to the management of New Hampshire's estuaries and proposes strategies to preserve, protect, and enhance the State's estuarine resources.

**Great Bay National Estuarine Research Reserve**

The National Estuarine Research Reserve System (Reserve System) is a network of 28 areas protected for long-term research, water quality monitoring, education, and coastal stewardship. Established by the Coastal Zone Management Act of 1972, as amended, the Reserve System is a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the coastal states. NOAA provides funding, national guidance, and technical assistance. Each reserve is managed by a lead state agency or university, with input from local partners.

The Great Bay National Estuarine Research Reserve (GBNERR) was designated in 1989 and now encompasses 10,235 acres. Great Bay Refuge lies within the reserve's boundaries and benefits from the research, education, and outreach conducted by reserve staff. The NHFG is the lead agency. In 1993, the Great Bay Discovery Center (formerly known as Sandy Point) was constructed on the shores of Great Bay Estuary in Greenland, New Hampshire. It serves as the conservation-education headquarters for the GBNERR. The reserve's primary purpose is to promote the wise use and management of the Great Bay Estuary (<http://www.greatbay.org/index.htm> [accessed May 2011]).

**New Hampshire Coastal Program**

The New Hampshire Department of Environmental Services (NHDES) administers the State's Coastal Program. The New Hampshire Coastal Program (NHCP) creates and sustains partnerships with local, State, and Federal agencies, as well as businesses and nonprofit groups to complete planning, restoration, and education projects. The mission of the NHCP is to "balance the preservation of natural resources of the coast with the social and economic needs of this and succeeding generations."

To accomplish its mission, the program focuses on

- preventing and reducing coastal pollution;
- providing public access to coastal lands and waters;
- fostering community stewardship and awareness of coastal resources;
- protecting and restoring coastal natural resources; and
- encouraging a viable economy with adequate infrastructure.

In 1982, New Hampshire received Federal approval from NOAA for the Ocean and Harbor Segment of its Coastal Program, which incorporated areas in proximity to the Atlantic Ocean and the lower Piscataqua River. In 1988, the NHCP received approval from NOAA to expand its boundaries to cover all near shore areas under tidal influence, including the lands that border Great Bay and Little Bay Estuaries and several tidal rivers. The NHCP received approval from NOAA again in 2004 to expand its inland boundary to encompass the jurisdictional boundary of the 17 municipalities along New Hampshire's tidal waters.

The NHCP is responsible for administering the Federal consistency provision of the Coastal Zone Management Act in New Hampshire. As such, the NHCP will review the proposals in this CCP to ensure consistency with its enforceable policies and all State coastal management requirements.

For more information on the NHCP, please visit: <http://des.nh.gov/organization/divisions/water/wmb/coastal/index.htm> (accessed September 2011).

## Partners in Amphibian and Reptile Conservation

Partners in Amphibian and Reptile Conservation (PARC) was created in response to the increasing, well-documented national declines in amphibian and reptile populations. PARC members come from state and Federal agencies, conservation organizations, museums, the pet trade industry, nature centers, zoos, power companies, universities, reptile and amphibian organizations, research laboratories, forest industries, and environmental consultants. Its five geographic regions—Northeast, Southeast, Midwest, Southwest and Northwest—focus on regional and national reptile and amphibian conservation challenges.

The National State Agency Herpetological Conservation Report, a summary report sponsored by PARC, provides a general overview of each state wildlife agency's support for reptile and amphibian conservation and research through September 2004. Each state report was compiled in cooperation with its agency's lead biologist on reptile and amphibian conservation. The purpose is to facilitate communication among state agencies and partner organizations throughout the PARC network to identify and address regional and national priorities. The State of New Hampshire completed report is included in the report online at: <http://www.parcplace.org/documents/PARCNationalStates2004.pdf> (accessed May 2011). We used the New Hampshire plan in developing objectives and strategies for goals 1 and 2 and in developing Appendix A, "Species and Habitats of Conservation Concern on Great Bay Refuge."

## The Service's Climate Change Strategy, "Rising to the Urgent Challenge" (USFWS 2010)

Accelerating climate change will affect our nation's fish, wildlife, and plant resources in profound ways. While many species will continue to thrive, some populations may decline and in some instances, go extinct. Others will survive in the wild only through direct and continuous intervention by managers. The challenge of climate change requires the Service, its employees, and partners to work with determination, creativity, and commitment to conserve the nation's natural resources.

In response to Secretarial Orders #3226, "Evaluating Climate Change Impacts in Management Planning" (January 19, 2001) and #3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" (February 22, 2010), the Service developed the strategic plan, "Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change," to address climate change. The plan establishes a basic framework for the Service's work as part of the conservation community to help ensure the sustainability of fish, wildlife, plants, and habitats in the face of accelerating climate change. It also details specific steps the Service will take during the next 5 years to implement the strategic plan (USFWS 2010). The plan can be accessed online at: <http://www.fws.gov/home/climatechange/strategy.html> (accessed December 2011).

*Upland sandpiper*



Shawn McCready, Flickr, Creative Commons

The strategic plan's six guiding principles are:

- We will continually evaluate our priorities and approaches, make difficult choices, take calculated risks, and adapt to climate change.
- We will commit to a new spirit of coordination, collaboration, and interdependence with others.
- We will reflect scientific excellence, professionalism, and integrity in all our work.
- We will emphasize the conservation of habitats within sustainable landscapes, applying our Strategic Habitat Conservation framework.

- We will assemble and use state-of-the-art technical capacity to meet the climate change challenge.
- We will be a leader in national and international efforts to address climate change.

The plan also lists three key strategies to address climate change: adaptation, mitigation, and engagement.

The Intergovernmental Panel on Climate Change (IPCC) defines **adaptation** as an, “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.” In the strategic plan, adaptation refers to planned management actions the Service will take to reduce the impacts of climate change on fish, wildlife, and their habitats. Adaptation forms the core of the Service’s response to climate change and is the centerpiece of our strategic plan. This adaptive response to climate change will involve strategic conservation of terrestrial, freshwater, and marine habitats within sustainable landscapes.

The IPCC defines **mitigation** as “human intervention to reduce the sources or enhance the sinks of greenhouse gases.” Mitigation involves reducing our “carbon footprint” by using less energy, consuming fewer materials, and appropriately changing our land management practices. Mitigation is also achieved through biological carbon sequestration, which is a process in which carbon dioxide (CO<sub>2</sub>) from the atmosphere is taken up by plants through photosynthesis and stored as carbon in biomass (e.g., tree trunks and roots). Sequestering carbon in vegetation, such as native hardwood forests or grassland, can often restore or improve habitat and directly benefit fish and wildlife.

Engagement involves reaching out to Service employees; local, national, and international partners in the public and private sectors; key stakeholders; and the general public to find solutions to the challenges to fish and wildlife conservation posed by climate change.

The Association of Fish & Wildlife Agencies has developed guidance for states as they update and implement their respective wildlife action plans (AFWA 2009). This publication, “Voluntary Guidance for States to Incorporate Climate Change into State Wildlife Action Plans and Other Management Plans,” also includes strategies that will help conserve fish and wildlife species and their habitats and ecosystems as climate conditions change. The broad spatial and temporal scales associated with climate change suggest that management efforts that are coordinated on at least the regional scale will likely lead to greater success. The Service will work with our state partners, among others, on meeting the climate change challenge.

The Service’s Climate Change Web site at: <http://www.fws.gov/home/climatechange/strategy.html> (accessed December 2011), provides detailed information on the priority actions the Service is taking through 2011 to begin to implement the strategic plan.

### North Atlantic Landscape Conservation Cooperative

Landscape Conservation Cooperatives (LCCs) are a network of conservation science and management partnerships across the U.S. and its international borders. LCCs were created in response to the unprecedented level of large-scale pressures on natural systems (e.g., land use pressures, habitat loss and fragmentation, invasive species, and climate change) and the need for agencies and organizations to work together to find long-term solutions to these threats. Each LCC is comprised of Federal and state agencies, Tribes, universities, and

public and private organizations, collectively working to sustain America's lands, waters, wildlife, and cultural resources. By functioning as an interdependent network, LCCs are able to accomplish more together than any single agency or organization alone. LCC partners use their combined resources to collaboratively

- identify common science needs, conservation goals, and priorities;
- develop science-based tools and solutions to meet shared conservation goals;
- support biological planning, conservation design, and adaptive management; and
- evaluate the effectiveness of scientific information and conservation actions ([http://www.fws.gov/science/shc/pdf/LCC\\_Fact\\_Sheet.pdf](http://www.fws.gov/science/shc/pdf/LCC_Fact_Sheet.pdf) [accessed August 2011]).

Great Bay Refuge lies in the the North Atlantic LCC, which covers portions of 12 Northeastern States and the District of Columbia (map 1.3). The North Atlantic LCC's 2009 Development and Operations Plan identified priority actions for the LCC and included a preliminary list of conservation priority species and habitats, many of which are on the refuge. The LCC partner group continues to update and refine its priorities, and is working on a representative species list to help focus inventories and monitoring. Refuge staff will stay attentive to new developments arising from the LCC partnership and adapt management accordingly. For more information on the North Atlantic LCC and its current conservation priorities, visit: <http://www.fws.gov/northeast/science/nalcc.html> (accessed August 2011).

## Refuge Purposes and Land Acquisition History

### Refuge Purposes

The purposes for Great Bay Refuge are derived from public law (Public Law 102-154, Section 319(d) Department of the Interior and Related Agencies Appropriations Bill, 1992). This act by Congress describes the terms of the land transfer of the Pease Air Force Base in New Hampshire, to the Department of the Interior as a national wildlife refuge. The act also states that the Secretary of the Air Force retains responsibility for any hazardous substance which may be found on the property. The following purposes were established for this refuge:

- To encourage the natural diversity of plant, fish, and wildlife species within the refuge, and to provide for their conservation and management
- To protect species federally listed as endangered or threatened or identified as candidates pursuant to the Endangered Species Act of 1973
- To preserve and enhance the water quality of aquatic habitat within the refuge
- To fulfill the international treaty obligations of the U.S relating to fish and wildlife

### Acquisition History

Currently, Great Bay Refuge encompasses 1,103 acres (map 1.1), with Federal jurisdiction to the mean high waterline. In 1992, the Department of Defense transferred the original 1,054 acres of the refuge to the Service. The transfer occurred because the Pease Air Force Base was one of 89 U.S. military installations closed by the Base Closure and Realignment Act (Public Law 100-526). Although the refuge was dedicated in October of 1992, it was not officially opened to public access until 1996.

In 2003, the refuge acquired an additional 33 acres on Fabyan Point in fee title from a willing seller. Fabyan Point is a spit of land on Great Bay located south of the main portion of the refuge. The parcel was bought by the Service using Land and Water Conservation Funds (LWCF) which is a funding source appropriated annually by Congress that comes from a variety of revenue sources rather than general tax revenues. At the time of sale, seven tenants living on the parcel were relocated with compensation and their cottages still remain on the property. This acquisition included a right-of-way access in common with others on Fabyan Point Road off of McIntyre Road.

For any future land acquisitions, the Service's policy is to acquire land only from willing sellers at fair market value. Landowners may sell their land to the Service in fee title (outright), or they may sell development rights through a conservation easement. Private landowners within an approved refuge acquisition boundary who do not wish to sell will continue to retain full control of their property and their rights to use it, in compliance with applicable local, state, and Federal regulations.

### **Karner Blue Butterfly Conservation Easement**

Great Bay Refuge also administers the 29-acre Karner blue butterfly conservation easement in Concord, New Hampshire. This easement was established in July 1992 through a cooperative agreement between the Service, the city of Concord, the Concord Community Development Corporation (CCDC), the U.S. Postal Service, and TNC. The Service's easement, located in the Concord Airport Industrial Park, consists of two adjacent parcels that were donated to the Service by the city of Concord following an exchange of airport land between the city of Concord and the nonprofit CCDC. The easement was established to protect a small remnant pine barren community in Concord that is habitat for the federally listed endangered Karner blue butterfly and other rare Lepidoptera (moths and butterflies). TNC agreed to serve as a managing partner with the Service while the city of Concord and CCDC agreed to cooperate in the research and management of Karner blue butterfly habitat in management agreement areas.

### **Refuge Vision Statement**

*Great Bay National Wildlife Refuge (Great Bay Refuge, the refuge) will be a treasured cornerstone in protecting and restoring the Great Bay Estuary's unique and significant ecological and cultural resources, which are unparalleled in New England. The estuary's shallow tidal waters will teem with a rich diversity of aquatic resources, from oysters and eelgrass beds, to healthy populations of migratory fish. The refuge's oak-hickory forests, grasslands, shrublands, and freshwater ponds will support a bounty of wildlife throughout the year. During winter, bald eagles will thrill refuge visitors as they taunt the many and diverse flocks of waterfowl and waterbirds foraging and resting in its quiet, protected waters. In spring, the refuge's forests, fields, and wetlands will fill with a symphony of bird songs and frog calls. The summer will reward visitors with the opportunity to view native fledgling birds, fawns, and other young of the year. During the fall, the refuge will host hundreds of migrating species ranging from waterfowl, to songbirds, bats, and butterflies, all needing safe haven in an increasingly urbanized landscape.*

*Visitors from throughout New England will travel to Great Bay Refuge to become immersed in the sights and sounds of nature. The refuge will showcase innovative, science-based, adaptive management techniques and, coupled with exceptional outreach, education, and interpretive programs, help raise awareness and appreciation of the natural world and uphold the mission of the National Wildlife Refuge System. The refuge, in collaboration with partners, will work tirelessly to expand the protection and conservation of the Great Bay Estuary and its native habitats and wildlife for the benefit of the American people.*

*The Karner blue butterfly easement lands in Concord, New Hampshire, will contribute to the recovery of the federally endangered Karner blue butterfly. Each spring, the flowers of native lupine plants growing among pitch pine on the easement lands will attract thousands of adult Karner blue butterflies to feed on nectar. During the summer, an abundance of Karner blue caterpillars will feed on the lupine leaves. As part of an extraordinarily dedicated partnership, the easement is a key link in the network of lands in the Concord area managed to help reverse the butterfly's decline and bring the species back from the brink of extirpation.*

## Refuge Goals

The purpose of the CCP is to provide the refuge with a 15-year strategic management plan, consistent with Service policies and legal mandates that will achieve the following five refuge goals. These goals were developed after consideration of refuge purposes, the Service and Refuge System missions, our vision for the refuge, and the mandates, plans,



Greg Thompson/USFWS

*A view of the salt marsh looking toward Fabyan Point*

and conservation initiatives described above. These goals are intentionally broad, descriptive statements of purpose.

**Goal 1:** Perpetuate the biological integrity, diversity, and environmental health of estuarine and freshwater habitats on Great Bay Refuge to protect water quality and sustain native plant communities and wildlife, including species of conservation concern.

**Goal 2:** Perpetuate the biological integrity, diversity, and environmental health of upland and forested wetland habitats on Great Bay Refuge to sustain native plant communities and wildlife, including species of conservation concern.

**Goal 3:** Foster and maintain conservation, research, and management partnerships to promote protection and stewardship of the ecological resources of the Great Bay Estuary.

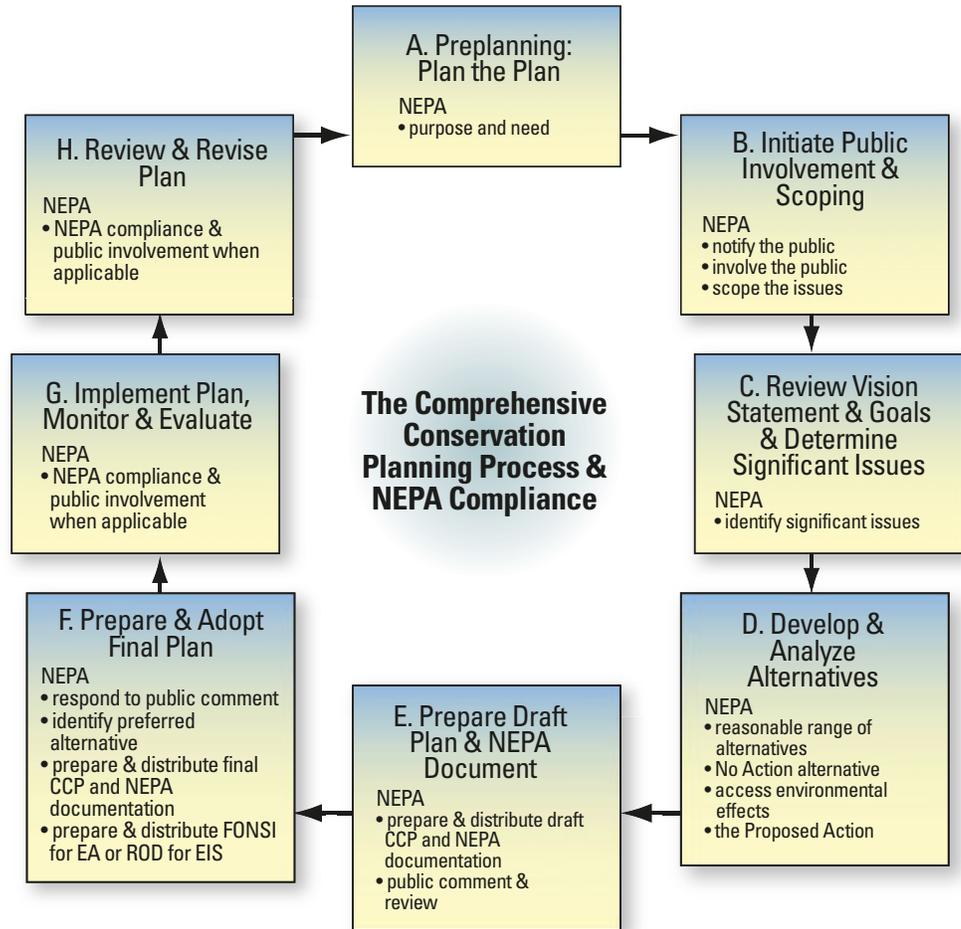
**Goal 4:** Promote enjoyment and awareness of Great Bay Refuge and Great Bay Estuary by providing high-quality, compatible wildlife-dependent public uses on refuge lands and on partner lands and waters around the refuge.

**Goal 5:** Contribute to the recovery of the federally listed endangered Karner blue butterfly and other rare Lepidoptera through the conservation, protection, and restoration of pine barrens habitat.

## The Comprehensive Conservation Planning Process

Service policy (602 FW 3) establishes a planning process that also complies with NEPA (figure 1.1). The full text of the policy and a detailed description of the planning steps can be viewed at: <http://policy.fws.gov/602fw3.html> (accessed May 2011). We followed the process depicted below in developing this draft CCP/EA. The planning process for the draft CCP/EA involved three primary steps: (1) initial planning, (2) public scoping, and (3) plan development. These steps are described below in more detail and depicted in figure 1.1.

Figure 1.1 The Service’s Comprehensive Conservation Planning Process



### Step A: Initial Planning

We began preparing a CCP for Great Bay Refuge in 2009. Initially, we focused on collecting information on the refuge’s natural and cultural resources and public use program. The CCP core team of refuge and regional office staff and two representatives from NHRG started meeting to discuss existing information, draft a vision statement, and prepare for the public scoping meeting and a technical meeting of State and Federal partners.

### Step B: Public Scoping

We held a public scoping meeting on June 18, 2009, at the Newington Town Hall. We announced the location, date, and time for this meeting in local newspapers and through special mailings. Twenty-two people attended the meeting, which was held to let people know what the Service was doing to manage Great Bay Refuge, and to elicit their input on topics of interest to them about the refuge.

In June 2009, we distributed a newsletter announcing the kick-off of the planning process. We followed that distribution late June with a mailing of issues workbooks. We distributed a workbook to everyone on our mailing list, to those who attended the public meeting, and to anyone who subsequently requested one. The purpose of the workbook was to collect ideas, concerns, and suggestions on important issues about refuge management. In the workbook, we asked the public to share what they valued most about the refuge, their vision for the future of Great Bay Refuge, and any other refuge issues they wanted to raise. Eleven copies of the workbooks were completed and returned, along with other written responses.

#### **Steps C and D: Vision, Goals, and Alternatives Development**

We held a meeting with 26 representatives of State and Federal partners on July 8, 2009, at the Great Bay Discovery Center in Stratham, New Hampshire. The purpose of the meeting was to identify issues, determine the significant resource values attributed to the refuge, and to seek advice from technical experts on what resources of conservation concern in the refuge planning area should be a management priority. We continued to consult with experts throughout 2009 and 2010, and to meet regularly as a core team, as we developed and refined our alternatives.

#### **Step E: Draft CCP and NEPA document**

This draft CCP/EA represents planning step E to prepare a draft plan and NEPA document. We will publish a Notice of Availability in the *Federal Register* announcing our release of this draft for a 30-day period of public review and comment. During that comment period, we will also hold a public meeting to obtain comments directly from individuals. We expect to receive comments by regular mail, e-mail, or at the public meeting. After the comment period ends, we will review and summarize all of the comments received, develop our responses, revise the CCP as warranted based on the comments, and publish the comments and our responses in an appendix to the final CCP.

#### **Step F: Adopt Final Plan**

Once we have prepared the final CCP, we will submit it to our Regional Director for approval. The Regional Director will determine whether it warrants a Finding of No Significant Impact (FONSI), and may find its analysis sufficient to simultaneously issue a decision adopting a CCP. If the Regional Director has concerns, we may be required to revise the EA or complete an environmental impact statement (EIS). We will announce the final decision by publishing Notice of Availability in the *Federal Register*, where we will also notify people of the availability of the final CCP. That will complete planning step F to prepare and adopt a final plan.

### **Issues, Concerns, and Opportunities**

We developed a list of key issues to address in the CCP from the responses to our issues workbook, public scoping meeting, technical meeting with partners, and planning team discussions. We define an issue as “any unsettled matter requiring a management decision.” This can be an “initiative, opportunity, resource management problem, threat to a resource, conflict in use, or a public concern.” One of the distinctions among the proposed management alternatives is how each addresses these key issues. The following summary provides a context for the issues that arose during the scoping process.

### **Habitat and Species Management**

The refuge was acquired in 1992, to conserve fish and wildlife and their habitats and to protect water quality. This is the foundation for what we do on the refuge. Despite its relatively small size at just over 1,100 acres, Great Bay Refuge is surprisingly diverse in its habitats and the species that it supports. The wide variety of habitats on the refuge is the result of human disturbances and past

land uses. The grasslands and impounded wetlands are examples of habitats that were created prior to Service ownership, and are now maintained to benefit wildlife. The refuge's shoreline along Great Bay Estuary is important in protecting water quality in the bay. The refuge's salt marsh and rocky shoreline, as well as adjacent intertidal areas, are critical to the health of the entire Great Bay Estuary.

We heard a range of opinions, particularly from our partners, on which habitat types we should emphasize and which Federal trust and State species of concern should be a management focus. Some of those habitats favored, in particular those for grassland and shrublands habitats, can be labor-intensive and expensive to maintain. Impounded wetlands can also require intensive management and maintenance. All habitat management decisions present tradeoffs between various suites of species that use different habitat types. Many people noted the potential role of the refuge in helping to restore oysters and eelgrass in the bay. The history of the refuge as a former Air Force base presents some species and habitat management considerations due to remaining military infrastructure and historic buildings and environmental contaminants. The alternatives in chapter 3 analyze different habitat management priorities.

The following key issues and concerns arose concerning habitat and species management:

- What is the appropriate contribution of the refuge to regional landscape habitat goals, including grassland and shrubland habitats?
- Which grassland and shrub habitat areas on the refuge should be maintained? How will we manage for them on the refuge?
- Which upland forest habitats and forest-dependent species should be management priorities? How will we manage for them on the refuge?
- How should we manage the former Weapons Storage Area, consistent with refuge goals and objectives?
- What role, if any, should the refuge have in restoring New England cottontail, a candidate for the Federal List of Threatened and Endangered Species?
- What is the refuge's role in restoring Karner blue butterflies to the Concord pine barrens?
- How will we balance the management of aquatic habitats for wetland-dependent birds, fisheries, and biological integrity?
- How will we manage the refuge's impoundments? Should we pursue restoration of wetland habitats through dam removal?
- How will we ensure the integrity of water quality to protect freshwater and saltwater-dependent species?
- What role should the refuge have in helping to restore oysters and eelgrass beds in Great Bay Estuary?
- How will the refuge manage exemplary natural communities and protect rare plant populations?

## **Invasive Species**

Invasive species are those that are nonnative (or alien) to the area and which cause, or are likely to cause, economic or environmental damage or harm to human health. Great Bay Refuge began a systematic inventory and mapping of invasive plant species in 2002. Much of the refuge has been mapped and 34 invasive species recorded. This is typical of southeastern New Hampshire, and especially on lands previously disturbed, like the refuge. Invasive plant species are a significant management challenge given that they occur in all habitats on the refuge. Invasive species control methods used on the refuge include hand pulling with weed wrenches, annual mowing, herbicides, and biological controls for purple loosestrife. In addition to invasive plants, the nonnative mute swan occurs in Great Bay waters, including the refuge. The Service has partnered with NHFG to control this species given its negative impact on native waterfowl and their habitats.

The following key issues and concerns arose concerning invasive species:

- Which invasive species should be a priority for control on refuge lands?
- How will we control specific invasive plant and animal species on refuge lands?

## **Environmental Contaminants**

As the site of a former Air Force base, the refuge still has potential contaminant issues. The adjacent Pease Airport presents additional challenges because runoff from the airport could flow onto the refuge. The airport authority is currently installing new de-icing pads not far from the refuge boundary. It is unclear what, if any, potential threat runoff from these pads might pose to refuge resources.

The following key issues and concerns arose concerning environmental contaminants:

- How will we address environmental contaminants resulting from past land uses and from offsite activities?
- How will we work with the Pease Airport Authority to protect water quality and address potential airport/wildlife conflicts?

## **Landscape-scale Conservation and Climate Change**

Historically, wildlife conservation efforts have tended to focus on single species or small suites of species. Given the changing landscape and climate, we need to manage and collaborate with partners beyond traditional boundaries. Some impacts—such as climate change, urbanization, resource extraction, and other economic and social pressures—occur at scales well beyond the boundaries of a single refuge and affect entire ecosystems, not just a few species. Landscape-level conservation involving multiple partners working together across large regions might be one of the most effective and important ways to help species of conservation concern and their habitats. Research collaboratives among multiple partners and at multiple scales can identify regional trends that would inform site specific management on the refuge. Almost all the respondents to the issues workbook supported a greater refuge role in protecting habitats outside the current refuge boundary. This included support for all methods of habitat conservation, including fee simple and conservation easement acquisition, supporting other conservation partners in their acquisitions, landowner education, and habitat restoration on private lands.

The following key issues and concerns arose concerning landscape-scale conservation and climate change:

- What role should the Service play in conserving lands and habitats in the Great Bay watershed and in the Concord pine barrens?

- How can the refuge work with partners to improve the water quality of the Great Bay Estuary?
- How can the refuge enhance its partnerships within the region to meet landscape-scale conservation concerns, such as climate change, invasive species, land development, and habitat fragmentation?
- What actions can the refuge take, in partnership with others, to minimize impacts from climate change?
- What role should the refuge play in regional research collaboratives that address management issues of concern to the Service?

### **Public Uses and Community Partnerships**

The Refuge Improvement Act identified wildlife observation and photography as two priority public uses for refuges, along with environmental education, interpretation, hunting, and fishing. In 2006, a regional visitor services team identified wildlife observation and photography as the areas of emphasis for Great Bay Refuge. We heard during public scoping that the primary reasons that many people visit the refuge are for wildlife and nature viewing, specifically for bird watching and hiking the nature trails. Many respondents also wanted to see more access and more trails on the refuge, but supported the primary roles of the refuge as conserving habitat and protecting water quality. Our partners recognize that not all priority public uses can be provided on the refuge, and that some of these activities are available on other lands in the Great Bay area that are open to the public.

The lack of staffing at the refuge has limited our ability to expand and monitor public uses on the refuge, and outreach to the community to offer environmental education and interpretive programs in collaboration with our community partners. Partnerships, including the existing core volunteer group, are essential to meeting the vision and goals of Great Bay Refuge. In 2008, volunteers contributed 2,500 to 3,000 hours to the refuge.

The following key issues and concerns arose concerning public uses and community relations:

- What are the appropriate types and levels of wildlife-dependent public uses on the refuge?
- How will we manage compatible, nonpriority public uses on the refuge?
- What staffing levels are needed to enhance onsite interpretation, environmental education, and outreach programs to reach a wider audience?
- What partnership opportunities exist to increase the number of environmental education, interpretation, and outreach programs?
- How will the refuge cultivate an informed and educated public to support the mission of the Service and the purposes for which the refuge was established?
- How will we build and maintain an active volunteer program?

### **Cultural Resources**

At least 22 archaeological or historical sites are present on Great Bay Refuge, including the remains of brick factories, ferry landings, and the foundations of buildings that were once part of local dairy operations. Two structures from the former Margeson Estate, the main house and a caretakers's residence, remain on the refuge and are located on Long Point Road in an area closed

to the public. Both structures are listed as part of a district nomination in the National Registry of Historic Places. As a Federal land management agency, we are responsible for locating and protecting cultural resources, including archaeological sites and historic structures. Balancing the protection of historic resources with the refuge's primary purposes of wildlife and habitat conservation is a management challenge.

The following key issues and concerns arose concerning cultural resources:

- How should we steward the historical structures on the refuge, including the Margeson Estate?
- What should we do with other remaining structures, including the bunkers and other infrastructure remaining from the former Air Force base?
- How will we preserve, protect, and interpret cultural resources on refuge lands?



Mao Teng Lin/USFWS

*The Margeson Estate main house at Great Bay National Wildlife Refuge*