

## Chapter 1

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*Umbagog Lake*

# The Purpose of and Need for Action

## Introduction

Umbagog National Wildlife Refuge (NWR; refuge) consists of 21,650 acres in Coos County, New Hampshire, and Oxford County, Maine. Established in 1992 with the first land purchase, its purposes are to provide long-term protection for unique wetlands, threatened or endangered species, migratory birds of conservation concern, and to sustain regionally significant concentrations of wildlife. Approximately half of the refuge consists of forested and non-forested wetland habitats and water, and half is forested upland habitat typical of the Northern Forest ecosystem.

This final Comprehensive Conservation Plan (CCP) was prepared pursuant to the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd et seq.). It is the culmination of a planning process that began in 2002. Meetings with the public, State agencies, commercial industry representatives, landowners, and conservation partners were held to identify and evaluate management alternatives. A draft and final CCP/Environmental Impact Statement (CCP/EIS) were previously distributed for public review and comment. These documents describe other management alternatives we considered for implementation.

This final CCP presents the combination of management goals, objectives, and strategies that we believe will best achieve our vision for the refuge, contribute to the National Wildlife Refuge System (Refuge System) mission, achieve refuge purposes, fulfill legal mandates, and serve the American public. The CCP will guide management decisions and actions on the refuge over the next 15 years. It will also be used as a tool to help the States of New Hampshire and Maine natural resource agencies, our conservation partners, Tribal governments, local communities, and the public understand our priorities.

Chapter 1 explains the purpose and need for preparing a CCP, and sets the stage for 4 subsequent chapters and 9 appendixes. 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 during plan development.

Chapter 2, “Planning Process,” describes the planning process we followed, including public and partner involvement, in the course of developing this plan.

Chapter 3, “Description of the Refuge Environment,” describes the physical, biological, and human environment of the refuge.

Chapter 4, “Management Direction,” presents the goals, objectives and strategies that will guide our management decisions and help set priorities over the next 15 years.

## The Purpose of and Need for Action

Chapter 5, “Consultation and Coordination with Others,” summarizes how we involved the public and our partners in the planning process. Their continued involvement is vital for the future management of the refuge.

Nine appendixes provide additional supporting documentation and references.

The purpose of a CCP is to define a set of actions that, in the Service’s best professional judgment, best achieves the purposes, goals, and vision of the refuge and contributes to the National Wildlife Refuge System’s mission, adheres to Service’s policies and other mandates, addresses identified issues of significance, and incorporates sound principles of fish and wildlife science.

Specifically, the CCP provides the refuge with strategic management direction for the next 15 years, by

- stating clearly the desired future conditions for refuge habitat, wildlife, visitor services, staffing, and facilities;
- explaining clearly to state agencies, refuge neighbors, visitors, and partners the reasons for management actions;
- ensuring that refuge management conforms to the policies and goals of the Refuge System and legal mandates;
- ensuring that present and future public uses are compatible with the purposes of the refuge;
- providing long-term continuity and direction in refuge management; and,
- justifying budget requests for staffing, operating and maintenance funds.

There are several reasons we identify a *need* for this CCP. First, the Refuge Improvement Act requires us to write a CCP for every national wildlife refuge to help fulfill the mission of the Refuge System.

Second, Umbagog Refuge lacked a master plan to accomplish the actions above, yet its environment has changed dramatically over the past decade. For example, the economy and land ownership patterns in local communities have changed; pressures for public access have continued to grow; and new ecosystem and species conservation plans bearing directly on refuge management have been developed.

Third, we have developed strong partnerships vital for our continued success, and we must convey our vision for the refuge to those partners and the public.

Fourth, we want to improve outreach and communications with our neighbors and the local community.

Fifth, we want to respond to public input regarding public uses programs and visitor facilities.

Finally, we need a CCP to guide us in conserving land to protect federal trust species in the Northern Forest. The refuge has acquired most of its land in the last 5 years.

All of these reasons clearly underscore the need for the strategic direction a CCP provides. Our planning process incorporated input from the natural resource agencies of New Hampshire and Maine, affected communities, individuals and organizations, our partners and the public.

## **Regional Context and Project Analysis Area**

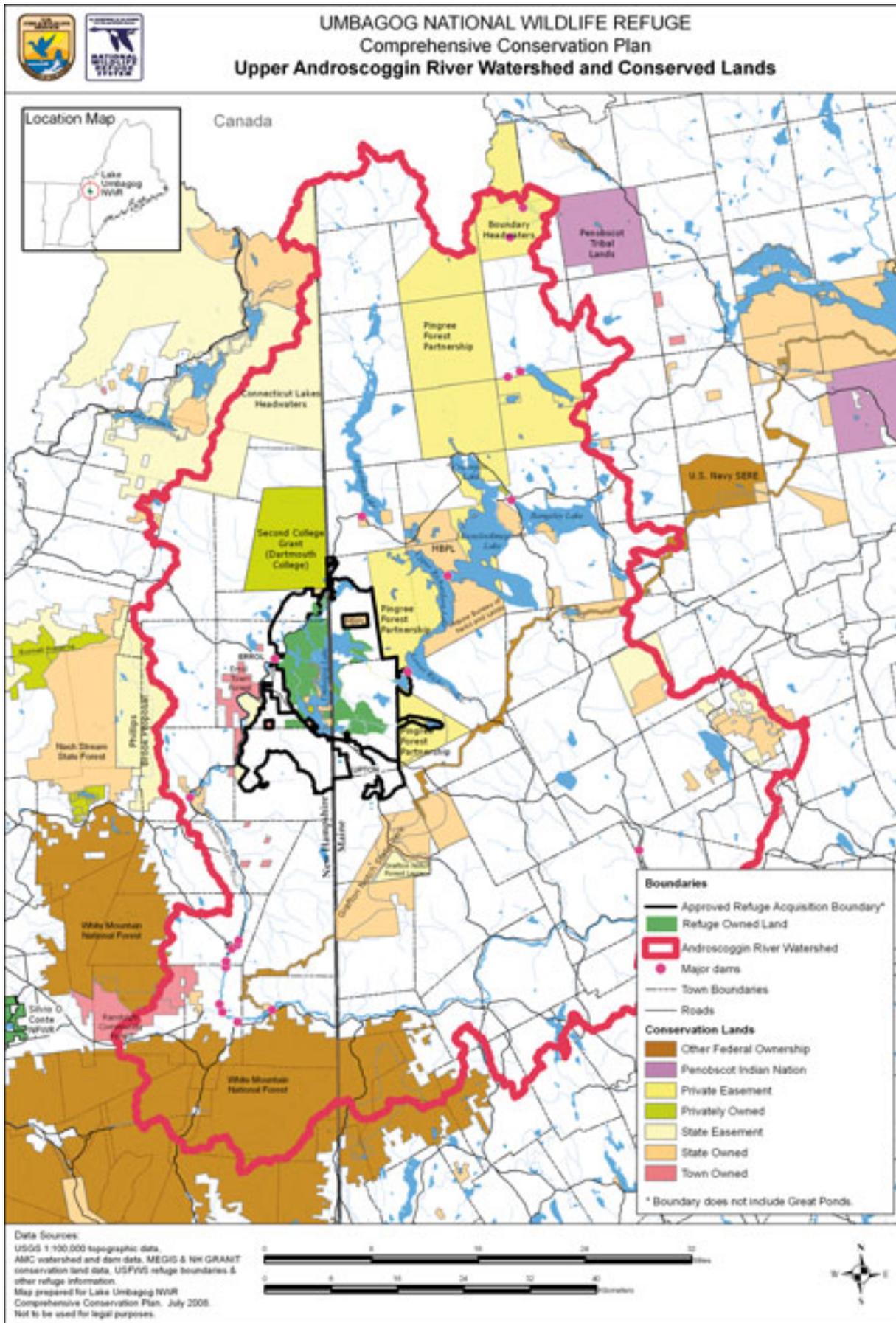
The regional context for the refuge is the Upper Androscoggin River watershed (map 1-1). We use the definition of the watershed developed by the Appalachian Mountain Club (AMC; Publicover and Weihrauch 2003). The AMC defines a larger watershed than does the U.S. Geological Survey (USGS). The AMC-defined watershed includes an area below Shelburne Dam draining south of the Mahoosuc Range and Elephant Mountain that shares many of the “north country” characteristics north of the Mahoosuc Range (Publicover and Weihrauch 2003).

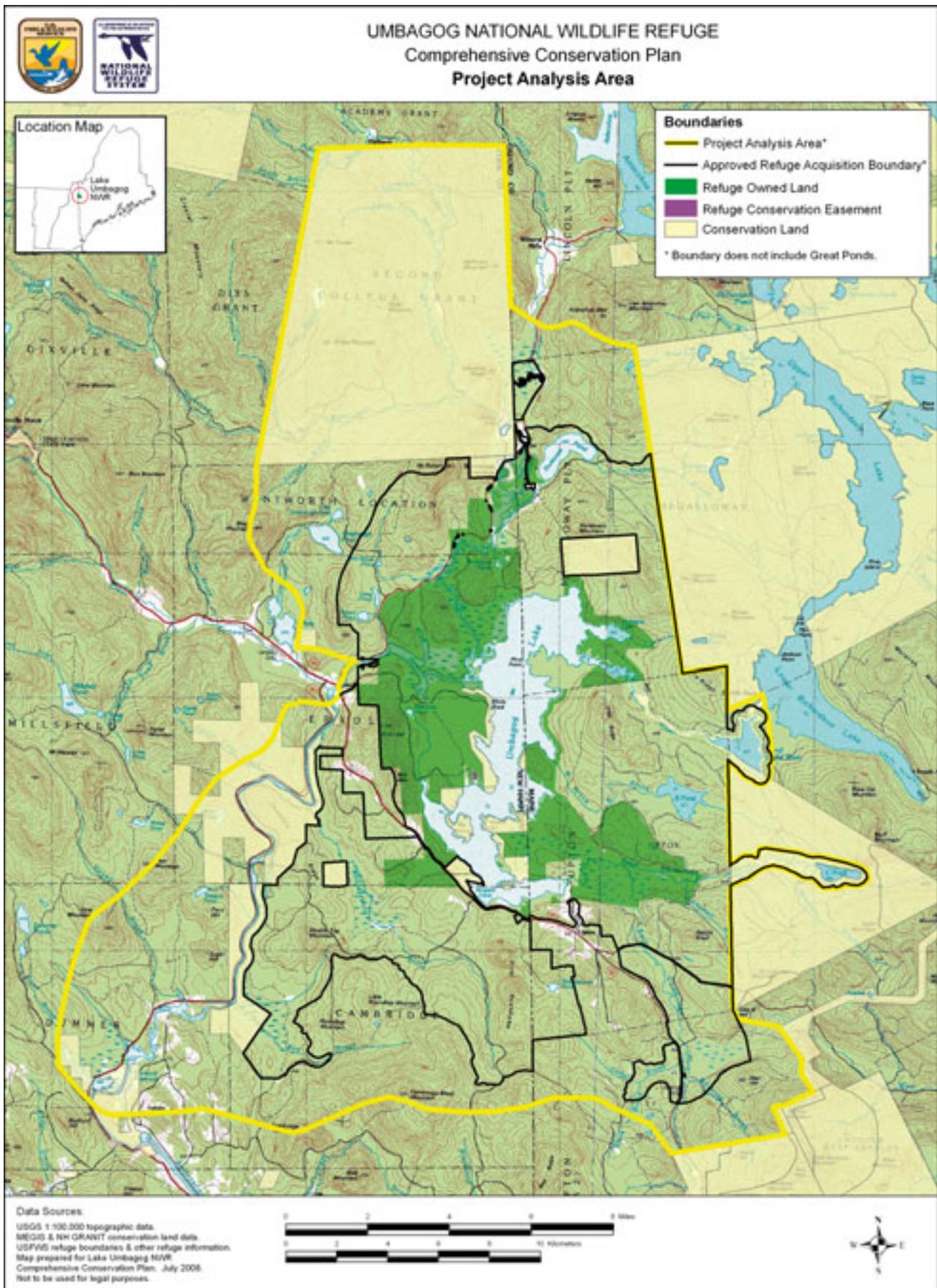
The watershed boundary on map 1-1 defines the socioeconomic and ecological context for evaluating the relationship of the refuge to regional resources of concern. The land ownership, land use or management patterns in that political, social, and ecological environment may affect our management of the refuge. Of particular note, map 1-1 also depicts the regional land conservation network in and around the watershed. More than a dozen partners cooperate in that network, of which the refuge lands form an integral part.

The watershed covers more than 2,300 square miles in northern New Hampshire and western Maine. At its northernmost point, it drains the south slopes of the mountains along the Canadian border. It includes all areas that drain into the Androscoggin River upstream of its confluence with the Web River in Dixfield, Maine. The Androscoggin River starts at the outlet of Umbagog Lake.

Forest covers most of the rugged mountains, steep slopes and narrow valleys in the watershed landscape. Human population densities there are relatively low; many of the northern reaches lack permanent populations. The AMC “Ecological Atlas of the Upper Androscoggin Watershed” (Publicover and Weihrauch 2003) provides more details on the land use history, land ownership patterns, natural history, habitat types, and conservation challenges in the watershed.

In cooperation with our state partners, we also developed a project analysis area within the watershed: an area of influence immediately around the refuge (map 1-2). Management or other activities in our project analysis area could directly affect refuge resources or influence our ability to achieve its purposes, vision, or goals. We did not distinguish among the types of private land ownership or land development within that boundary. It includes the incorporated towns of Errol, New Hampshire, and Magalloway and Upton, Maine; the unincorporated towns of Wentworth Location and Cambridge, New Hampshire; and, private land trusts, undeveloped lands owned by timber companies, and conservation lands owned by state or federal agencies.





## Refuge Establishment Purposes

The refuge was established in 1992 for the following purposes and under the following authorities:

“... 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 Resources Act of 1986, 16 U.S.C. 3901(b));

“... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (Migratory Bird Conservation Act, 16 U.S.C. 715d); “... for the development, advancement, management, conservation, and protection of fish and wildlife resources...” (Fish and Wildlife Act of 1956; 16 U.S.C. 742f(a) (4)); and

“... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude” (Fish and Wildlife Act; 16 U.S.C. 742f(b)(1)) .”

## The Service and the Refuge System Policies and Mandates Guiding CCP Development

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

The Service is part of the Department of the Interior. The Department’s 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.”*

Congress entrusts to the Service the conservation and protection of these national natural resources: migratory birds and fish, federal-listed endangered or threatened species, inter-jurisdictional fish, wetlands, certain marine mammals, and national wildlife refuges. We also enforce federal wildlife laws and international treaties on importing and exporting wildlife, assist states with their fish and wildlife programs, and help other countries develop conservation programs.

The Service manual, available online at <http://www.fws.gov/policy/manuals>, 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.access.gpo.gov/nara/cfr/index.html>).

### The National Wildlife Refuge System and its Mission and Policies

The Refuge System is the world’s largest collection of lands and waters set aside specifically for the conservation of wildlife and the protection of ecosystems. More than 545 national wildlife refuges encompass more than 95 million acres of lands and waters in all 50 states and several island territories. Each year, more than 40 million visitors hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretation on refuges.

In 1997, President William Jefferson Clinton signed into law the Refuge Improvement Act. That act establishes a unifying mission for the Refuge System.

*“The mission of the 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 act states that the Refuge System must focus on wildlife conservation as its highest priority. It also states that the mission of the Refuge System, coupled with the purposes for which each refuge was established, will provide the principal management direction on that refuge. In addition, it establishes a new process for determining the compatibility of public uses on refuges, and requires us to prepare a CCP for each refuge.

The Refuge System Manual contains policy governing the operation and management of the Refuge System that the Service Manual does not cover, including technical information on implementing refuge policies and guidelines on enforcing laws. You can review that manual at refuge headquarters. These are a few noteworthy policies instrumental in developing this CCP.

### **Policy on Refuge System Planning**

This policy (602 FW 1, 2, and 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 mandates.

That planning policy provides guidance, systematic direction, and minimum requirements for developing all CCPs, and provides a systematic decision-making process that fulfills those requirements. Among them, we are to review any existing special designation areas or the potential for such designations (e.g., wilderness and wild and scenic rivers); and, incorporate a summary of those reviews into each CCP (602 FW 3).

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

This policy provides guidance on maintaining or 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. It provides refuge managers with a process for evaluating the best management direction to prevent the additional degradation of environmental conditions and restore lost or severely degraded environmental components. It also provides guidelines for dealing with external threats

*Umbagog Lake in winter*



Marvin Moriarty/USFWS

to the biological integrity, diversity, and environmental health of a refuge and its ecosystem (601 FW 3).

### **Policy on 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 visitors can enjoy its lands and waters. This policy (603 FW 1) provides a national framework for determining appropriate refuge uses in an effort to prevent or eliminate those uses that should not occur in the Refuge System. It describes the initial decision process the refuge manager follows when first considering whether or not 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 Refuge 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 Refuge Improvement Act was signed into law.
- 3) The use involves the take of fish and wildlife under State regulations.
- 4) The use has been found to be appropriate after concluding a specified findings process using 10 criteria.

This policy can be viewed on-line at <http://www.fws.gov/policy/library/06-5645.pdf>.

### **Policy on Compatibility**

This policy (603 FW 2) complements the appropriateness policy. The refuge manager must first find a use is appropriate before undertaking a compatibility review of that use. If the proposed use is not appropriate, the refuge manager will not allow the use and will not prepare a compatibility determination.

This policy and its regulations, including a description of the process and requirements for conducting compatibility reviews, can be viewed on-line at <http://policy.fws.gov/library/00fr62483.pdf>. Our summary 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.
- 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.”
- The act defines six wildlife-dependent uses that are to receive our enhanced consideration on refuges: hunting, fishing, wildlife observation and photography, and environmental education and interpretation.
- The refuge manager may authorize those priority uses on a refuge when they are compatible and consistent with public safety.
- When the refuge manager publishes a compatibility determination, it will stipulate 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 any 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 (602 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.

## Other Mandates

Although Service and Refuge System policy and the purposes of each refuge provide the foundation for its management, other federal laws, executive orders, treaties, interstate compacts, and regulations on conserving and protecting natural resources also affect how we manage refuges. A centralized library of Service-wide policies, executive orders, director's orders, and the "Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service" can be viewed at <http://www.fws.gov/policy/>.

Of interest to readers may be the numerous Federal laws that direct the Service to identify, protect, and preserve its important cultural resources, including 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 for each refuge identify its archaeological and cultural values.

The National Historic Preservation Act (NHPA; Pub. L. 102-575; 16 U.S.C. 470) requires federal agencies to locate and protect historic resources—archaeological sites and historic structures eligible for listing or listed in the National Register of Historic Places and museum property—on their land or on land affected by their activities. It also requires agencies to establish a program for those activities and carry them out in consultation with State Historic Preservation Offices (SHPOs).

The NHPA also charges federal agencies with locating, evaluating, and nominating sites on their land to the National Register of Historic Places. We maintain an inventory of known archaeological sites and historic structures in the Northeast Regional Office and file copies of the sites at each refuge. Our regional historic preservation officer in Hadley, Massachusetts, oversees our compliance with the NHPA and our consultations with state SHPOs. We must also comply with the Archaeological Resources Protection Act (Pub. L. 96-95, 16 U.S.C. 470aa-mm). It requires that we protect our archaeological sites from vandalism or looting and issue permits for site excavation.

## Conservation Plans and Initiatives Guiding the Project

### Birds of Conservation Concern 2002 Report

The Service developed this report (USFWS 2002) in consultation with the leaders of ongoing bird conservation initiatives and partnerships such as Partners In Flight (PIF), the North American Waterfowl Management Plan (NAWMP) and its Joint Ventures, the North American Waterbird Conservation Plan (NAWCP), and the U.S. Shorebird Conservation Plan. The report fulfills the mandate of the 1988 amendment to the Fish and Wildlife Conservation Act (16 U.S.C. §§2901 et seq.) requiring the Secretary of the Interior, through the Service, to "identify species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973."

The 2002 report contains 45 lists that identify bird species of conservation concern at national, regional, and landscape scales. It includes a principal national

list, seven regional lists corresponding to the seven regional administrative units of the Service, and species lists for each of the 37 Bird Conservation Regions designated by the North American Bird Conservation Initiative (NABCI) in the United States. NABCI defined those Bird Conservation Regions (BCRs) as ecologically based units in a framework for planning, implementing, and evaluating bird conservation. The refuge lies in the Atlantic Northern Forest Bird Conservation Region (BCR 14; see additional discussion below).

Our agency's overarching goal in developing that report is to stimulate 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/reports/BCC02/BCC02.pdf>.

**North American Bird Conservation Initiative: Blueprint for the Design and Delivery of Bird Conservation in the Atlantic Northern Forest—Bird Conservation Region 14 (2005)**

The Atlantic Coast Joint Venture partnership created this blueprint in response to the NABCI challenge of building on existing partnerships to plan, implement, and evaluate cooperative bird conservation across North America. You may read the entire text of this document, "Blueprint for the Design and Delivery of Bird Conservation in the Atlantic Northern Forest," online at [http://www.acjv.org/documents/bcr14\\_blueprint.pdf](http://www.acjv.org/documents/bcr14_blueprint.pdf). It presents a strategic design of the key components that this BCR initiative will need to implement to maintain healthy populations of birds native to the Atlantic Northern Forest BCR, more commonly referred to as BCR 14. Specifically, it establishes a series of goals for moving BCR 14 toward a vision of sustained bird populations; it presents the biological foundation for its recommendation; and, it lays out a framework for implementing and evaluating them (Dettmers 2004).

The BCR 14 blueprint identifies 53 bird species designated "highest" or "high" conservation priority in the region, and 15 habitat types important for supporting one or more of those priority bird species during at least one of their life stages. Those habitats either need critical conservation attention, or are crucial in long-term planning to conserve continentally and regionally important bird populations. Of the 53 highest and high-priority birds, 21 breed on the refuge, and several others migrate through. The refuge supports 9 of the 15 priority habitat types. We considered each of those species and habitats in writing CCP appendix B, "Species and Habitats of Conservation Concern," and in developing our habitat goals, objectives, and strategies. Some examples of priority species, ranked highest, high, or moderate, in the BCR14 plan for different habitat types which are known to occur on the refuge include:

- *Mixed forest*: Canada warbler, wood thrush (highest); black-throated blue warbler (high); blackburnian warbler, black-throated green warbler (moderate)
- *Coniferous forest*: Bay-breasted warbler, Canada warbler (highest), boreal chickadee (high), black-backed woodpecker (moderate)
- *Deciduous and Mixed Forest*: Canada warbler, wood thrush (highest); black-throated blue warbler (high); ovenbird (moderate)
- *Shrub-scrub*: Canada warbler, American woodcock (highest), rusty blackbird (high), palm warbler, yellow-bellied flycatcher (moderate)
- *Forested wetland*: American black duck (highest), common goldeneye, rusty blackbird (high); wood duck (moderate)
- *Palustrine emergent marsh*: American black duck (highest); northern harrier, Wilson's snipe, American bittern (moderate)
- *Freshwater lakes, rivers, and streams*: American black duck (highest), common goldeneye (high); wood duck, bald eagle (moderate)

**Partners in Flight Bird Conservation Plans**

In 1990, PIF began as a voluntary, international coalition of government agencies, conservation organizations, academic institutions, private industries, and citizens dedicated to reversing the population declines of bird species and “keeping common birds common.” The foundation of its long-term strategy is a series of scientifically based bird conservation plans using physiographic areas as planning units.

The goal of each PIF plan is to ensure the long-term maintenance of healthy populations of native birds, primarily non-game birds. The plan for each physiographic area ranks bird species according to their conservation priority, describes their desired habitat conditions, develops biological objectives, and recommends conservation measures. The priority ranking factors in habitat loss, population trends, and the vulnerability of a species and its habitats to regional and local threats.

Our project area lies in Physiographic Area 28, The Eastern Spruce-Hardwood Forest. The PIF Plan for Physiographic Area 28 represents a bird conservation plan for the subsection of Bird Conservation Region 14 in which the refuge is located.

In developing our CCP habitat goals and objectives, we referred to its draft plan, now online at [http://www.blm.gov/wildlife/plan/pl\\_28\\_10.pdf](http://www.blm.gov/wildlife/plan/pl_28_10.pdf).

The plan (Rosenberg and Hodgman 2000) includes objectives for the following habitat types and associated species of conservation concern on the refuge:

- *Northern hardwood and mixed forest*: Canada and black-throated blue warbler, wood thrush, and veery;
- *Mature conifer (spruce-fir) forest*: bay-breasted, Cape May and blackburnian warbler, spruce grouse, and red crossbill;
- *Boreal peatland*: spruce grouse and olive-sided flycatcher;
- *Early successional forest/edge*: American woodcock and olive-sided flycatcher; and,
- *Freshwater wetland/rivers/lakes*: American black duck

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

*American black duck in flight*



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Originally written in 1986, the NAWMP Plan describes a 15-year strategy for the United States, Canada, and Mexico to restore and sustain waterfowl populations by protecting, restoring and enhancing habitat. The plan committee, including representatives from Canada, the United States, and Mexico, has modified the 1986 plan twice to account for biological, sociological, and economic changes that influenced the status of waterfowl and the conduct of cooperative habitat conservation. The most recent modification in 2004 updates the latest needs, priorities, and strategies for the next 15 years, and guides partners in strengthening the biological foundation of North American waterfowl conservation and stakeholder confidence in the direction of the plan. You may review it online at <http://www.fws.gov/birdhabitat/NAWMP/images/implementationframework.pdf>.

To convey goals, priorities, and strategies more effectively, that 2004 modification comprises two separate documents: Strategic Guidance and Implementation Framework. The former document is for agency administrators and policy makers who set the direction and priorities for conservation. The latter document includes technical information for use by biologists and land managers.

The plans are implemented at the regional level in 14 habitat Joint Ventures and 3 species Joint Ventures: Arctic Goose, Black Duck, and Sea Duck. Our project area lies in the Atlantic Coast Joint Venture, which includes all the Atlantic Flyway states from Maine to Florida and Puerto Rico. The part of the refuge in Maine lies in the “Inland Wetlands” focus area; the part in New Hampshire lies in the “Lake Umbagog Focus Area,” an indication of the importance of the refuge. You may view a map of focus areas for New Hampshire and Maine online at <http://www.acjv.org/>.

The waterfowl goal for the Atlantic Coast Joint Venture is, “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.”

The Black Duck Joint Venture plan also relates to our project. Black ducks use the refuge during their breeding season and fall migration. The Black Duck Joint Venture Plan-Final Draft Strategic Plan (USFWS/CWS 1993) resides online at <http://www.pwrc.usgs.gov/bdjv/>. We used both plans in developing waterfowl objectives and strategies in CCP goals 1 and 2.

This plan (Kushlan et al. 2002) is an independent partnership among individuals and institutions interested in, or responsible for, conserving water birds and their habitats. The plan is just one element of a multi-faceted conservation program. The primary goal of the plan is to ensure that the distribution, diversity, and abundance of populations and habitats of breeding, migratory, and non-breeding water birds are sustained or restored throughout the lands and waters of North America, Central America, and the Caribbean. It provides a framework for conserving and managing colonially nesting water-dependent birds. In addition, it will facilitate continent-wide planning and monitoring, national, state, and provincial conservation, regional coordination, and local habitat protection and management.

A Mid-Atlantic/New England/Maritimes Regional Working Group has been established. It is a regional partnership of organizations and individuals working to facilitate waterbird conservation in this region. Their overarching goal is to help local resource managers within the region protect waterbirds and their habitats. This will be accomplished by facilitating the development and distribution of information on the status and conservation needs of waterbirds and habitats, and by building partnerships between wildlife managers, scientists, conservationists and supporters.

You can access the continental plan online at <http://www.nawcp.org/pubs/ContinentalPlan.cfm>. You can access information on Mid-Atlantic/New England/Maritimes Regional planning online at <http://www.fws.gov/birds/waterbirds/MANEM/>. We used information from both those sources in developing waterfowl objectives and strategies for CCP goals 1 and 2.

### **U.S. Shorebird (2001, 2<sup>nd</sup> ed.) and North Atlantic Regional Shorebird Plans**

Concerns about shorebirds led to the creation of the U.S. Shorebird Conservation Plan in 2000. Brown, et al. published a second edition in May 2001. Developed under a partnership of individuals and organizations throughout the United States, the plan develops conservation goals for each U.S. region, identifies important habitat conservation and research needs, and proposes education and outreach programs to increase public awareness of shorebirds and of threats to them.

In the Northeast, the North Atlantic Regional Shorebird Plan was also drafted to step down the goals of the continental plan to smaller scales to identify priority species and habitat and species goals, and prioritize implementation projects. You may read the U.S. Shorebird Plan online at <http://www.fws.gov/shorebirdplan/USShorebird/downloads/USShorebirdPlan2Ed.pdf>

The North Atlantic Regional Shorebird Plan appears online at <http://www.fws.gov/shorebirdplan/RegionalShorebird/RegionalPlans.htm>. We used both plans in developing our objectives and strategies for goals 1 and 2.

**National Bald Eagle Management Guidelines (May 2007)**

In July 2007, the Service issued a final ruling to remove the bald eagle from the federal list of endangered and threatened species. The bald eagle remains under the protection of the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). The Service developed 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. The guidelines help minimize impacts on bald eagles, particularly where people may constitute a “disturbance,” which the Eagle Act prohibits. The guidelines (1) publicize the provisions of the Eagle Act that continue to protect bald eagles, to reduce the possibility that people will violate the law, (2) advise landowners, land managers and the 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 Service intended the guidelines to be used primarily as a tool for landowners and planners who seek information and recommendations on how to avoid disturbing bald eagles. You may view the guidelines at <http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>.

**Partners in Amphibian and Reptile Conservation, National State Agency Herpetological Conservation Report (Draft 2004)**

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, the power industry, universities, herpetological organizations, research laboratories, forest industries and environmental consultants. Its five geographic regions—Northeast, Southeast, Midwest, Southwest and Northwest—focus on national and regional herpetofaunal conservation challenges. Regional working groups allow for region-specific communication.

The National State Agency Herpetological Conservation Report (NHCR), 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 herpetofaunal conservation. The purpose is to facilitate communication among state agencies and partner organizations throughout the PARC network to identify and address regional and national herpetological priorities.

PARC intends to expand the scope of the NHCR to include other states, provinces, and territories. It will also include other state agencies that are supporting herpetofaunal conservation and research, such as transportation departments, park departments, and forest agencies. The states of New Hampshire and Maine have completed reports included in the NHCR online at <http://www.parcplace.org/documents/PARCNationalStates2004.pdf>. The next NHCR will also integrate the list of species of conservation concern into each state’s comprehensive wildlife conservation strategy (see below). We used the latest draft NHCR plan in developing objectives and strategies for CCP goals 1, 2, and 3, and in developing CCP appendix B, “Species and Habitats of Conservation Concern.”

**Eastern Brook Trout Joint Venture**

In 2004, in recognition of the need to address regional and range-wide threats to brook trout, a group of public and private entities formed the Eastern Brook Trout Joint Venture (EBTJV) with a mission to halt the decline of brook trout and restore fishable populations. Its unique partnership has grown and now

Brook trout



Duane Raver/USFWS

includes state and federal agencies, regional and local governments, businesses, conservation organizations, academia, scientific societies, and private citizens. It is the nation's first pilot project under the *National Fish and Wildlife Initiative*, and is a geographically focused, locally driven, and scientifically-based effort to protect, restore and enhance aquatic habitat throughout the range of the Eastern brook trout. The EBTJV has been modeled after the joint ventures aligned with the North American Waterfowl Management Plan.

The EBTJV is developing a draft Conservation Strategy that identifies current threats to Eastern brook trout, proposes a general strategy to deal with these threats, and outlines potential corrective measures. One important technical report is "Distribution, Status and Perturbations to Brook Trout within the Eastern United States." It will categorize a variety of threats to brook trout and their habitat and helps to identify restoration and protection priorities. This and other products will then be used to formulate operational plans to begin implementation of high priority programs. More information is available online at <http://www.fishhabitat.org>.

Native brook trout occur in our project area and we have identified them as a species of conservation concern in CCP appendix B. Sub-watersheds in our project area represent most of the intact brook trout habitat remaining outside of Maine. Maine is considered the last true stronghold for brook trout in the eastern U.S. We will continue to consult with Service and state fisheries biologists involved in the development of the EBTJV Conservation Strategy to assist us in developing and implementing objectives and strategies related to brook trout and other associated aquatic resources.

**New Hampshire Fish and Game Department, Wildlife Action Plan (WAP 2005), and State of Maine Comprehensive Conservation Strategy**

In 2002, Congress created the State Wildlife Grant Program (SWG), and appropriated \$80 million for 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 states according to a formula that takes into account their size and population.

To be eligible for additional federal grants and satisfy the requirements for participating in the SWG program, each state and U.S. territory must develop a statewide "Comprehensive Wildlife Conservation Strategy" and submit it to the National Advisory Acceptance Team by October 1, 2005. Each plan must address eight required elements, identify and focus on "species of greatest conservation need," yet address the "full array of wildlife" and wildlife-related issues, and "keep common species common."

The New Hampshire and Maine plans (NHFG 2005; MDIFW 2005) resulted from that charge. The goal of each plan is to create a vision for conserving that state's wildlife and stimulate other states, federal agencies, and conservation partners to think strategically about their individual and coordinated roles in prioritizing conservation.

In addressing the eight elements below, those two plans supplement and validate the information on species and habitat and their distribution in our analysis area, and help us identify conservation threats and management strategies for species and habitats of conservation concern in the CCP. The expertise that convened to compile those plans and their partner and public involvement further enhance their benefits for us. We used them in developing objectives and strategies for CCP goals 1, 2, and 3, and in developing CCP appendix B, "Species and Habitats of Conservation Concern." These are the eight elements.

- 1) Information on the distribution and abundance of species of wildlife, including low and declining populations, as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the state's wildlife.
- 2) Descriptions of locations and relative condition of key habitats and community types essential to the conservation of species identified in element 1.
- 3) Descriptions of problems that may adversely affect species identified in element 1 or their habitats, and priority research and survey efforts needed to identify factors that may assist in restoration and improved conservation of these species and habitats.
- 4) Descriptions of conservation actions necessary to conserve the identified species and habitats and priorities for implementing such actions.
- 5) Plans proposed for monitoring species identified in element 1 and their habitats, for monitoring the effectiveness of the conservation actions proposed in element 4, and for adapting those conservation actions to respond appropriately to new information or changing conditions.
- 6) Description of procedures to review the plan at intervals not to exceed 10 years.
- 7) Plans for coordinating, to the extent feasible, the development, implementation, review, and revision of the plan strategy with federal, state, and local agencies and Native American tribes that manage significant areas of land and water within the state, or administer programs that significantly affect the conservation of identified species and habitats.
- 8) Plans for involving the public in the development and implementation of plan strategies.

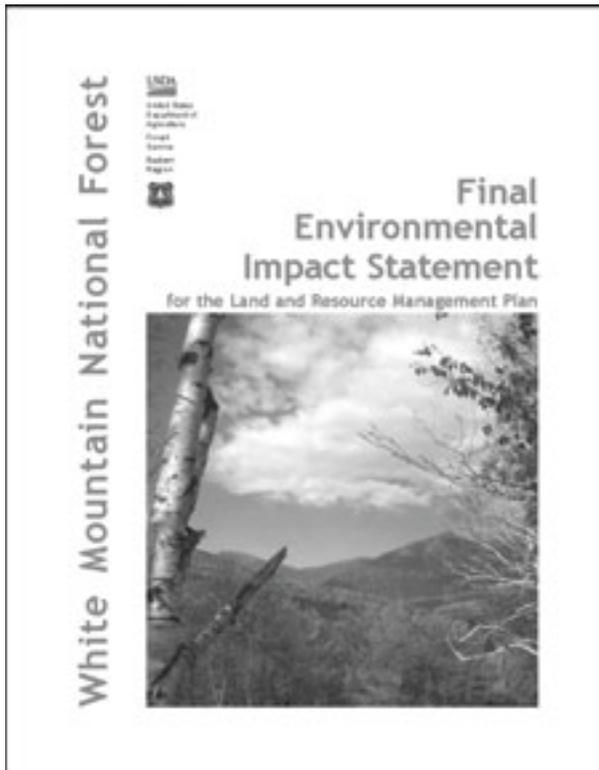
**Other Regional Information Sources**

We also consulted the plans and resources below as we refined our CCP management objectives and strategies, especially those with a local context.

- *Finding Common Ground: Conserving the Northern Forest*. 1994. Northern Forest Lands Council, Concord, New Hampshire; copy available at refuge headquarters.

- The Northern Forest Lands Study of New England and New York: A report to the Congress of the United States on the recent changes in landownership and land use in the Northern Forest of Maine, New Hampshire, New York, and Vermont. Governors' Task Force on Northern Forest Lands. 1990. USDA Forest Service, Rutland, Vermont; copy available at refuge headquarters.
- 10th Anniversary Forum, Final Report: Recommendations for the Conservation of the Northern Forest. 2005. Northern Forest Lands Council, Concord, New Hampshire; copy available at refuge headquarters
- Maine State Forest and Conserved Lands plans for Dodge Point, Richardson Lakes, and Days Academy and Sugar Island (Public Reserved Lands) and Kineo and Farm Island (State Park Lands); copy available at refuge headquarters.
- New Hampshire State-wide Comprehensive Outdoor Recreation Plan (SCORP); available online at <http://www.nh.gov/oep/programs/SCORP/documents/scorpsummaryreport.pdf>.
- Maine State-wide Comprehensive Outdoor Recreation Plan; available online at <http://www.state.me.us/doc/parks/programs/SCORP/index.html>.
- Connecticut Lakes Headwaters Plan; available online at <http://www.nhstateparks.org/ParksPages/CLHWF/CLHWFinterminPlan.html>.
- New Hampshire Forest Resources Plan; available online at <http://www.ceinfo.unh.edu/Pubs/ForPubs/NHFRP01.pdf>.

One source used  
for regional information



- White Mountain National Forest Plan; available online at [http://www.fs.fed.us/r9/forests/white\\_mountain/projects/forest\\_plan/](http://www.fs.fed.us/r9/forests/white_mountain/projects/forest_plan/).
- Society for the Protection of NH Forests, New Hampshire's Changing Landscape, 2005; available online at <http://www.spnhf.org/research/research-projects.asp#nhcl>.
- New England Forestry Foundation Plan; available online at <http://www.newenglandforestry.org/forestry/rfmp.asp>.
- Northern Forest Canoe Trail plan; available online at <http://www.northernforestcanoetrail.org/>.
- Appalachian Trail, National Park Service, Strategic Plan and other resources; available online at <http://data2.itc.nps.gov/parks/appa/ppdocuments/05Strategic%20Plan.doc>.
- GORP Adventure Travel and Outdoor Recreation with information Appalachian trail; available online at [http://gorp.away.com/gorp/resource/us\\_trail/guid\\_app.htm](http://gorp.away.com/gorp/resource/us_trail/guid_app.htm).
- Rangeley Lakes Heritage Trust; available online at <http://www.rlht.org/index.shtml>.

## Refuge Land Acquisition History

The Service established the refuge with its first land purchase in 1992. Map 1-3 depicts the current refuge boundary. Table 1.1 summarizes the land acquisition history of the refuge.

**Table 1.1. Land acquisition history of Umbagog refuge (\*as of January 1, 2008)**

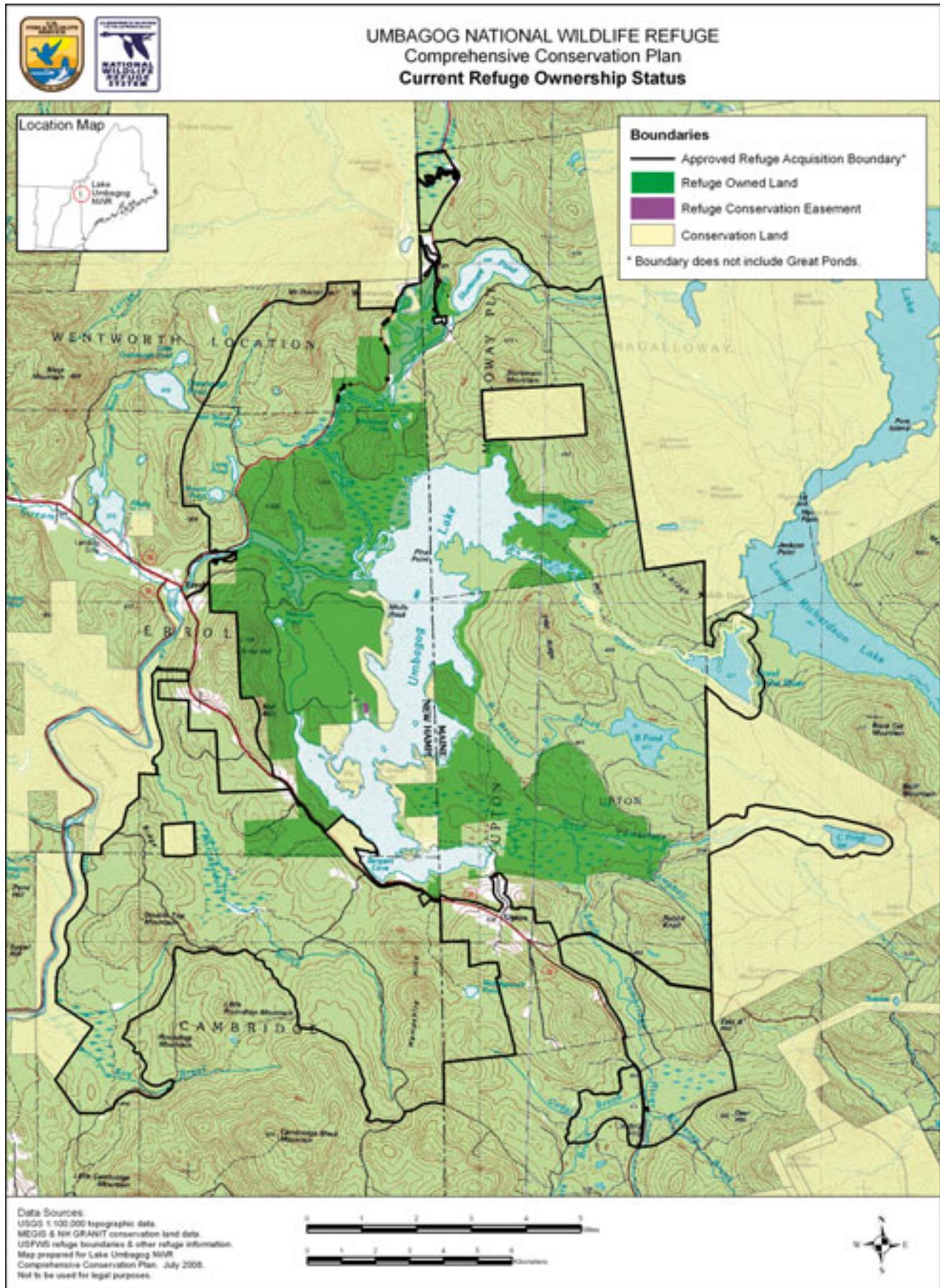
Calendar Year	Acres*	Funding Source#
1992	128	LWCF
1993	41	LWCF
1995	5,986	LWCF, MBCF
1996	203	LWCF
1998	214	MBCF
1999	2,488	LWCF, MBCF
2000	1,309	LWCF, MBCF
2001	8,847	LWCF, MBCF
2002	191	LWCF
2003	1	LWCF
2004	8	LWCF
2005	1,097	LWCF, MBCF
2006	406	MBCF
2007	727	MBCF
<b>Total All</b>	<b>21,650</b>	

*Table Notes*

\* *The Service owns all acreage in full fee simple, except for a conservation easement on 6.01 acres. Acreage is approximate, as numbers are rounded up and it derives from these three sources of varying accuracy: (1) land deeds (2) surveys or (3) GIS digitizing. For ease of presentation, the maps throughout this document do not show Service ownership of the lake bottom, or the road easements outside the approved refuge boundary. However, all summaries of refuge acres, including table 1.1, include that ownership. This acreage is current as of January 1, 2008*

*#LWCF—Land and Water Conservation Fund.—funding sources include revenues from the sale of surplus federal real property, motorboat fuel taxes, fees for recreation on federal lands, and receipts from mineral leases on the outer continental shelf.*

*#MBCF—Migratory Bird Conservation Fund.—the funding source is receipts from the sale of Federal Migratory Bird Hunting and Conservation Stamps.*



## Refuge Administration

The refuge now has four full-time permanent staff positions: refuge manager, deputy refuge manager, refuge wildlife biologist, and maintenance worker. In addition, the refuge shares a full-time law enforcement officer with the Silvio O. Conte Refuge. Seasonal staff positions will vary between one and ten each year. The Youth Conservation Corps (YCC) program adds an adult crew leader and up to five youths each summer.

## Refuge Vision Statement

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

*“We envision Umbagog National Wildlife Refuge as an essential link in the network of conservation lands in the Northern Forests. We will showcase science-based, adaptive management in a working forest landscape and provide an outstanding center for research. We will achieve this through strong partnerships with State agencies, conservation organizations, land managers, and neighboring communities.*

*“Our management will perpetuate the diversity and integrity of upland spruce-fir and northern hardwood forests, boreal and riverine wetlands, and lake habitats for the continued health of native fish and wildlife populations. These habitats will provide an important regional breeding area for migratory land birds, waterfowl, and other species of regional significance, such as the common loon and bald eagle.*

*“Visitors of all ages will feel welcome to enjoy the full complement of priority wildlife-dependent public uses. We will foster their knowledge of and support for conserving northern forest habitats through exceptional outreach and visitor programs. We want all our visitors to return home filled with enthusiasm for promoting and practicing resource stewardship in their own communities.*

*“We hope residents of neighboring communities in Maine and New Hampshire will value the refuge for enhancing their quality of life. Within the National Wildlife Refuge System, the refuge will be treasured for conserving Federal trust resources and providing inspirational outdoor experiences for present and future generations of Americans.”*

## Refuge Goals

We developed the following goals after considering that vision, the purposes of the refuge, the missions of the Service and the Refuge System, and the mandates, plans, and conservation initiatives above. These goals are intentionally broad, descriptive statements of purpose. They highlight elements of our vision for the refuge we will emphasize in its future management. The biological goals take precedence; but otherwise, we do not present them in any particular order. Each goal discussion below offers background information on its importance.

### GOAL 1:

**Manage open water and wetland habitats to benefit Federal trust species and other species of conservation concern.**

#### Background

A rich variety of wetland communities on the refuge supports an array of habitats benefiting widely diverse species of animals and plants. The Magalloway River, Whaleback Ponds, Greater Floating Island, Mountain Pond, Tidswell Point, and Dead Cambridge areas all contain extensive wetlands, some with such rare species as heart-leaved twayblade or bog sedge. Rapp (2003) documented an unusual occurrence of a circumneutral fen at Tidswell Point. The refuge peatlands are among the largest and most diverse in the state (Sperduto et al. 2000).

The Service, other federal and state agencies, conservation organizations, sporting groups, and local residents recognize the importance of those unique wetland and wildlife resources. Protecting the lake and its associated rivers and wetlands was a principal reason for establishing the refuge. Those habitats support threatened and endangered species, waterfowl and other migratory species of federal and state concern and populations of mammals, reptiles, amphibians and fish and rare plants. As we mentioned above, New Hampshire lists the refuge as a priority for protection under the NAWMP, as does the Emergency Wetlands Resources Act of 1986 (USFWS 1991).

The refuge is unique in the region for its diversity of breeding waterfowl. Its marshes and backwaters, forested and shrub wetlands and adjacent forested and cut-over uplands provide important nesting and brood-rearing habitat for such waterfowl as black duck, ring-necked duck, and cavity-nesters, including common goldeneye, wood duck, common merganser, and hooded merganser. Blue-winged teal, green-winged teal and mallard also nest in the area.

Lake levels on Umbagog Lake are managed by the operator of a dam at the outlet of the lake in accordance with a license issued by the Federal Energy Regulatory Commission (FERC). The current license issued by FERC is for the Errol Project (FERC no. 3133). It was issued in 1983 for a 40-year term, and both it and this CCP will therefore expire in 2023. The license is currently held by Florida Power and Light Energy Maine (FPLE). The current license requires that the licensee "...conduct a study to determine the reservoir surface elevation and time of year at which stable waters levels should be maintained for the protection of nesting wildlife at Lake Umbagog." The licensee is further required to "... develop a plan to regulate the level of Lake Umbagog for the benefit of wildlife species and the water users downstream of the Errol Project." In the past, this has meant limiting water level fluctuations during the loon nesting season in June and July. Wetlands management by the refuge must therefore recognize that water level fluctuations are neither entirely natural nor directly controlled by the refuge. The FERC license and related issues are further discussed in chapter 2.

**GOAL 2:**

**Manage floodplain and lakeshore forests to benefit Federal trust species and other species of conservation concern.**

**Background**

The refuge floodplain and lakeshore forests lie next to water bodies and non-forested wetlands, and typically have high species richness with dynamic and complex biophysical processes. These habitats are important for many wildlife species of concern, including nesting and foraging waterfowl, bald eagles, ospreys, and many migratory songbirds. They provide important structural components, including large nest trees for eagles and ospreys and cavity trees for nesting common goldeneye, wood duck, and certain songbirds. These habitats also help control erosion and sediment loading into the lake and its tributaries. Without forested shorelines, stream banks in this area are more susceptible to erosion. The New Hampshire Natural Heritage Bureau (NHNHB) has defined an area along the Magalloway River as a rare type of silver maple floodplain forest community of conservation concern.

Most of the vernal pools on the refuge are embedded in floodplain forested habitats. A vernal pool is a small body of water that lacks a permanent, aboveground outlet. In the Northeast, snowmelt and spring and autumn rains fill vernal pools. They typically dry by mid-to-late summer, or earlier in years of drought. How long water stays in a vernal pool is its hydroperiod, which varies depending on the pool and the year. Maintaining vernal pools with a range of



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*Purple-fringed orchid*



© Robert Quinn

*Black-backed woodpecker*

hydroperiods is important in sustaining vernal pool biodiversity. Because of that periodic drying, vernal pools do not support breeding populations of fish. The vernal pools on the refuge contribute to its native biodiversity by providing essential habitat for several obligate amphibian species, including blue-spotted salamander, spotted salamander and wood frog.

The restoration of developed floodplain and lakeshore riparian areas involves removing cabins and other structures, purchased from willing sellers, as funding and staffing allows. In 1996, the refuge acquired active cabin leases on lakeshore and floodplain land purchased from the James River, Boise Cascade, and Mead Paper companies. These acquired leases include stipulations to allow their continued use, but requires there be minimal impacts on resources. All leases expire at 50 years.

### GOAL 3:

#### **Manage upland forest habitats, consistent with site capabilities, to benefit Federal trust species and other species of conservation concern.**

##### **Background**

Forests cover 90 percent of the Upper Androscoggin River watershed. The dominant tree species include red spruce, balsam fir, sugar maple, red maple, yellow birch, and white birch. At the landscape level, the matrix forest is a mixed spruce-fir/northern hardwoods forest; although embedded in that matrix, three broad vegetation types are found in varying amounts: spruce-fir, mixed softwoods-hardwoods, and northern hardwoods. The spruce-fir type is dominated by at least 75 percent red spruce and/or balsam fir at higher elevations, above 2700 ft., on thin, rocky soils at mid-elevations and on nutrient-poor soils in valley bottoms. The mixed hardwood-softwood forest type includes varying amounts of the major tree species in the region, depending on site conditions (Publicover and Weihrauch 2003). Bill Leak, a forester with the U.S Forest Service's Northeast Forest Experiment Station, considers a stand with 25 percent to 65 percent softwood a "mixed wood" stand (Leak, personal communication, 2004). White pine, hemlock, white spruce, northern white cedar, tamarack, black spruce, yellow and white birch, and red maple are also present in varying amounts. The northern hardwoods type is a mixture of at least 75 percent sugar maple, yellow birch, and beech on fine-textured soils at lower and mid-slopes.

Forest ecologists believe that the forest in the Upper Androscoggin River watershed of 150 years ago was also a mixed forest matrix; however, it supported more softwoods than we see on the landscape today (Kuchler 1964; Charlie Cogbill, personal communication, 2004). Multiple cycles of timber harvesting during the past 150 years affected forest composition. The selective harvesting of softwoods has converted many spruce-fir stands to mixed stands, and mixed stands to hardwood stands. In the absence of further human disturbance, natural succession and disturbance patterns will shift these forests to a higher proportion of softwood (Publicover and Weihrauch 2003). Our analysis for this CCP confirms that this mixed forest type, with a high proportion of softwoods, has the highest natural potential for growth in our area. That analysis included a site capability assessment using The Nature Conservancy (TNC) ecological land units (a combination of elevation, bedrock geology, and topography), Natural Resource Conservation Service (NRCS) soils surveys, and aerial photo interpretation.

Pre-settlement forests are believed to have been multi-aged with a diverse structure including a variety of tree sizes, many large-diameter trees, multiple canopy layers, deep forest duff, and a "pit-and-mound" forest floor. The canopy, shrub, and herbaceous layers of the mixed forests around the refuge today have varying composition and coverage depending on specific site conditions and disturbance history (Rapp 2003).

The breeding bird survey data over the last 30 years shows the importance of this mixed forest habitat for species of concern such as blackburnian warbler, Canada warbler, and black-throated-green warbler (appendix H). A structurally complex (e.g., vertical diversity, coarse woody debris, large-diameter trees with cavities) mixed forest landscape also supports large, wide-ranging mammals, including marten, fisher, bobcat, and lynx (Ray 2000).

Although no stands of old growth forest are present on the refuge, it contains a few conifer stands with some late-seral characteristics, such as large-diameter trees. Hagen and Whitman (2004) report on the looming loss of late-successional forest in working forest landscapes including northern New England and the negative consequences for forest biodiversity. They note that forests develop along a continuum and, despite a harvest history, a stand can retain and develop such old growth characteristics as large live trees 100–200 years old, large dead trees, and fallen logs. Species associated with those characteristics include mosses, lichens, fungi, and insects.

Natural disturbance regimes affected by long-term climate change and disturbance patterns on the landscape are highly influenced by soil, topography, and forest type (Lorimer 2001; Lorimer and White 2003). Natural disturbance patterns for this region occur at two different scales. Large-scale, stand replacement disturbances from fire and wind occur infrequently, on the magnitude of 1000+ years. Small-scale disturbances, creating single tree-fall gaps, occur frequently (50–200-year return rates) (Lorimer 1977; Seymour et al. 2002). Pure stands of spruce and fir are much more susceptible to windthrow, insect outbreaks, and crown fires than associated hardwood species, because of their shallow root system, prevalence in swamps and on upland sites with thin, stony soils or on upper slopes exposed to high winds. Large areas of mixed spruce-hardwood that typically grow on better soils are rarely destroyed (i.e., stand replacement) by large-scale disturbances (Lorimer and White 2003).

#### **GOAL 4:**

**Provide high quality wildlife-dependent activities such as hunting, fishing, wildlife observation and photography, as well as camping and boating in support of those activities.**

##### **Background**

Hunting, fishing, wildlife observation and photography are four of the six priority public uses designated by the Refuge Improvement Act. The other two priority uses are environmental education and interpretation (see goal 5 below). The Act stipulates those six uses are to receive enhanced consideration in refuge planning. Opportunities to engage in them should be provided to the extent compatible with refuge goals and objectives. Our objectives aim at providing high-quality opportunities for each of these four activities in ways consistent and compatible with the priorities of our other refuge programs, including opportunities for the other two priority uses. The Refuge Improvement Act does not establish a hierarchy among the six uses, but provides for refuge managers to determine whether any or all are appropriate and compatible. The ability to fund the management of these activities is also a factor for refuge managers to consider in determining their compatibility. Service policy requires that refuge managers set limits on, and establish stipulations for, any of those activities as warranted to ensure their compatibility.

Each of these activities is already facilitated on current refuge lands; however, we plan to improve current opportunities through new infrastructure and improved access.

**GOAL 5:**

**Develop high-quality interpretative opportunities, and facilitate environmental education, to promote an understanding and appreciation for the conservation of fish and wildlife and their habitats, as well as the role of the refuge in the Northern Forest.**

**Background**

This goal complements goal 4 by recognizing the importance of the remaining two priority public uses: environmental education and interpretation. Its objectives focus on providing informational and educational opportunities about the significance of the refuge and its role in conserving the Northern Forest to audiences of all ages. We strive to foster our visitor's appreciation of wildlife conservation and encourage them to make responsible environmental decisions in the future.

Our proposed future programs will achieve our objectives through increased visitor contacts, on-site programs, and new and improved infrastructure. Our emphasis will be on providing interpretive resources with planned infrastructure (e.g. trails, roadside pullouts, and a visitor contact facility). We will facilitate the use of refuge lands for educational purposes; however, we will look to our state and conservation partners, local and state educators, Friends Group, and/or volunteers to lead the development of educational programs.

One desired outcome of our programs is that participants recognize we manage the refuge to provide a variety of habitats to benefit Northern Forest wildlife, with particular emphasis on migratory birds and wetlands. Through high-quality programs, visitors will gain a better understanding of the unique and important contribution of this refuge to migratory bird conservation and the Refuge System.

**GOAL 6:**

**Enhance the conservation and management of wildlife resources in the Northern Forest Region through partnerships with public and private conservation groups, private landowners, State and local entities.**

**Background**

The Northern Forest stretches from the St. Croix River in Maine westward through New Hampshire and Vermont across the Adirondack Mountains to the Tug Hill plateau in New York. It includes the largest contiguous forest remaining in the eastern United States. Those 26 million acres encompass the most remote, pristine lakes in the Northeast, the headwaters of the Hudson, Connecticut, St. John and other great eastern rivers, and vast tracts of forest that provide habitats for an impressive array of species, including many that are federal-listed as threatened or endangered or regional or state species of high conservation concern. Close to a million people live in that landscape, and many of them depend on the forest to sustain their communities and quality of life.

In the last decade, significant changes in land use have threatened the natural landscape, culture, and communities of the region. Huge forest landholdings, many owned by multinational corporations, are being sold at an accelerated rate.

Many of the large, contiguous tracts are being divided into smaller tracts and sold to developers or institutional investment corporations, including insurance companies and bank trusts, whose interests are purely economic. Those sales raise concerns about the rising trend of unsustainable timber cutting, forest subdivision, and other permanent development, particularly around lakefronts and in secluded forest tracts. In addition to fragmenting the forests, those developments destroy wildlife habitat, restrict public access, degrade water

quality, spoil the remote and scenic beauty of the forest, and undermine the hope of a sustainable, forest-based economy to support Northern Forest communities. More recently, a shift to renewable energy sources may impact forest management on a regional scale. In May, 2007 New Hampshire enacted the Renewable Energy Act, which codified the renewable portfolio standards for the state. This law requires that all suppliers of electricity in the state demonstrate that they are obtaining 25% of their electricity from renewable energy sources by 2025. Included in the list of renewable energy sources are biomass, wind, hydropower, and solar, among others. Since biomass energy production facilities can utilize wood products not traditionally used by the pulp and paper industry, a large-scale shift to electricity production from biomass facilities has the potential of altering forest stand structure, rotation ages, species composition, soil nutrient levels, and wildlife habitat on a landscape scale.

Those concerns underscore the need for partners who will work together to permanently conserve the ecological integrity of the Northern Forest, preserve public recreational opportunities, and promote the economic sustainability of a forest-based economy. Fortunately, an impressive partnership already exists in the region including over a dozen federal, state, non-governmental, and private entities, who share this common mission. In addition, these partners' landholdings collectively create a conservation lands network, as depicted on map 1-1, which provides a basis for further connecting and conserving resources of conservation concern. The Service is a key partner in this effort, and refuge lands are integral to the land conservation network. Appendix A, "Land Protection Plan," presents our vision for expanding our contribution to the partnership and the land conservation network, all in support of sustaining Federal trust resources.

**GOAL 7:**

**Develop the refuge as an outstanding center for research and development of applied management practices to sustain and enhance the natural resources in the Northern Forest in concert with the Refuge System Land Management and Research Demonstration Area program.**

**Background**

In 1999, the leadership of the Refuge System published their vision for its programs and management priorities in a publication titled "Fulfilling the Promise, the National Wildlife Refuge System" (USFWS 1999). Forty-two different recommendations were identified. One of those was to designate Land Management and Research Demonstration (LMRD) Areas. They envisioned LMRD areas as "places where new habitat management techniques and approaches are developed, implemented, and showcased...places where professional land managers and others come to learn about cutting edge habitat management techniques and technology, and carry back with them the information and knowledge which allows them to better manage their own lands." Specifically, the recommendation was to designate areas "to facilitate development, testing, teaching, publishing, and demonstration of state-of-the-art management techniques that support the critical habitat management information needs for fish, wildlife, and plant conservation within the System and other lands" (USFWS 1999).

The implementation of that recommendation has begun. Nationwide, 5 of the 14 LMRD areas approved by the Directorate are now funded and in operation. Those are (1) Hanford Reach National Monument and Saddle Mountain Refuge in Washington, (2) the National Elk Refuge and National Bison Range in Montana,

(3) the Rachel Carson and Parker River refuges in Maine and Massachusetts, (4) the Neal Smith and Northern Tallgrass Prairie refuges in Iowa, and (5) the Bosque del Apache Refuge in Arizona. Each of those LMRD areas has a different habitat management focus. Umbagog Refuge, in partnership with the Moosehorn Refuge and the Nulhegan Division of the Silvio O. Conte Refuge, is another approved LMRD area, but lacks funding to implement programs.

Its focus is the management and restoration of habitats in the working forest landscape of the Northern Forest ecosystem. Research will be implemented in cooperation and coordination with other northern forest research entities, such as universities, Manomet Center for Conservation Sciences, and the U.S. Forest Service Northeastern Forest Experiment Station, Forestry Sciences Laboratory.