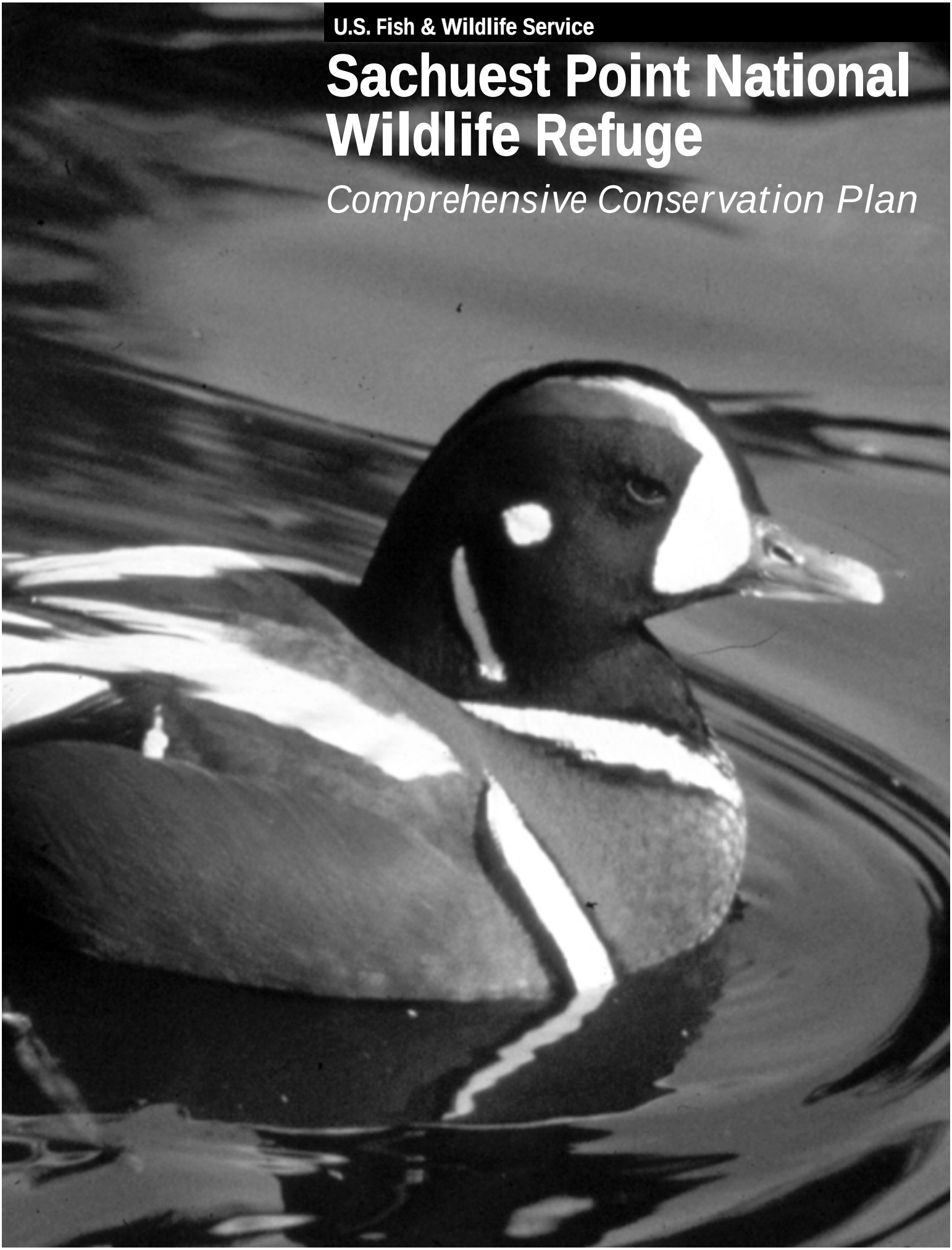
U.S. Fish & Wildlife Service

Sachuest Point National Wildlife Refuge

Comprehensive Conservation Plan



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Comprehensive Conservation Plan

Sachuest Point National Wildlife Refuge

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Cover photo: Harlequin duck, USFWS photo

May 2002

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

The *U.S. Fish & Wildlife Service* is the principal federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. The Service manages the 93-million acre National Wildlife Refuge System comprised of more than 500 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological services field stations. The agency enforces federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program which distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

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

Comprehensive Conservation Plan Approval
for Sachuest Point National Wildlife Refuge

Submitted by:

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Rhode Island NWR Complex

6/21/02
Date

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8/9/02
Date

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U.S. Fish and Wildlife Service

8/13/02
Date

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Harlequin duck off Sachuest Point
USFWS photo

Introduction and Background

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Introduction

This Comprehensive Conservation Plan (CCP) is the culmination of a planning process that began in February 1998. Numerous meetings with the public, the state, and conservation partners were held to identify and evaluate management alternatives. A draft Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) was distributed in December 2000. This CCP presents the management goals, objectives, and strategies that we believe will best achieve our vision for the refuge, contribute to the National Wildlife Refuge System Mision, achieve refuge purposes and legal mandates, and serve the American public.

Refuge Overview

Sachuest Point National Wildlife Refuge (Sachuest Point Refuge) is located in the Town of Middletown, Newport County, Rhode Island, about 23 miles southeast of Providence and 5 miles east of Newport (see maps 1-1and 1-2). To the north and east, the Sakonnet River bounds the refuge; to the south, the Atlantic Ocean; and to the west, Sachuest Bay. Located immediately northwest are a Town of Middletown campground, the Norman Bird Sanctuary, Gardiner Pond (supplying water to Newport), and Second and Third Beaches, owned and maintained by the Town of Middletown.

In 1970, The Audubon Society of Rhode Island donated 71 acres. The U.S. Navy transferred 50 acres in 1976, and 107 acres in 1979. An exchange of land between the U.S. Fish and Wildlife Service (Service) and the Town of Middletown brought the refuge total to 242 acres. The 2002 Land Protection Plan (Appendix E) expanded the refuge acquisition boundary by 35 acres. These acres may now be acquired fom willing sellers.

The Purpose of and Need for a CCP

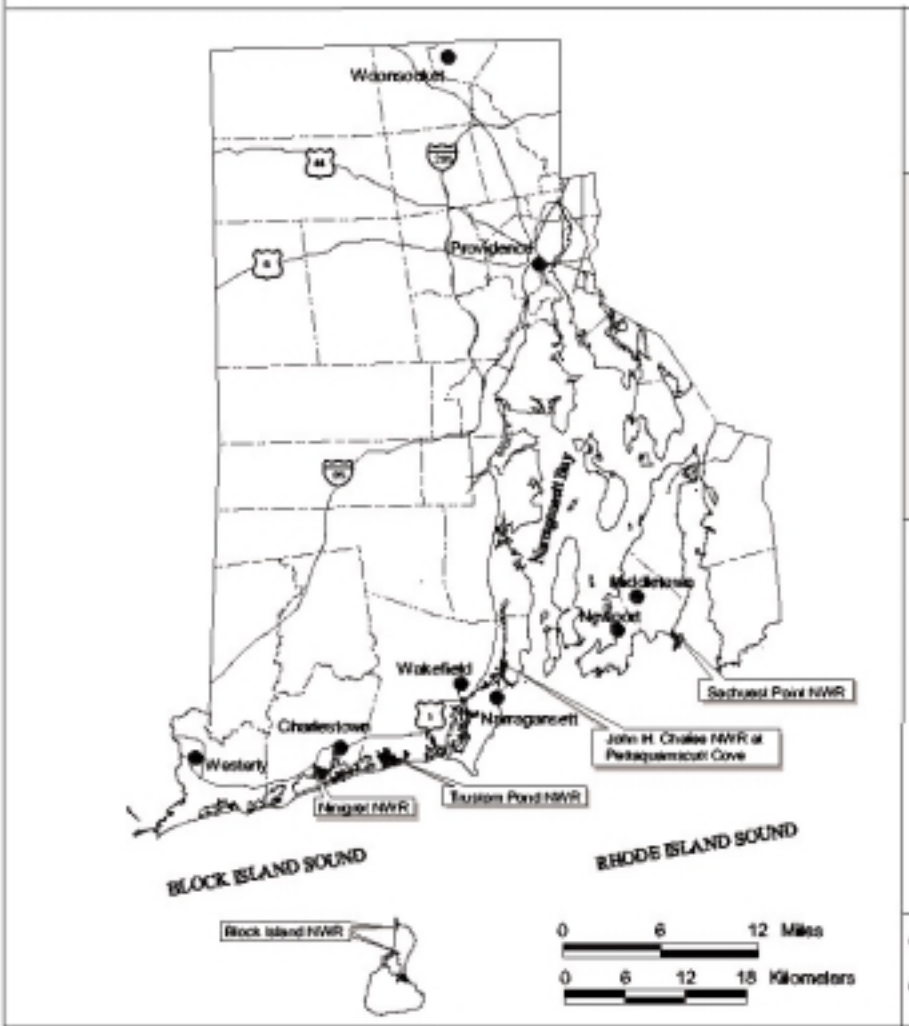
Developing a CCP is vital to refuge management. The purpose of this CCP is to provide strategic management direction over the next 15 years, by…

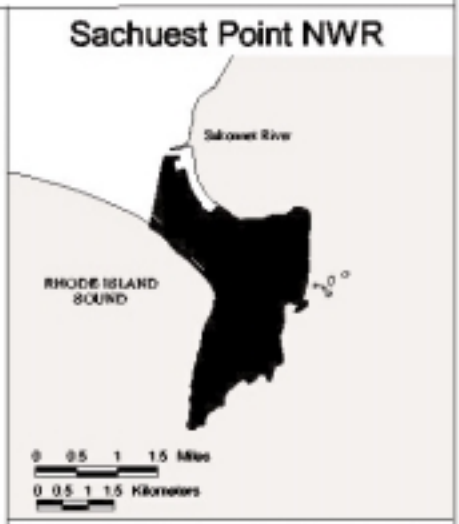
- Providing a clear statement of desired future conditions for habitat, wildlife, visitor services, and facilities;
- Providing refuge neighbors, visitors, and partners with a clear understanding of the reasons for management actions;
- Ensuring refuge management reflects the policies and goals of the 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 developing budget requests.

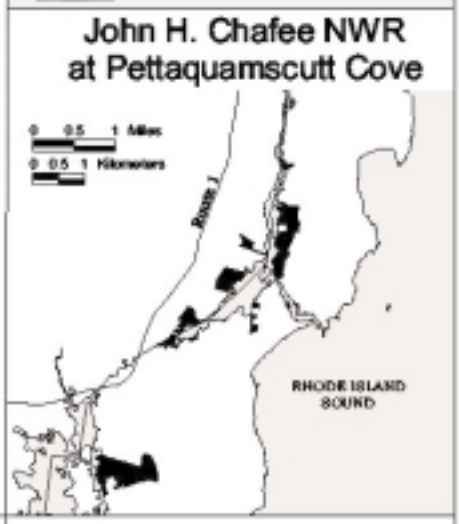
The need to develop a CCP for Sachuest Point Refuge is two-fold. First, the 1997 National Wildlife Refuge System Improvement Act

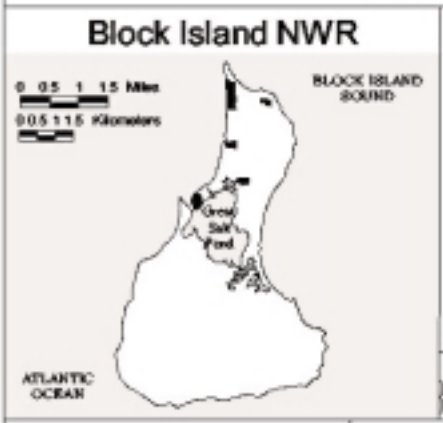
Rhode Island National Wildlife Refuge Complex

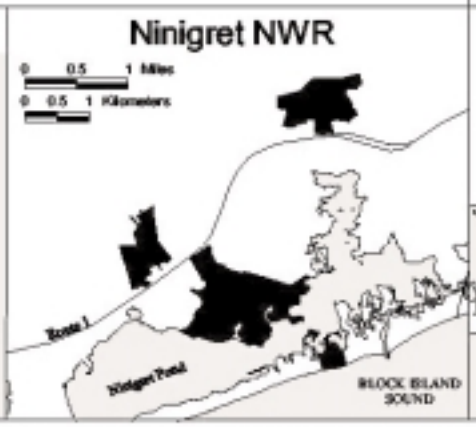
U.S. Fish & Wildlife Service Current Ownership

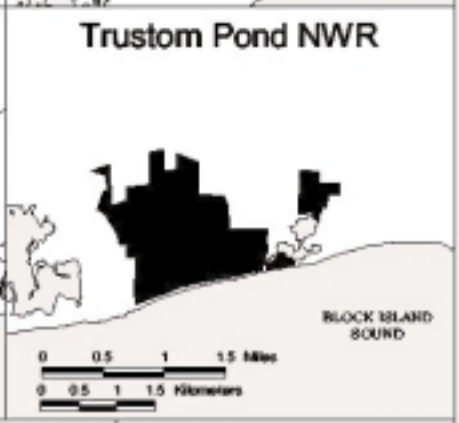












Data Sources:

Rhode Island State and Town Boundaries from MassGIS
USFWS Refuge Boundaries
USGS 1:100,000 Roads

Map prepared for RI Complex Comprehensive Conservation Plan, March 2002.

Block Island: Established in 1973; currently 102 acres
John H. Chafee: Established in 1988; currently 322 acres
Ninigret: Established in 1970; currently 713 acres
Sachuest Point: Established in 1973; currently 242 acres
Trustom Pond: Established in 1973; currently 659 acres

*Acreage figures are approximate.

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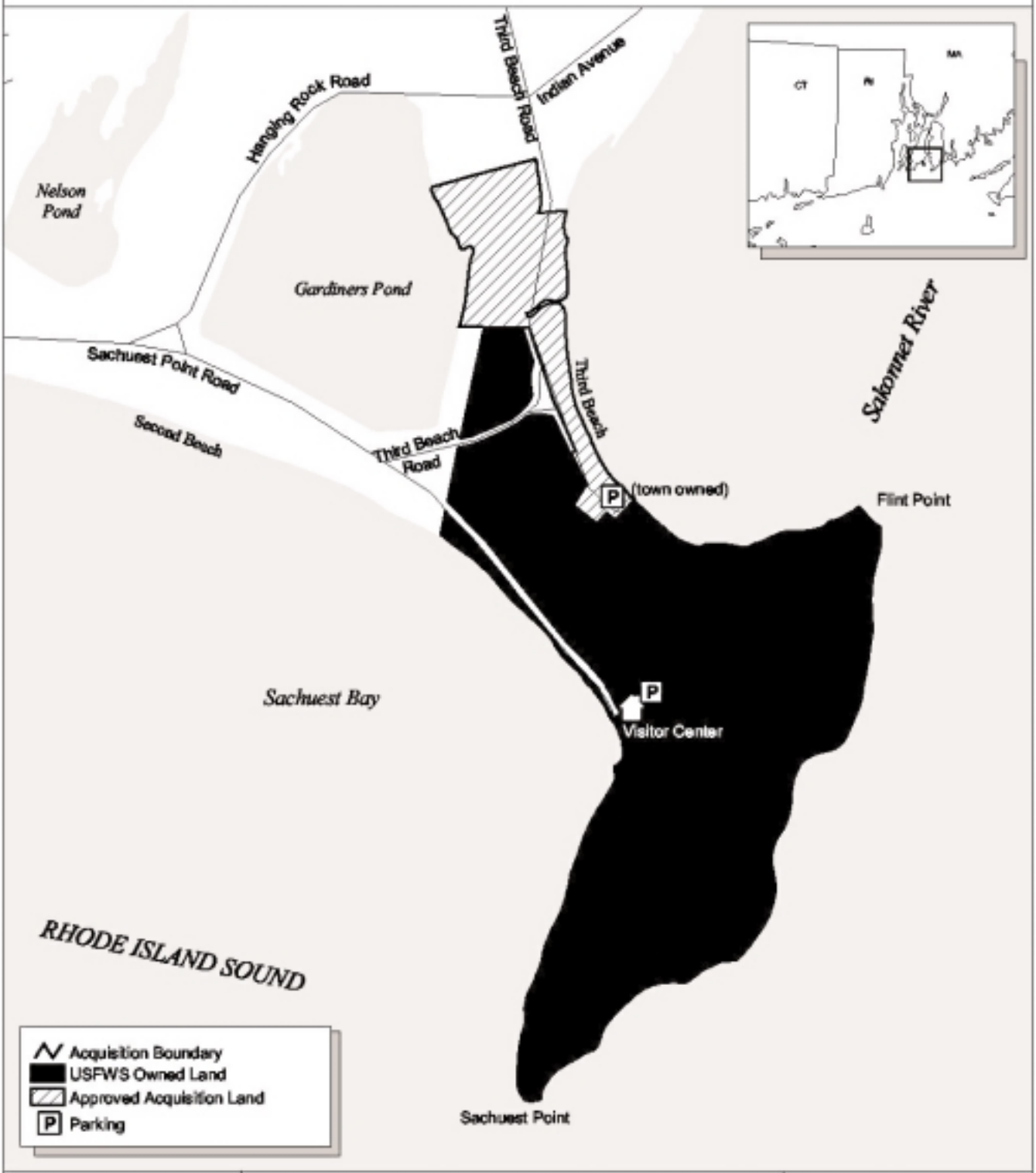
Map 1-2

Sachuest Point National Wildlife Refuge
Current Ownership and Approved Acquisition Boundary
Rhode Island NWR Complex Comprehensive Conservation Plan



Compiled by the US Fish & Wildlife Service, Region 5 Cartography & Spatial Data Services Branch, Hadley, Massachusetts using Town of Middletown (1990), and USFWS (2000) data.

Map prepared for Rhode Island NWR Complex Comprehensive Conservation Plan. May 2007.

Not to be used for legal purposes.

0 0.2 0.4 0.6 Miles

0 0.2 0.4 0.6 Kilometers

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(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. Second, the Refuge Complex lacks a master plan that establishes priorities and ensures consistent, integrated management among its five refuges.

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

"...working with others, to conserve, protect and enhance fish wildlife, and plants and their habitats for the continuing benefit of the American people."

– Mission, U.S. Fish & Wildlife Service

The Service, part of the Department of the Interior, manages national wildlife refuges and national fish hatcheries. By law, Congress entrusts the following federal trust resources to the Service for conservation and protection: migratory birds and fish, endangered species, inter-jurisdictional fish, wetlands, and certain marine mammals. The Service also enforces federal wildlife laws and international treaties on importing and exporting wildlife, assists with state fish and wildlife programs, and helps other countries develop wildlife conservation programs.

The National Wildlife Refuge System and its Mission

The Refuge System is the world's largest collection of lands and waters set aside specifically for conserving wildlife and protecting ecosystems. More than 534 national wildlife refuges, in every state and a number of U.S. Territories, protect more than 93 million acres. Over 34 million visitors annually hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretive activities on refuges.

"...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 System Mission, Refuge Improvement Act; Public Law 105-57

In 1997, Congress passed theRefuge Improvement Act, establishing a unifying mission for the Refuge System, and a new process for determining compatible public use activities on refuges. The act states that, first and foremost, the Refuge System must focus on wildlife conservation. It further states that the mission of the Refuge System, coupled with the purpose(s) for which each refuge was established, will provide management direction for each refuge.

On public use, the act declares that all existing or proposed public uses must be compatible with each refuge's purpose. It highlights six wildlife-dependent public uses as priorities that all CCPs must evaluate: environmental education and interpretation, fishing, hunting, and wildlife observation and photography. Each refuge manager determines the compatibility of an activity by evaluating its potential impact on refuge resources, insuring that the activity supports the Refuge System mission, and ensuring that the activity does not materially detract from or interfere with the refuge purpose.

Refuge Purposes

The establishment purposes for Sachuest Point Refuge are:

"... for the development, management, advancement, conservation, and protection of fish and wildlife resources," and for

"(1) incidental fish and wildlife oriented recreational development;
(2) protection of natural resources; and
(3) conservation of endangered or threatened species."

– Fish and Wildlife Act of 1956 and Refuge Recreation Act of 1962

National and Regional Mandates Guiding this CCP

This section highlights Service policy, legal mandates, and existing resource plans, arranged from the national to the local level, that directly influenced development of this CCP.

The *Digest of Federal Resource Laws of Interest to the USFWS* lists the various federal laws, Executive Orders, treaties, interstate compacts, and regulations on conserving and protecting natural and cultural resources (online at http://laws.fws.gov/lawsdigest/indx.html). The Service Manual and Refuge Manual contain Service policies and guidance on planning and day-to-day refuge management. The draft CCP/EA was written to fulfill compliance with NEPA.

North American Waterfowl Management Plan (May 14, 1986)

Black duck. *USFWS photo.*

This plan outlines the strategy among the United States, Canada, and Mexico to restore waterfowl populations by protecting, restoring, and enhancing habitat within 11 U.S. Joint Venture Areas and three species Joint Ventures: Arctic Goose, Black Duck, and Sea Duck. Partnerships among federal, state and provincial governments, tribal nations, local businesses, conservation organizations, and individual citizens protect that habitat. The Refuge Complex lies within the Atlantic Coast Joint Venture, which has identified 13 priority focus areas totaling 3,226 acres of both wetlands and adjacent uplands for protection in Rhode Island (Atlantic Coast Joint Venture 1988). Three priority focus areas in the Refuge Complex are Trustom Pond, Ninigret Pond, and the Pettaquamscutt (Narrow) River.

Since black ducks winter in Rhode Island, the goals and objectives of the Black Duck Joint Venture apply to managing the Refuge Complex. The Black Duck Joint Venture has identified the coastal salt marsh habitats along the mid-upper Atlantic coast as important wintering habitat.

Partners In Flight Landbird Conservation Plan: Physiographic Area 9, Southern New England (draft, October 2000)

In 1990, Partners in Flight (PIF) was conceived as a voluntary, international coalition of government agencies, conservation organizations, academic institutions, private industry, and other citizens dedicated to reversing the downward trends of declining species and "keeping common birds common." The foundation of PIF's long-term strategy for bird conservation is a series of scientifically based Landbird Conservation Plans. The goal of each PIF Landbird Conservation Plan is to ensure long term maintenance of healthy populations of native landbirds.

The PIF Program is developing a plan for the Southern New England Physiographic Area, using existing data on habitat loss, landbird population trends, and the vulnerability of species and habitats to threats, to rank the conservation priority of landbird species. The plan will identify focal species for each habitat type from which population and habitat objectives and conservation actions will be determined. We utilized this draft document for the list of priority species to consider in management. A revised draft of

the plan was released in October 2000, and we will use the final plan, when finished, to further guide management.

Connecticut River/Long Island Sound Ecosystem Priorities, 1997

During the last decade, we have emphasized ecosystem conservation, particularly the role of refuges within ecosystems, and their ability to affect the long-term conservation of natural resources. Implementing an ecosystem approach to resource management is one of our top national priorities. We have initiated new partnerships with private landowners, state and federal agencies, corporations, conservation groups, and volunteers, to form 52 ecosystem teams across the country, typically using large river watersheds to define ecosystems. Those teams work on developing goals and priorities for research and management within each ecosystem.

The Refuge Complex lies within our Connecticut River/Long Island Sound Ecosystem (Map 1-3). A team composed of Fish and Wildlife Service personnel and representatives from six State Fish and Wildlife Departments developed a Priority Resources Plan (July 1996) that identifies seven priorities, each involving numerous action strategies, all of which are relevant to the Rhode Island refuges.

1. Protect, restore, and enhance listed and candidate populations…with special emphasis on beach strand species, coastal sandplain habitat, and Connecticut River species.

2. Protect, restore, and enhance anadromous and interjurisdictional migratory fish populations…with special emphasis on Atlantic salmon, American shad, shortnose sturgeon, and river herring.

3. Reverse the decline of migrant landbirds…with special emphasis on grassland and forest interior species.

4. Protect, restore, and enhance populations of colonial nesting waterbirds, shorebirds, and waterfowl…with special emphasis on coastal areas and major rivers.

5. Protect, restore, and enhance wetland habitats.

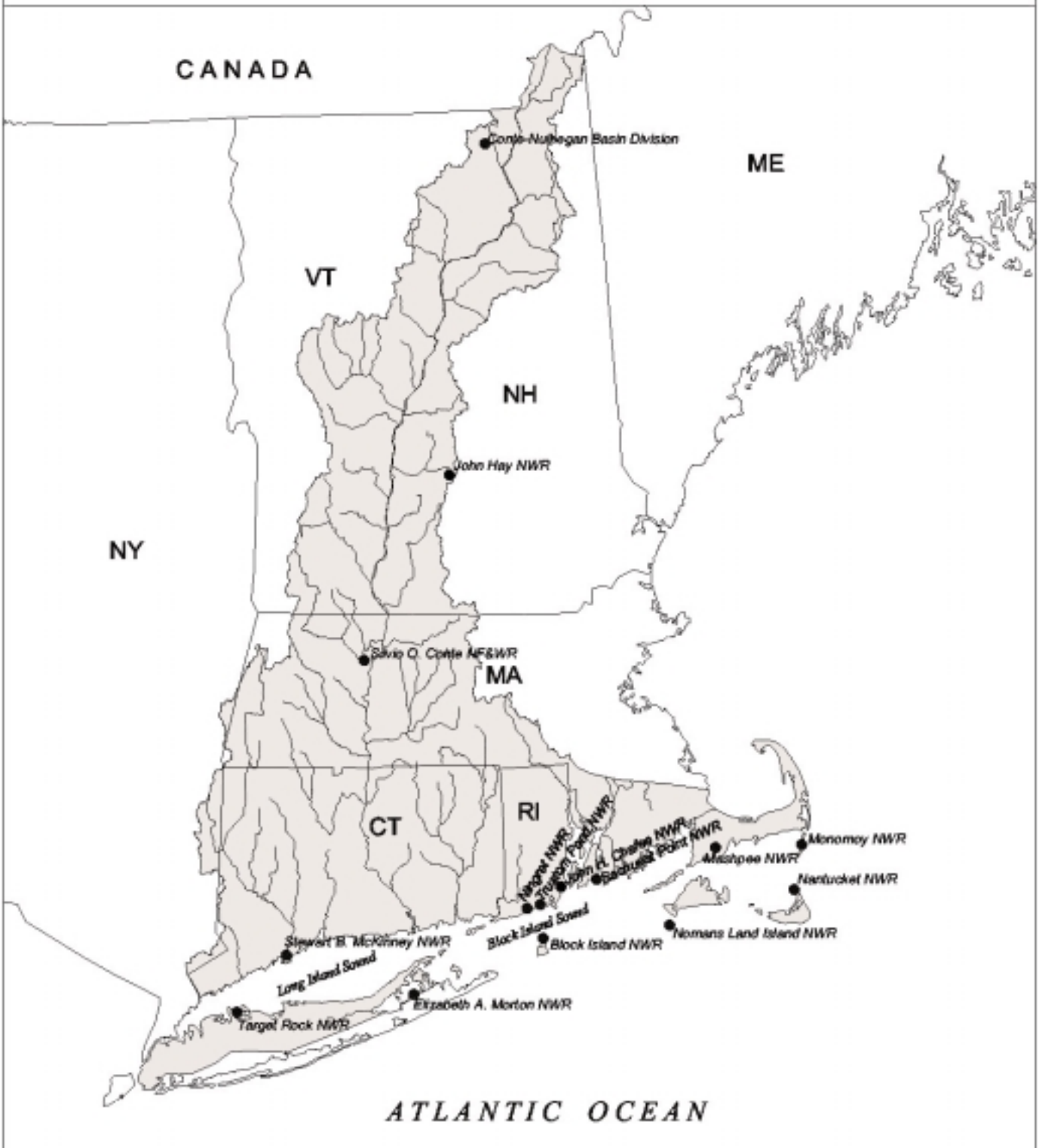
6. Manage refuge lands to protect, restore, and enhance native communities and trust resources.

7. Develop a public that values the fish and wildlife resources…understands events and issues related to these resources, and acts to promote fish and wildlife conservation.

Map 1-3

Connecticut River/Long Island Sound Ecosystem

Comprehensive Conservation Plan



Data Sources:

USGS 1:2,000,000 Hydrography & States, All other data provided by USFWS & So. New England/MT Bight Coastal Program.

Map prepared for Rhode Island NWR Complex Comprehensive Conservation Plan. June 2002
Not to be used for legal purposes.

0 40 80 120 Miles

0 60 120 180 Kilometers

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Regional Wetlands Concept Plan – Emergency Wetlands Resources Act 9 (USFWS 1990)

In 1986, Congress enacted the Emergency Wetlands Resources Act to promote the conservation of our nation's wetlands. The Act directed the Department of Interior to develop a National Wetlands Priority Conservation Plan identifying the location and types of wetlands that should receive priority for acquisition by federal and state agencies using Land and Water Conservation Fund appropriations. In 1990, the Service's Northeast Region completed a Regional Wetlands Concept Plan identifying a total of 850 wetland sites in the Region warranting consideration for acquisition due to wetland values. Wetland values, functions, and potential threats for each site were cited; 24 sites within the State of Rhode Island were listed.

Protecting Our Land Resources: A Land Acquisition and Protection Plan, Rhode Island Department of Environmental Management, May 1996

The purpose of this State plan is to assist agencies within the Rhode Island Department of Environmental Management (RI DEM) in protecting land to support their primary mission, "…protection of the integrity of natural resources essential to the environmental, economic and social welfare of the citizens of Rhode Island." Its framework provides strategies to permanently protect five critical State resources: agriculture, forestry, drinking water, recreation, and natural heritage and biodiversity. It includes evaluation criteria for selecting and prioritizing lands.

Existing partnerships

Throughout this CCP, we use the term "partners". In addition to our volunteers, we receive significant help from the following partners:

- Southern New England/New York Bight Coastal Ecosystems Office (FWS)
- Ecological Services, New England Field Office (FWS)
- Friends of the National Wildlife Refuges of Rhode Island
- Rhode Island Department of Environmental Management (RI DEM)
- The Nature Conservancy, Rhode Island and Block Island Offices
- University of Rhode Island, Department of Natural Resources Science (URI)
- Audubon Society of Rhode Island
- Rhode Island Coastal Resources Management Council (RI CRMC)
- Local land trusts
- Narragansett Indian Tribal Council
- Norman Bird Sanctuary

Chapter 2

Public Open House on CCP, Rhode Island
USFWS photo

Planning Process

- The Comprehensive Conservation Planning Process
- Issues, Concerns, and Opportunities

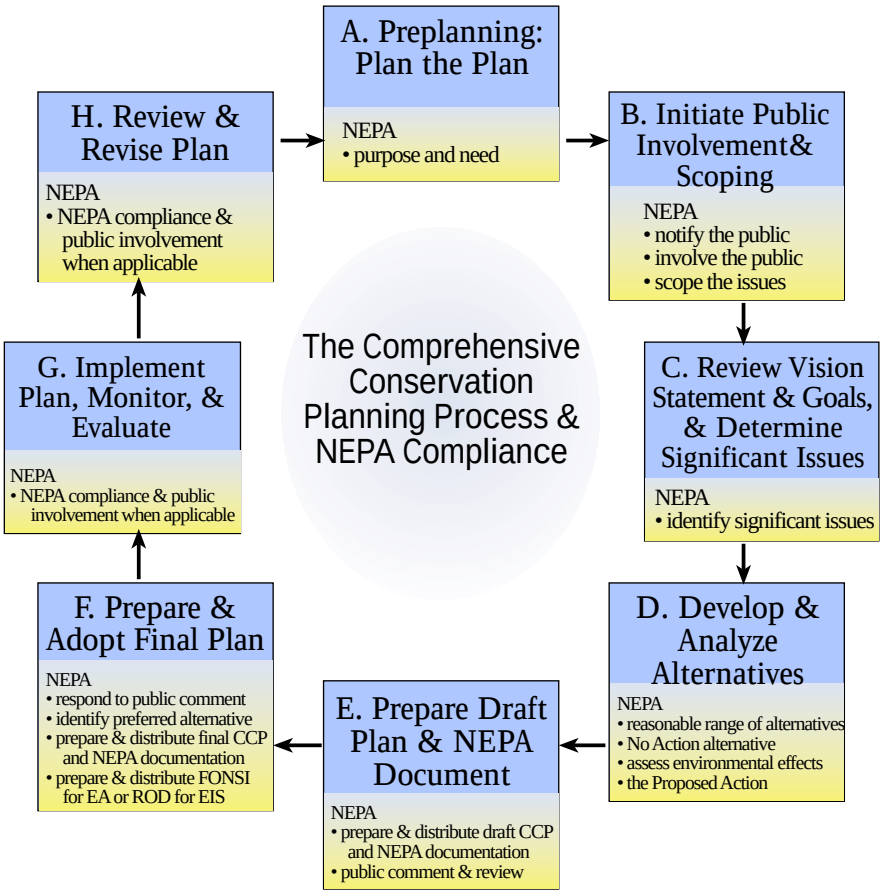
The Comprehensive Conservation Planning Process

Given the mandate in the Refuge Improvement Act to develop a CCP for each national wildlife refuge, our Northeast Regional Office began the planning process for the Refuge Complex in February 1998. Figure 2-1 displays the steps of the planning process and how they incorporate National Environmental Policy Act (NEPA) requirements.

First, we focused on collecting information on natural resources and public use at the Refuge Complex, and developed its long-term vision and preliminary goals, including issues associated with each of its refuges. Next, we compiled a mailing list of more than 2,000 organizations and individuals, to ensure we would be contacting a diverse sample of the interested public.

Recognizing that not everyone could attend the open houses planned for April and May 1998, we developed Issues Workbooks in March, to encourage even more people to provide their written comments on topics related to managing the Refuge Complex. We offered the workbooks to everyone on our mailing list, including adjacent landowners, and made workbooks available at refuge headquarters, local libraries, and on the Internet from the Region 5 Home Page (http://www.northeast.fws.gov). We received 150 completed workbooks. Those responses and public input at our meetings have influenced our formulating issues and developing alternatives on resource protection and public use.

Figure 2-1. *NEPA and the CCP Process*



In April and May 1998, we began a series of public meetings: five Open Houses in the communities of Middletown, South Kingstown, Charlestown, and Block Island invited public comments on goals and issues. We advertised the meetings through news releases, radio broadcasts, and notices to our mailing list. From 15 to 40 people attended each meeting. We also organized 15 informational meetings with state and federal agencies, non-profit conservation groups, town planners, conservation commissions, and sporting clubs.

Public responses suggested more than 50 additional areas where lands warranted protection, typically along the coast. We evaluated those lands for their potential as national wildlife refuges, using criteria such as the presence of threatened, endangered, or other trust species and their habitats, the presence of wetlands, our ability to manage or restore the areas,

existing threats to their integrity, and their size and location.

We distributed a Planning Update to everyone on our mailing list in September 1998. This newsletter summarized public comments from meetings and workbooks, described policy guidelines for managing public use on refuges, and identified the long-term vision and goals for the Refuge Complex.

Once the key issues had firmed up, we developed alternative strategies by May 1999 to resolve each one. We derived the strategies from public comment, from follow-up contacts with partners, or from the planning team. We distributed a second Planning Update newsletter in May 1999, updating everyone on our planning timelines and our decision to start a separate Environmental Assessment for a visitor center/headquarters.

We released a draft CCP/EA in December of 2000 for a 51-day comment period. We held public hearings and open houses in February of 2001. A summary of public comments is included in Appendix B. The land acquisition component of this planning process is contained in the Land Protection Plan (Appendix E).

Each year, we will evaluate our accomplishments under this CCP, including the completion of detailed step down plans. Monitoring will reveal whether resource objectives are being met, and whether we need to change strategies. We will modify the CCP documents and associated management activities as needed, following the procedures outlined in Service policy and NEPA requirements. This CCP will be fully revised every 15 years, or sooner if necessary.

Issues, Concerns, and Opportunities

From the Issues Workbooks, public and focus group meetings, and planning team discussions, we developed a list of issues, concerns, opportunities, or any other items requiring a management decision. Then we sorted them into two categories: “Key issues,” and “Issues and concerns considered outside the scope of this analysis”.

Key issues, along with goals, formed the basis for developing and comparing the different management alternatives that were analyzed in the draft CCP/EA.

Some issues and concerns were outside the scope of this analysis. These were identified in the draft CCP/EA, but we will not further address them here.

Key Issues

Public and partner meetings and further team discussions produced the following key issues:

1. Protection of endangered and threatened species and other species and habitats of special concern.

This is the most important issue facing the refuge. Protecting federally listed endangered and threatened species is integral to the

fundamental mission of the Refuge System. Other federal trust species are also of primary concern, including migratory birds, anadromous fish, and certain marine mammals.

Appendix A lists species and habitats of special management concern. The list includes the status of all plants, wildlife, fish, and rare natural communities known to occur in Rhode Island that are federally listed as endangered or threatened, were candidates for listing, or are otherwise of management concern. Combined with location information, we used that list to identify additional land protection needs and opportunities. We know very little about many of these species' presence on or use of refuge habitats. The alternatives in the draft CCP/EA differed in their strategies for managing these species and habitats. Addressing this issue will help achieve Goal 1: Protect and enhance federal trust resources and other species and habitats of special concern.

2. Restoration and maintenance of coastal sandplain and maritime natural communities, including grasslands and shrublands (less than 60 years old).

While it is true that the Northeast landscape was primarily forested prior to rapid agricultural settlement in the 1800's, grasslands quickly became a dominant part of the landscape in the 19th century. Grassland-dependent species responded in kind and became established. Over the last several decades, however, coastal sandplain grasslands and shrublands, coastal maritime grasslands and shrublands, and agricultural fields and pastures have been in rapid decline in New England due to a combination of development, changes in agricultural technology, succession to forest as farms were abandoned, and lack of a natural disturbance such as fire (Vickery 1997).

In Rhode Island, the State's farmland dropped nearly 50 percent between 1964 and 1997, from 103,801 to 55,256 acres. An additional 3,100 acres of farmland will be lost in the next 20 years if current sprawl patterns continue (Common Ground 2000). As a result, few large, contiguous grasslands and shrublands are left; only smaller, fragmented, and isolated habitat patches remain (<75 acres).

These smaller areas are unsuitable for many focus species, including once-common grassland birds such as grasshopper sparrow and upland sandpiper. Grasshopper sparrows have declined by 69 percent in the past 25 years, according to Breeding Bird Survey data (Vickery 1997). Our best available information suggests that grasslands should ideally be managed in 100 acre or larger patches. Smaller grassland habitat patches are much less productive for grassland birds, and could serve as "sinks", where species try to nest, but becaused of increased predation and other factors, productivity and survival is severely limited.

Other grassland and shrubland species have declined dramatically as well. Many of Rhode Island's State-listed plant and animal species are dependent on these habitat types.

Tremendous potential exists for refuge staff to become involved in restoring habitat on private lands. Grassland and shrubland restoration offers opportunities for our staff to provide technical expertise to local communities. The alternatives in the draft

CCP/EA compared different levels of restoring and maintaining these habitats and providing technical assistance to private landowners. Addressing this issue will help achieve Goal 2: Maintain and/or restore natural ecological communities to promote healthy, functioning ecosystems.

3. Protection and restoration of wetlands.

The well documented values of healthy wetlands include fish and wildlife habitat, flood protection, erosion control, and water quality maintenance. Despite laws and regulations to protect them, wetlands throughout Rhode Island have been rapidly declining since the 1960's through conversion to agriculture, residential and industrial development. Rhode Island has developed more land in the last 34 years than in its first 325 years (Common Ground May/June 2000). Most recent sprawl occurs outside the urban areas, near the remaining wetlands.

Estuarine wetlands consisting of tidal salt and brackish waters are of particular concern. Invasive species are dominating refuge wetlands and threatening their biodiversity.

Non-point pollution and sources off-refuge are impacting water quality and the health and productivity of these wetlands. The alternatives in the draft CCP/EA included different levels of management for restoring wetlands and for cooperatively managing entire watersheds. Addressing this issue will help achieve Goal 2: Maintain and/or restore natural ecological communities to promote healthy, functioning ecosystems.

4. Control of invasive, non-native, or overabundant plant and wildlife species.

Each of the five refuges has an extensive distribution of invasive plant species. These plants are a threat because they displace native plant and animal species, degrade wetlands and other natural communities, and reduce natural diversity and wildlife habitat values. They outcompete native species by dominating light, water, and nutrient resources. Once established, getting rid of invasive plants is expensive and labor-intensive. Unfortunately, their characteristic abilities to establish easily, reproduce prolifically, and disperse readily, make eradication difficult. Many of these plants cause measurable economic impacts, particularly in agricultural fields. Preventing new invasions is extremely important for maintaining biodiversity and native plant populations. The control of affected areas will require extensive partnerships with adjacent landowners, state, and local governments.

Thirteen invasive plant species affecting the natural communities within the Refuge Complex are considered of high management concern. The most prevalent are *Phragmites*, purple loosestrife, Asian bittersweet, autumn olive, and Japanese honeysuckle. Other species such as Japanese knotweed and multiflora rose are increasing on the Refuge Complex, and likely to become an issue soon.

Several wildlife species occur on the Refuge Complex that are known, or suspected to be, adversely affecting natural diversity. Issues surface when these species directly impact federal trust species or degrade natural communities. Mute swans are non-native, invasive

species that aggressively drive native waterfowl and shorebirds away from nesting areas, compete with them for food, degrade water quality when they spend extended periods of time molting on coastal ponds, and are sometimes aggressive towards humans.

Native species such as deer, red fox, gull, and small predatory mammals such as mink, skunk, and weasel can be a problem when their populations exceed the range of natural fluctuation and the ability of the habitat to support them. Excessive numbers of deer are a threat to rare plant communities on the Refuge Complex, and excessive browse lines are evident on two refuges. Adjacent landowners are also concerned about deer impacts on landscaping, the increase in vehicle-deer collisions, and the threat of Lyme disease.

Red fox, gull, and some small mammals are voracious predators that can adversely impact other native wildlife populations. Occurrences have been documented of herring and black-backed gull, red fox, and weasel preying on piping plover and least tern, a State-listed species (threatened). Fox easily habituate to humans, and were being hand-fed at Sachuest Point Refuge. Many people fear fox and other mammals because they can carry rabies. These predators are particularly troublesome when their populations exceed natural levels. Control measures for each species are controversial, and may include lethal removal, visual and audio deterrents, or destroying eggs, nests, or den sites.

The alternatives in the draft CCP/EA compared different strategies for managing invasive species. Addressing this issue will help achieve Goal 1: Protect and enhance Federal trust resources and other species and habitats of special concern, and Goal 2: Maintain and/or restore natural ecological communities to promote healthy, functioning ecosystems.

5. Protection of biologically significant areas through acquisition and/or cooperative management.

Public meetings, partner meetings, and workbook responses expressed a great deal of support for the protection of additional fish and wildlife habitat in southern Rhode Island. That support runs across the State, as Rhode Islanders consistently vote ballot measures to maintain open space and protect fish and wildlife habitats. Many people mentioned that their support stems from their concern over the rapid pace of development on the South Shore. As we stated earlier, development in non-urban areas of Rhode Island has increased dramatically over the last 30 years. It is now the second most densely populated State in the country. One estimate predicts that current sprawl patterns will ensure the loss of all its rural areas before 2100 (Common Ground 2000). The Rhode Island Office of The Nature Conservancy has noted that the conservation actions taken during the next 5 to 10 years will be the most important for the majority of Rhode Island towns (The Nature Conservancy 2000).

This dramatic increase in development has changed land use patterns and practices, significantly modifying natural landscapes.

As natural lands (those with sustainable native species populations and intact ecological processes) become isolated and fragmented into smaller pieces disconnected from other natural areas, their ability to support a full complement of native species is adversely affected. Cut off from larger populations, species and plant communities within these natural areas face the problems of limited genetic exchange, a decreased ability to support diverse populations, and lost capacity to recruit new individuals. Ultimately, the number of native species declines and exotic species gain a stronghold. It is precisely this diminished ability of natural areas to support diverse species with different habitat requirements that leads to a decline in biodiversity. While some species can tolerate fragmentation as they prefer "edge habitat," many others, including "interior" dependent species, require larger, contiguous natural areas or functional corridors linking patches of natural habitat. This ability to protect and sustain larger natural areas and corridors, coupled with the protection of unique or rare species or communities, is critical to maintaining biodiversity.

A landscape or ecosystem approach to protecting land is also critical in the recovery of threatened and endangered species. Piping plover serve to illustrate this point. They have a fairly strong fidelity to certain nesting areas and typically return to them most years. Shifting of pairs between nesting areas has been observed when disturbances or habitat conditions affect their ability to nest. Barrier beaches are dynamic ecosystems, and their nesting conditions can change dramatically from year to year. While 1999 was a good nesting year on Moonstone Beach (Trustom Pond Refuge), in 2000 the beach consists entirely of cobble with virtually no sand for nesting. The piping plover pairs there in 1999 appear to have shifted to the Ninigret Conservation Area. Without consideration of these shifts in habitat use across a landscape, management for these species would be ineffective.

Some individuals preferred that the Service acquire and manage federal trust resources, and that the Refuge Complex continue to acquire these sites. Others emphasized partnerships to cooperatively protect and manage important habitats not currently on refuge land. Still others recommended a combination of Service acquisition and cooperative management to provide the greatest long-term benefit to resources. At public meetings and in our workbooks, many responses suggested specific areas needing protection, particularly wetlands threatened by development. Some individuals we spoke with especially supported our acquiring land occupied by endangered or threatened species.

The alternatives in the draft CCP offered various levels of Service land acquisition, ranging from lands within the currently approved acquisition boundaries only, to a considerable expansion of each refuge's acquisition boundary. They also evaluate our increased involvement in cooperative land protection off-refuge. Addressing this issue will help achieve Goal 3: Establish a land protection program that fully supports accomplishment of species, habitat, and ecosystem goals.

6. Assurance of access to credible information about resources regarding the Refuge Complex to ensure management decisions are based on the best available science.

We need to determine and prioritize what information reasonably could be collected to facilitate decision-making using the best available science. In particular, many individuals expressed concern over the lack of information available to fully evaluate impacts to wildlife and habitats from excessive public use. Others questioned the effectiveness of management actions that have not been adequately monitored and evaluated. Several university researchers and other partners encouraged our staff to prioritize baseline inventory needs, establish monitoring protocols to better evaluate management actions, and identify information needed to determine each refuge's contribution to the ecosystem.

Implementing Service *Policy on Maintaining the Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System* will require us to ascertain the natural conditions for each refuge and identify the natural communities, species, and ecological processes that are rare, declining, or unique. Opportunities to cooperate in collecting this information could be developed once the priorities have been identified. Addressing this issue will help achieve all the goals identified for the Refuge Complex.

7. Management of public use and access.

The Refuge Improvement Act and Service policy require our enhanced consideration of opportunities for six priority wildlife-dependent uses (see above). Some level of each occurs on the Refuge Complex. Only those uses that are compatible with a refuge's purpose may be allowed. According to Service policy, all refuges are closed to any use until they are formally opened through the compatibility determination process.

The act also directs refuges to terminate immediately or phase out as expeditiously as practicable, existing uses determined to be not compatible. Non-wildlife-dependent uses exist on all the refuges, and some have been occurring for years. Examples include jogging, sunbathing and swimming, bicycling, and dog walking.

Public meetings input and workbook responses make it clear that public use on refuges is extremely important to most people. More than 90 percent ranked environmental education and interpretation and wildlife observation and photography very high as desirable public uses. Rarely, however, was there consensus on other public uses or just how much of each type to allow. Public opinion spans the entire spectrum from those wanting to open up refuges to non-wildlife-dependent activities, to those who want to close refuges to all public use to maintain an undisturbed sanctuary for wildlife.

The alternatives in the draft CCP/EA compared different levels and combinations of wildlife-dependent public use. Addressing this issue will help achieve Goal 4: Provide opportunities for high quality, compatible, wildlife-dependent public use with particular emphasis on environmental education and interpretation.

8. Hunting.

Hunting surfaced late in the scoping process as a key issue, perhaps because, initially, few viewed it as a possibility on the Refuge Complex. This issue was raised by Service personnel, by RI DEM biologists, and by individuals both for and against expanding hunting opportunities on the Refuge Complex. Those in support primarily are interested in deer hunting on all refuges, waterfowl hunting on Chafee Refuge and Ninigret Refuge, and pheasant hunting on Block Island. Advocates of hunting refer to its inclusion as one of the six priority public uses that "...shall receive priority consideration in refuge planning and management" (1997 Refuge Improvement Act).

None of Sachuest Point Refuge is currently open to hunting, but RI DEM has expressed interest in any new opportunities for hunting because rapid residential development in Rhode Island is confining public hunting opportunities to fewer and fewer areas.

The Service views managed or administrative hunts in areas where there are overabundant deer populations as an effective tool for regulating them. Responses generally agree that the overabundance of deer is a concern in Rhode Island, reflected in increased numbers of vehicle-deer collisions, increased complaints about deer browsing on commercial and residential landscape plantings, visible impacts on native vegetation, and higher concern about contracting Lyme disease.

Those opposed to hunting cited concerns with public safety, disturbance and harm to other wildlife species, and the impact to visitors engaged in the other five priority public uses. The latter results from the likelihood that significant portions of the refuges, due to their small sizes and configurations, would be closed to other activities during hunting. Some expressed the opinion that the refuges should function as a sanctuary for all native species, and that hunting is incongruous with that function.

The alternatives in the draft CCP/EA offered varying levels of hunting opportunities, from no hunting at all, to opening four refuges during State-regulated seasons for deer, waterfowl, and pheasant. Addressing this issue will help achieve both Goal 2: Maintain and/or restore natural ecological communities to promote healthy, functioning ecosystems, and Goal 4: Provide opportunities for high quality, compatible, wildlife-dependent public use with particular emphasis on environmental education and interpretation.

9. Opportunities for environmental education.

Responses so frequently mentioned increasing environmental educational opportunities across the Refuge Complex that our planning team decided it warranted special recognition. More than 90 percent of the workbook responses ranked environmental education and interpretation as one of their top three interests. The alternatives in the draft CCP/EA compared different levels of environmental educational opportunities and the different levels of partnerships so integral to implementing them on each of the five refuges. Addressing this issue will help achieve Goal 4: Provide opportunities for high quality, compatible, wildlife-dependent public use with particular emphasis on environmental education and interpretation.

10. Provision of staffing, operations, and maintenance support sufficient to accomplish goals and objectives.

The Refuge Complex lacks adequate funding and personnel to provide the programs and services desired by the public and to effectively meet the goals for this CCP. The alternatives in the draft CCP/EA compared different funding and staffing levels based on their proposed management strategies for dealing with the issues. Addressing this issue will help achieve Goal 5: Provide Refuge Complex staffing, operations, and maintenance support to effectively accomplish refuge goals and objectives.

11. Increasing the visibility of the Fish and Wildlife Service.

Our lack of visibility on refuges was brought up repeatedly at public meetings and in the workbooks. Many people felt strongly about the need for more refuge staff to be present during peak visitation to increase resource protection and improve visitor services. Other recommendations to increase visibility included more visitor contact stations, increasing wildlife interpretation and environmental educational opportunities, a better location for a headquarters office, developing a Refuge Complex visitor center, improving existing visitor facilities (e.g., kiosks, interpretive signs on trails, etc.), increasing support for a volunteer program, and increasing community involvement.

Some people expressed an interest in seeing refuge staff enforce public use policy more consistently. Others argued it was unnecessary for Service personnel to be armed while patrolling beaches. The alternatives in the draft CCP/EA compared different levels of promoting our visibility and providing these services. Addressing this issue will help achieve both Goal 2: Maintain and/or restore natural ecological communities to promote healthy, functioning ecosystems, and Goal 4: Provide opportunities for high quality, compatible, wildlife-dependent public use with particular emphasis on environmental education and interpretation.

12. Need for improved facilities.

The Refuge Complex lacks a facilities plan establishing current and future needs for staff operations and visitor services. Many of its current facilities are inadequate. Its headquarters does not have enough office space to accommodate even current staff, and the visitor services area is limited to one rack of literature in the reception area. The Sachuest Point Visitor Contact Facility has structural problems and the current exhibits are inadequate. The alternatives in the draft CCP/EA compared opportunities for new or improved facilities to accommodate staff work space, increase the visibility of the Service and the Refuge Complex, and improve visitor services, including environmental education and interpretation. Addressing this issue will help achieve Goal 5: Provide Refuge Complex staffing, operations, and maintenance support to effectively accomplish refuge goals and objectives.

Chapter 3

Gull
USFWS photo

Refuge and Resource Descriptions

- Geographic/Ecosystem Setting
- Socioeconomic Setting
- Refuge Complex Administration
- Refuge Resources
- Cultural Resources
- Public Uses

Geographic/Ecosystem Setting

Landscape Formation

The movement of glaciers across New England created the land forms seen in Rhode Island today. The last of those great ice sheets occurred during the Wisconsin glacial period. Approximately 15,000 - 20,000 years ago, the glacier was in a state of equilibrium, where the melting rate of ice equaled the glacial rate of movement (Bell 1985). As the climate warmed 12,000-15,000 years ago, the glacier began its retreat, depositing pronounced land forms along its outermost edge. The southern coast of Rhode Island, including Block Island, is the farthest point the Wisconsin glacier reached in its southeastern frontal movement. The retreating glacier deposited rocks pushed by the front of its ice sheet in piles called moraines. These terminal or end moraines formed sinuous ridges up to 200 feet high. Block Island is part of the terminal moraine that includes Nantucket and parts of Long Island.

A second prominent moraine lies inland, the low ridge referred to as the Charlestown or Watch Hill moraine, stretching east to west parallel to U.S. Route 1. Glacial action also created other features in today's landscape: recessional moraines, outwash plains, kettle hole ponds, glacial lake deposits, deltas, and submerged gravel shoals. Prominent headlands like Sachuest Point are composed of glacial till, a mixture of silt-sized grains to boulder-sized deposits by the melting glacier.

Melting ice sheets caused the sea to rise rapidly across Block Island and Rhode Island Sounds until it reached its present level approximately 4,000 years ago. Wave action parallel to the shore continued to erode glacial deposits, creating the barrier spits. As the spits formed, they almost entirely sealed off the low-lying areas between the headlands and the ocean, forming coastal lagoons connected to the sea by narrow inlets. These became the coastal salt ponds we see today. Through the 1700's, all of the coastal salt ponds had direct, seasonally open connections to the ocean (RI CRMC 1984). The effects of erosion through time have shifted the salt ponds and barrier spits gradually landward (RI CRMC 1998).

The bedrock formations of southern Rhode Island include the Blackstone series of metamorphic rock along its southern coastal border (including most of Westerly, Charlestown and South Kingstown), granite rock of various ages (including most of Narragansett and Middletown and parts of Westerly and Charlestown), and Pennsylvanian sedimentary rock in most of south central Rhode Island (including Richmond, much of South Kingstown, and most of Hopkinton). Most of the soils around the refuges are fine sandy loams or silt loams.

Historical Influences on Landscape Vegetation

The upland forests of southern Rhode Island are classified by Kuchler (1964) as oak-hickory forest; while most of northern Rhode Island is classified as oak-pitch pine forest. Historic land use practices promoted this forest type.

As early as 12,000 years ago, Native Americans began occupying the area. Documented evidence places the first intensive occupation of

the salt pond region during the late Archaic period (5,000 to 3,000 years ago). Native American camps from more than 4,000 years ago are known to have existed at one location along the shore of Ninigret Pond. However, societies of that time were primarily hunter-gatherer with little agriculture; broad changes to landscape vegetation probably did not occur.

During the Woodland Period 3000-450 years ago, larger, semi-permanent or recurrently occupied camps became coastal settlements. Fortified villages are known to have existed in some locations. Maize horticulture became prominent, which likely resulted in small clearings. Larger clearings and burnings to control the movement of deer and upland birds may have occurred, and the first pronounced clearing of land along the coast for settlements, game management, and agriculture. Much of this land was cleared by cutting and burning, which favored resprouting by hardwood species like oak, hickory, and red maple.

The role fire may have played in shaping landscape vegetation is not well known. Evidence of fire has been observed in charcoal layers at Ninigret Refuge. Soil cores dug at most points on the refuge reveal charcoal below the historic farmers plow zone, approximately 10 inches soil depth. The dates attributed to these fires, coupled with their locations, suggest early Native Americans used fire extensively and purposefully.

Although small areas of land were cleared and more or less permanently settled by early Native Americans, it was European settlement and expansion in the 1600's that exponentially escalated the conversion of forests to agriculture. The eighteenth century Rhode Island plantation era "…required massive land clearing of the forests that had dominated the landscapes for the last 8,000 years" (USFWS 1999). During the mid-nineteenth century, an estimated 85 percent of southern New England was converted to field and pasture. Any woods remaining often were managed for firewood (Jorgensen 1977).

A detailed report on the archeological history of the Refuge Complex is available from the Refuge Complex office on request (Jacobson USFWS).

Contemporary Influences on the Landscape

The major natural disturbances affecting the coastline today are hurricanes and winter ice-storms. Hurricanes have the greatest impact, by far. The straight border of barrier beaches separated from the mainland by tidal wetlands and coastal salt ponds characterizes a coastline influenced by frequent storms. Wind and waves pick up loose sand and sediment and move it along the shoreline or back out to sea, allowing occasional overwash of barrier beaches and breaching of coastal ponds. Overwash, tidal currents, longshore currents, and rip currents are all mechanisms transporting sediment along the barrier beaches (RI CRMC 1998).

Fall and winter storms combining wind, rain, and waves are the predominant physical process shaping this landscape today. "Nor'easters" are well known along the New England coast in winter, winds generated offshore from the southeast, can actually be

more destructive to the south shore, because of its exposure to the open ocean. The draft Salt Pond Region Special Area Management Plan describes the geologic, wave, and wind action for coastal areas, including details on how sediment movement constantly reshapes this dynamic landscape (RI CRMC 1998).

The Great New England Hurricane of 1938 was the most recent 100-year storm, one of immense power along the coast. Not only did winds reach speeds up to 240 miles per hour, but also a spring high tide created a storm surge between 10 and 15 feet. Storms of this magnitude are suspected to have occurred only four other times in recorded history: 1635, 1683, 1815, and 1821 (Bell 1985). Smaller hurricanes are less powerful but more frequent than the hurricane of 1938. Hurricanes in 1944, 1954, 1955, 1960, 1976, and Hurricane Bob in 1991 each left its mark on the coastline.

Human influences on sustaining the form and function of coastal landscapes and ecosystems over the long term are predominantly negative. Attempts to stabilize the beach system by constructing jetties or breach ways and planting beach grass have greatly affected the natural dynamics of this system by interrupting the natural flow of waves and sediment. In fact, the breach ways connecting the ponds to the ocean and one pond to another are the single greatest human impact on the ecology of coastal ponds (RI CRMC 1984).

Military installations directly impacted the landscapes that include Ninigret Refuge and Sachuest Point Refuge . From the 1940's through the 1960's, Ninigret Refuge was a U.S. Naval Auxiliary Landing Field. More than 70 acres of tree and shrub vegetation were cleared and maintained as asphalt runways and taxiways. Adjacent areas maintained as grasslands were planted with non-native species like larch and autumn olive. Between 1945 and 1973, 107 acres at the center of the Sachuest Point peninsula were used as an Army Coastal Defense site and a Navy firing range. Around a more recent Naval communications center, mowing and the use of herbicides maintained the vegetation in a low shrub-grasslands structure. A separate report on the history of the Sachuest Point Naval facility, entitled "Historical Perspectives on Establishing Sachuest Point Refuge " (Walker 1995), is available upon request at the Refuge Complex visitor center.

Introducing non-native, invasive plants, diverting or draining coastal wetlands for development, converting uplands for residential use, and spilling oil are other significant human impacts on the coastal landscape. Recent studies indicate that the greatest threats to Rhode Island's estuaries and coastal salt ponds are septic systems and road runoff (RI DEM 1996). More studies are needed to establish the extent to which each of these factors influences Refuge Complex ecosystems.

On Rhode Island's upland landscape, a combination of management and natural succession has allowed forests to make a comeback. The State Division of Forest Environment estimates that 300,000 acres of privately owned forest plus 45,000 acres of State-managed forest make up 45 percent of the State's land area. Their estimate places 80 percent of the privately owned forest in tracts from 1 to 10 acres in size, which are difficult to manage as forest and are rapidly being converted to residential areas (RI DEM 1996).

Ecosystem Delineations

The Service emphasizes an ecosystem approach to conservation, typically using large river watersheds to define ecosystems. Rhode Island falls within our Connecticut River/Long Island Sound Ecosystem (Map 1-3).

Another commonly used delineation of ecosystems was developed by Bailey (USDA 1978, expanded 1995). These ecologically based map units often are used in landscape-level analyses. An ecoregion is first divided into a domain, then a division, a province, a section, and a subsection. Each level defines in greater detail its geomorphology, geology, soil, climate, potential vegetation, surface water, and current human use. Each of these resource attributes has implications for resource management. For example, opportunities to restore native grasslands may be limited by soil types, potential vegetation, and the extent of human impacts on the natural environment. Rhode Island falls within the Humid Temperate Domain, Hot Continental Division, Eastern Broadleaf Forest Province, and Lower New England Section.

Climate

Cold winters and warm summers with a moderating ocean influence characterize Rhode Island's climate. Winter temperatures average 30º F, with lowest temperatures ranging between -10º F and -20º F. Summer temperatures average 70º F, and peak in the 90s. Annual precipitation averages 44 to 48 inches, evenly distributed throughout the year. Thunderstorms occur throughout the summer (USFWS 1989).

Air Quality

The Clean Air Act establishes Class I, II, and III areas with limits on the amount of "criteria air pollutants" that can exist in pre-defined geographic areas. Examples of criteria air pollutants are smog (primarily ground-level ozone), particulate matter, and carbon monoxide. Class I areas allow very little additional deterioration of air quality (e.g. Wilderness Areas); Class II areas allow for more deterioration; and Class III areas allow even more. All of Rhode Island is currently classified as a Class II area. The U.S. Environmental Protection Agency (EPA) has designated the entire State a serious non-attainment area for ozone. That designation resulted in stricter automobile emissions standards designed to reduce emissions by 24 percent between 1990 and 1999.

Socio-economic Factors

The Refuge Complex lies close to some of the largest population centers on the east coast. The New York City metropolitan area, population 8.5 million, is 2.5 hours to the southeast. Metropolitan Boston, population 3.2 million, is 2 hours to the north. Hartford, with a population of 140,000, is 1.5 hours to the northwest, and Providence, population 161,000, is 45 minutes to the north (U.S. Census Bureau 1996 estimates and 1990 U.S. Census).

According to those estimates, the population of Rhode Island is about 1 million; 94 percent live in metropolitan areas (cf. the national average of 80 percent) and 6 percent in rural areas. South County,

which includes Ninigret Refuge , Trustom Pond Refuge , and Chafee Refuge , has the fastest growing population and the highest number of building permits issued annually (RI CRMC 1998). South County population figures between 1990 and 1996 increased 7.4 percent, 4.6 percent, and 5.3 percent respectively in Charlestown, Narragansett, and South Kingstown, while Middletown's population decreased by 1.4 percent. The Town of New Shoreham, which includes Block Island, had a population increase of 10.8 percent. The population for the entire state of Rhode Island decreased by 1.3 percent over the same period (http://www.riedc.com).

The Refuge Complex directly contributes to the economies of Charlestown, South Kingstown, Narragansett, Middletown, and New Shoreham through refuge revenue sharing payments. The Federal Government does not pay property tax; it does pay refuge revenue sharing directly to cities and towns each year, based on the fair market value of refuge lands. The revenue sharing formula calculates three-quarters of 1 percent of the fair market value of refuge lands as the maximum amount payable each year. An appraisal updated every five years keeps their fair market value current. The actual amount of revenue sharing paid each year varies, depending on what portion of the maximum amount Congress appropriates that year (rarely the maximum). Figure 3-1 depicts refuge revenue sharing payments to those towns for the fiscal year 2000.

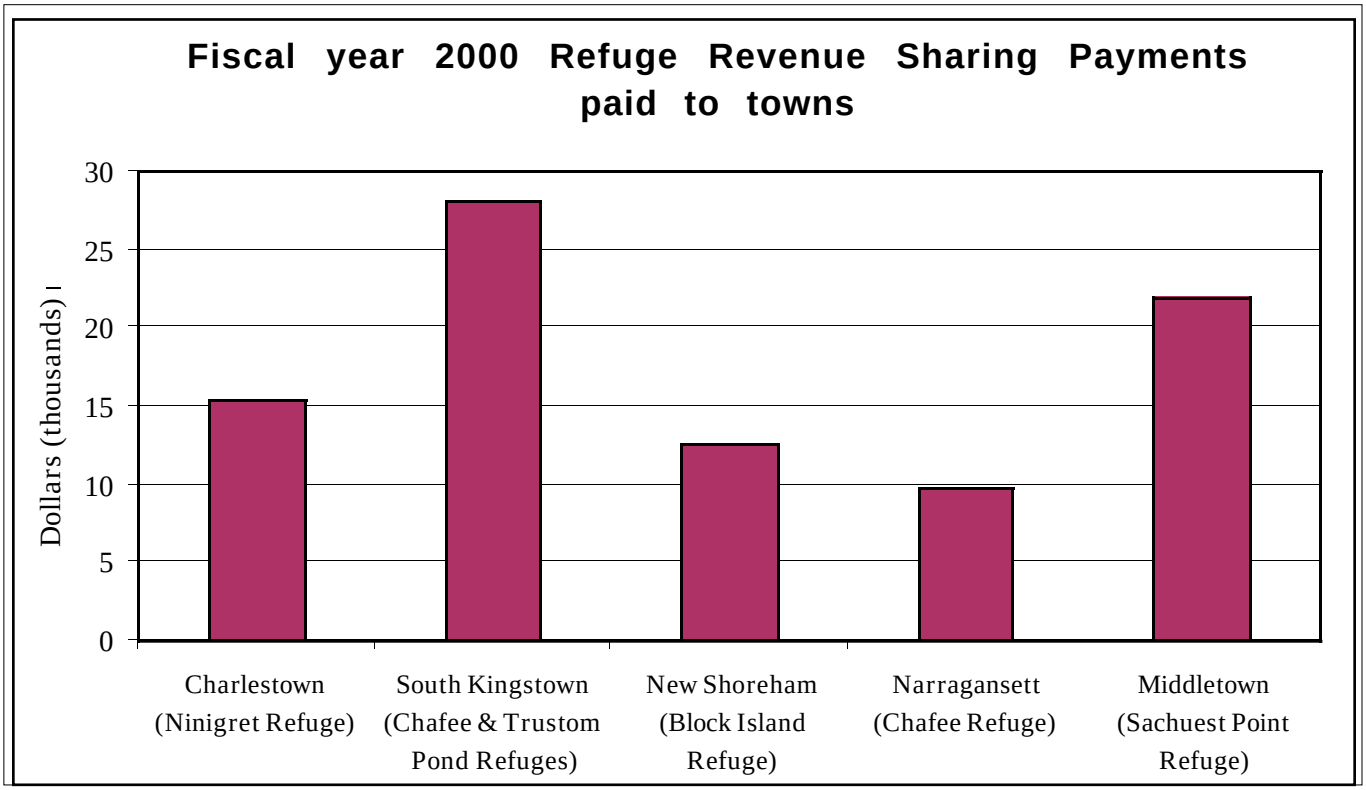


Figure 3-1. *Refuge Revenue Sharing Payments made to towns in 2000.*

The University of Rhode Island Department of Resource Economics (Spring 1997) reports that travel and tourism is the State's fastest growing industry. In 1996, it generated $1.7 billion. The number of visitors to the State in 1997 increased at a rate twice the national average. Also in 1997, Rhode Island's services industry, which includes those in health, business, and education, comprised the largest wage and salary employment at 34 percent (RI EDC 1997). Between 1987 and 1997, the services industry increased by 37 percent, while the manufacturing industry decreased by 37 percent.

In all the communities surrounding the refuges, travel and tourism and the services that support them contribute substantially to local economies. According to Ann O'Neill, President of the South County Tourism Council (O'Neill 1999), the tourist season lasts from April through October, with peak activity during the summer months. Responses to our workbooks confirm that beaches and water-associated recreation are the primary attractions for visitors with destinations along the Rhode Island coast.

Current travel and tourism literature does not feature the Refuge Complex. According to Ms. O'Neill, refuges are not well known as tourist destinations, although many visitors discover them during their visit and enjoy the scenery and open space they provide. They are small enough to explore in one day, and generally do not prompt an additional night's lodging. Ms. O'Neill stated that, since the Tourism Council is trying to showcase a greater mix of outdoor recreational opportunities in coastal areas, the Refuge Complex will figure more prominently in future promotional material.

The greatest contribution by the Refuge Complex to the local economy comes from the values attributed to the preservation of open space (NPS 1992). We represent those values using three indicators, below: Cost of Community Services; Property Values; and Public Willingness to Pay.

Cost of Community Services compares the cost per dollar of revenue generated by residential or commercial development to that of revenue generated by an open space designation. On the one hand, residential development expands the tax base, but the costs of increased infrastructure and public services (schools, utilities, emergency services, etc.) often offset any increase in revenue. On the other hand, undeveloped land requires few town services and places little pressure on the local infrastructure. The cost per dollar of revenue generated by commercial land typically falls between those of residential and open space.

The American Farmland Trust (1989, 1992, and 1993) and the Commonwealth Research Group (1995) evaluated community revenues and expenses associated with open space vs. residential and commercial development. All available information on the New England States shows that open space and commercial development produced more revenues than costs, while the opposite was true for residential land.

Conversations with local realtors and appraisers helped us evaluate the refuges' influence on property values. Two South County realtors and one realtor/appraiser confirmed that properties adjacent to refuges generally are valued higher (Gross, et al. 1998). That value is realized through increased sales price/acre in properties adjacent to a refuge, compared to otherwise similar properties, and by how quickly those properties sell. Properties with views protected by their proximity to a refuge exhibit an even greater difference. All the realtors estimated, but none with any certainty, that properties adjacent to refuges may realize from 1- to 4-percent increases in property value. All the realtors we spoke with use a property's adjacency to a refuge as an important advertising asset.

Public Willingness to Pay is a method for estimating the monetary value of ecosystem goods and services by determining how much the public would be willing to pay, either in taxes, fees, or opportunity costs, to preserve ecosystem values. In Rhode Island, where coastal ecosystems are threatened by development-at-large, we have used Willingness to Pay to estimate the value of open space preservation.

Rhode Islanders consistently and overwhelmingly vote for bond measures to protect open space. Local and State-wide bond measures passed in 1985, 1986, 1987, and 1989, invested more than $100 million in acquiring land for recreation and open space. A State-wide bond in 1998 passed an additional $15 million specifically for protecting open space (RI CRMC 1998).

Refuge Management

Staffing and Budget

Table 3-1. *Refuge Complex staffing levels and budgets between 1995 - 1999.*

Fiscal year	*Operations*	*Maintenance*	*Full time staff*	*Seasonal staff*
1995	$216,299	$85,700	7	3
1996	355,715	23,900	7	3
1997	350,700	97,700	8	4
1998	428,400	171,000	8	4
1999	441,900	28,000	9	2

Annual budget appropriations are highly variable, and commensurately affect our staffing levels. Table 3-1 summarizes budget and staffing levels from 1995 to 1999. Fluctuations reflect funding for special projects, moving costs for new employees, or large equipment purchases. Most of the funding is earmarked; very little discretionary funding is available.

Resource Protection and Visitor Safety

Law enforcement officers, with full authority to enforce federal regulations, are required to ensure resource protection and visitor safety. Three permanent refuge staff have been assigned collateral duties for law enforcement at any time during the course of refuge operations, but those collateral duties draw staff time and resources away from other important programs. We typically hire up to three seasonal staff with law enforcement authority each year.

During the past 5 years, formal notices of violation averaged 15 per year. They typically involved vehicle and pedestrian trespass, vandalism, and waterfowl hunting in closed areas. Well over 100 verbal warnings are also given each year, typically for inadvertently walking or driving in closed areas, littering, walking dogs in a closed area or off-leash, bicycling in closed areas, and digging plants. In 1993, a Trail Warden program began using volunteers to assist in documenting violations. Wardens also inform visitors of public use policy and permitted activities.

Refuge Complex Office

The Refuge Complex office currently lies in the Shoreline Plaza strip mall in Charlestown. In addition to housing our staff, it also houses our Division of Ecological Services Southern New England/New York Bight Coastal Ecosystem Program five-member staff, an Atlantic Coast Joint Venture staff person, and Friends of the National Wildlife Refuges of Rhode Island.

An environmental assessment was written in 2000, which determined a new location for a Refuge Headquarters and Visitor Center. The new building will be located on Deer Run Road (off Route 1) in Charlestown, RI. The building is currently being designed, with construction to begin in 2003.

Refuge Resources

Physical Resources

Topography and Soils

Formerly an island, Sachuest Point is now a prominent headland separating Sachuest Bay to the west from Sakonnet River to the east. The uplands are gently sloping and appear generally flat, but dip sharply to the shoreline. The Refuge has the appearance of a hammerhead, with Sachuest Point to the southeast and Flint Point to the northwest (map 1-2).

Upland soils at Sachuest Point are a thin mantle of broken-down outcropping bedrock, mixed with deposits of sand and silt, producing loose, acidic soil of poor fertility. Underlying the soil are Carboniferous Period rocks containing outcrops of Dighton Conglomerate of the Rhode Island formation, volcanic schists, and white quartz intrusions. Most soils are Newport and Pittstown silt loams, very poorly drained and varying in slope from 0 to 15 percent. Also present on the Refuge are areas of Newport very stony loams. Rocky outcrops ring the perimeter of the Refuge, and several areas of fill are located in the salt marsh on its northwest corner.

Historical land use practices likely impacted the soils of the refuge, although no seriously compacted soils or expanses of soil loss have been noted. From the mid-1600's until the early 1900's, Sachuest Point was used for farming, including sheep grazing. This continued until World War II, when approximately 107 acres of the property became an Army Coastal Defense site, including a Navy firing range. More recently, the U.S. Navy operated a Naval Radio Station Receiver Site there.

Hydrology

Sachuest Point is apparently the remnant of a drumlin, and was at one time an island separated from the mainland by shallow marshes. Groundwater on Aquidneck Island generally moves east towards the Sakonnet River, or west towards Narragansett Bay. The groundwater moves from areas of recharge to areas of discharge, unless intercepted by wells. Areas of discharge include springs and seeps located along the bottom of streams, ponds, lakes, and reservoirs.

Biological Resources

Salt marsh

Approximately 40 acres of Sachuest Point are salt marsh wetlands. Remnants of a salt marsh are found on the northeast end of the Refuge, but have been severely impacted by a former Town of Middletown landfill and a road. The southern, largely freshwater portion of the salt marsh has been overtaken by the invasive plant *Phragmites*. In 1997, extensive baseline data was collected on the *Phragmites* patch and adjacent vegetation community in anticipation of salt marsh restoration (Roman, et al. 1997). The primary goal of the restoration was to restore a natural tidal flow into the salt marsh and thus, reduce the domination of *Phragmites* in the plant community.

Actual restoration work began in 1998 on the south side of the road between Second and Third Beaches. Initial monitoring shows native plants returning to areas where *Phragmites* was mechanically scarified or exposed to a more natural tidal flow of salt water. Some of the *Phragmites* is dying and showing signs of poor vigor. The upper reaches of the salt marsh along Paradise Brook, however, are still highly impacted by freshwater, as freshwater from the brook is being pushed up the tidal channels during high tide. It will be more difficult to control *Phragmites* there.

Vegetation

Table 3-2 displays the dominant land cover types for the refuge. Compared with other locations in Rhode Island, vegetation on Sachuest Point Refuge is relatively homogeneous, with an estimated 150 plant species. A detailed plant list for the Refuge is available upon request from the Refuge Office (George 1999). Principal vegetation types are shrubland, dominated by the invasive exotic, Asian bittersweet (C*elastrus orbiculatus*), and open fields dominated by forbs like goldenrod. Small patches of switchgrass also occur throughout the refuge.

Of the 150 estimated documented plant species for Sachuest Point Refuge, an incredible 40 percent are invasive species covering approximately 80 percent of the refuge. The issue of how to control invasive plants is probably its most significant management concern. So far, little control of invasive species has occurred.

Restoring salt marsh tidal flows in 1997 was the first real effort to deal with *Phragmites* on this refuge. Informal monitoring has indicated a reduction in the vigor and amount of *Phragmites*.

Table 3-2. *Land cover at Sachuest Point Refuge, Newport County, Rhode Island (source: aerial photo interpretation by J. Stone).*

Cover-type	*Acreage*	*Percentage*
Cobble beach	5.0	1.9%
Developed	16.1	6.3
Exposed rock	4.8	1.9
Native emergent wetland	9.5	3.7
Native forest upland	0.4	0.2
Native grass	17.4	6.3
Native shrub upland	70.3	27.5
Native shrub wetland	1.2	0.5
Non-native emergent wetland	28.1	11.0
Non-native forest upland	0.4	0.2
Non-native grass	10.1	4.0
Non-native shrub upland	64.8	25.3
Sand	6.6	2.6
Vegetated sand dunes	13.3	5.2
Water	8.1	3.2
Total	**256.1**	**100%**

In 1998, approximately 6,000 beetles (*Garucerla* spp.) were released as a biological control agent for purple loosestrife (*Lythrum salicaria*), another invasive wetland plant. Monitoring continues on this project.

Also in 1998, prescribed burning was conducted on three acres of upland to determine if this was a viable tool for controlling Asian bittersweet. Asian bittersweet is present on virtually every acre of upland. Results were poor, due to lack of dry fuels. In 1999, approximately 15 acres of Asian bittersweet were hydroaxed and mowed as an experimental control technique to be monitored. The results show promise and will continue to be monitored.

Threatened and Endangered Species

No State- or Federal-listed threatened or endangered animal species are known to breed in the immediate area. A 1990 survey for the Federal-endangered American burying beetle at Sachuest Point Refuge found other ***Nicrophorus*** species there, but not the burying beetle.

Sachuest Point Refuge is a historic site for sea beach amaranth (*Amaranthus pumilus*), a Federal-threatened plant species. No State-listed plants are known.

Several State-listed wildlife species are known to forage in the area, including northern harrier, great blue heron, snowy egret, great egret, and glossy ibis. Sachuest Point Refuge was probably historical nesting habitat for grasshopper sparrow and upland sandpiper, both of which are State-listed. The peregrine falcon (*Falco peregrinus*), formerly Federal-listed, sometimes uses the refuge for roosting or foraging during migration. None of these species are known to breed on the Refuge.

Birds

Bird diversity varies little among habitat types during the breeding season. Abundant nesting species include red-winged blackbird, yellow warbler, song sparrow, American robin, and common yellowthroat. As shrubs have continued to dominate the landscape,

breeding bird communities have changed. Gray catbird, northern oriole, brown thrasher, rufous-sided towhee, and American redstart have been detected on recent breeding bird surveys, yet these same species could not be found on the refuge 5 years ago. Island Rocks, just off the eastern point, is habitat for common terns.

Few formal surveys for wintering or migratory landbirds have been conducted for this refuge. Migrants vary yearly, but typically include thousands of tree swallows, snow buntings, and various warblers, thrushes, and vireos. Remaining grasslands and trails provide foraging areas for a variety of wintering and migratory raptors. No raptors currently nest on the refuge, but because of Sachuest Point's location, a large diversity of raptors are seen during migration. Migrant raptors typically observed include peregrine falcon, American kestrel, merlin, broad-winged hawk, osprey, red-tailed hawk, sharp-shinned and Cooper's hawks.

The refuge shoreline is also an important place for migrating and wintering shorebirds, including sanderlings, purple sandpipers, dunlin, and semipalmated plovers. Disturbance of feeding shorebirds along Second and Third Beaches is a concern, since very little habitat for these species remains on Aquidneck Island.

Wintering songbirds include yellow-rumped warblers, white-throated sparrows, and dark-eyed juncos. Sachuest Point is a reliable spot for viewing wintering snowy and short-eared owls and northern harrier.

Wintering sea ducks are perhaps the most popular attraction for visitors to the refuge. Sachuest Point boasts the second largest winter population of eastern harlequin ducks on the Atlantic coast. Only one site off the coast of Maine has a larger winter concentration. Annual surveys at Sachuest Point Refuge indicate the number of harlequin ducks fluctuates from 50 to a high of 107 from October through March each year.

The harlequin duck is one of the least studied ducks in North America, because it breeds and winters in some of the most inaccessible and remote habitats in the northern hemisphere (Alaska Deparment of Fish and Game 1994). Harlequin ducks congregate off the eastern side of Sachuest Point, feeding and roosting near the area known as Island Rocks. Since they expend considerable energy feeding in rough waters, they can often be seen perching on rocks to rest or sleep. They forage on a variety of intertidal invertebrates gathered from rocks and ocean-bottom close to shore.

Throughout their range, harlequin duck populations have increased slightly over the last 10 years, but they remain endangered in Canada. Recent attempts to list their Eastern States population were determined unwarranted (USFWS 1998). Studies are now underway to better understand habitat use and impacts at nesting locations in Canada and at wintering locations along the eastern seaboard.

Table 3-3 summarizes peak numbers for the incredible diversity of waterfowl observed off Sachuest Point over an eight year period.

Table 3-3. *Peak waterfowl numbers at Sachuest Point Refuge from 1992 to 1999.*

	1992	1993	1994	1995	1996	1997	1998	1999
Mute swan	2	3	10	2	2	1	4	5
Brant	75	20	34	7	58	3	20	3
Canada goose	40	2	1	-	-	37	-	-
American black duck	37	35	65	61	160	116	26	-
Mallard	-	-	-	-	4	-	2	-
Gadwall	-	-	-	-	-	-	16	11
American wigeon	2	-	2	-	-	2	-	-
Greater scaup	36	44	33	28	34	57	53	63
Lesser scaup	-	-	-	-	-	80	-	-
Common eider	207	77	1030	550	762	76	3011	312
King eider	-	-	1	-	-	27	-	-
Harlequin duck	64	77	77	82	82	84	107	105
Oldsquaw	-	-	3	-	-	1	-	2
Black scoter	-	57	300	58	28	29	21	32
Surf scoter	-	101	167	88	102	319	368	53
White-winged scoter	-	57	115	5	10	20	61	62
Common goldeneye	28	106	78	132	78	87	-	143
Barrow's goldeneye	1	1	1	-	-	-	-	-
Bufflehead	7	29	26	38	62	44	117	165
Common merganser	-	-	-	-	-	-	27	97
Red breasted merganser	77	51	61	49	37	70	43	47
Ruddy duck	4	-	23	-	-	30	-	43

Mammals

Nine species of mammals have been observed on the refuge, including white-tailed deer, raccoon, mink, striped skunk , eastern cottontail, eastern meadow vole, and white-footed mouse. Overly friendly red fox have been an issue on the Refuge, as visitors have been observed feeding them. Harbor seals (*Phoca vitulina*) are frequently seen hauled out on rocks along the shoreline.

Reptiles and Amphibians

No formal surveys of reptiles and amphibians have been conducted on the Sachuest Point Refuge. Most sightings have been opportunistic, and therefore represent an incomplete list of what is found on the refuge. Eastern milk snake, northern brown snake, and eastern garter snake have been observed on Refuge trails. Recently, northern leopard frog (*Rana pipiens*) were observed near the salt marsh on the refuge. Spring peepers have been heard in the Refuge wetlands; no salamanders or turtles have been documented.

Cultural Resources

No archaeological sites have been recorded on Sachuest Point, but we consider the refuge a high probability site. No comprehensive surveys have been conducted, but two prehistoric archeological sites have been submitted to our Regional Historic Preservation Officer for designation.

Public Uses

Estimated annual public use for Sachuest Point Refuge is 65,000 total visitor days. As stated earlier, there is no consistent process on the Refuge Complex for collecting and documenting visitation data. Estimating night surf fishing is particularly challenging.

Renovations to the visitor center will include exterior and interior redesigns with significant improvements, especially to exhibits. The impressive number of visitors offers great potential to educate and inform them about the Refuge Complex and the Refuge System. Volunteers primarily have staffed the center since the 1980's. We plan to station one permanent staff and at least one seasonal staff there to establish a year-round presence and to meet the tremendous number of requests for environmental education and interpretive programs.

Known public use activities vary seasonally, but include wildlife-dependent activities such as nature observation and photography, environmental education and interpretation, and salt water fishing. Birdwatching is the year-round primary attraction. Salt water fishing includes striped bass and bluefish in late summer and fall. Other fish taken include flounder, tautog, and scup. The refuge is not open to hunting.

Non-wildlife-dependent activities now occurring include dog walking, jogging, swimming and sunbathing. Second Beach and Third Beach are immediately adjacent to the refuge, and beach users often spill over onto the refuge, sometimes unknowingly, since boundary signs have a way of disappearing. Litter and random access to the shoreline are constant issues.

In 1994, the Refuge Manager formally determined dog walking, bicycling, jogging, swimming and using the beach were not compatible with Refuge purposes. Because of the lack of a permanent Service presence, enforcement against these incompatible public uses has been inconsistent.

The Norman Bird Sanctuary is located adjacent to the Sachuest Point Refuge. Refuge staff and volunteers work closely with the Sanctuary, occasionally sharing volunteer hours. The Sanctuary operates a summer camp, a visitor center, and provides nature walks and family programs.

Trail System

Approximately 3 miles of trail exist on the refuge. Trails maintenance includes extensive mowing, brushing, and repairing erosion damage. One kiosk stands at the junction of several trail heads just off the parking lot. The Flint Point trail, Island Rocks trail, and the Sachuest Point trail each have one observation

platform. We plan to evaluate the Sachuest Point Refuge trail system to determine whether all of its current trails are necessary.

The entrance road to the refuge will be improved with Transportation Equity Act funding.

Special Management Areas

Contaminants

The Town of Middletown operated a municipal landfill at Sachuest Point from 1958 to 1973. The site then operated as a transfer station until 1975. The 21-acre landfill was constructed in a coastal salt marsh and barrier beach system between Second Beach and Third Beach on the east side of Sachuest Point. It was listed on the Federal Facilities Compliance Docket and published on February 12, 1988, in Federal Register Volume 53, Number 29 (CERCLIS No. RI4143690010).

In 1994, Refuge staff completed a Preliminary Assessment of the ecological and human health risks associated with the site, providing the basis for EPA to score the site for inclusion in the EPA Superfund Program National Priority List (NPL) for cleanup, as required by CERCLA. The EPA determined that the site did score high enough to be rated as an NPL site, but that its score did not rank high enough to require EPA Superfund Program cleanup oversight. Instead, EPA deferred oversight to the Division of Site Remediation (RI DEM).

Because the site is located on a national wildlife refuge, we voluntarily began the next phase of studies needed to determine the extent and characteristics of contamination. In 1995, we contracted a Site Investigation from Foster Wheeler Environmental Corporation, completed in April 1998. Its results indicated widespread distribution of several chemical compounds within the landfill area, including polynuclear aromatic hydrocarbons (PAHs), pesticides, polychlorinated biphenyls (PCBs), petroleum hydrocarbons, and metals. The contaminants detected and their concentration ranges are typical of those commonly found at municipal landfills known to have operated during the 1950's and 1960's. Lead is the contaminant that most consistently exceeds RI DEM criteria, especially in the surface soil.

We will close the site under RI DEM Site Remediation regulations. In February 1999, Foster Wheeler completed a Remedial Action Work Plan incorporating comments from RI DEM. A RI DEM-approved Remedial Action Design is expected to be completed soon. We hope to complete all work in 2003, assuming adequate funding is available. Depending on the final, approved Remedial Action Design, we estimate construction costs between $2 million and $4 million.

Chapter 4

Redstart
USFWS photo

Management Direction

- Refuge Complex Vision
- Refuge Complex Goals
- General Refuge Management

Refuge Complex Vision

We developed this vision statement to provide a guiding philosophy and sense of purpose for the five refuge CCPs. It qualitatively describes the desired future character of the Refuge Complex through 2015 and beyond. We wrote in the present tense to provide a more motivating, positive, and compelling statement of purpose. It has guided, and will continue to guide, program emphases and priorities for each refuge in Rhode Island.

Freshwater wetland. *USFWS photo.*

"The Rhode Island National Wildlife Refuge Complex protects a unique collection of thriving coastal sandplain, coastal maritime, and beach strand communities, and represents some of the last undeveloped seacoast in southern New England. Leading the way in the protection and restoration of coastal wetlands, shrubland, and grassland habitats, the Refuge Complex contributes to the long-term conservation of migratory and resident native wildlife populations, and the recovery of endangered and threatened species. These refuges offer research opportunities and provide an outstanding showcase of habitat management for other landowners."

"The Refuge Complex is the premiere destination for visitors to coastal Rhode Island to engage in high quality, wildlife-dependent recreation. Hundreds of thousands of visitors are rewarded each year with inspiring vistas and exceptional opportunities to view wildlife in native habitats. Innovative environmental educational and interpretive programs motivate visitors to engage in better stewardship of coastal resources."

"Through partnerships and extensive outreach efforts, Refuge Complex staff are committed to accomplishing refuge goals and significantly contributing to the Mission of the National Wildlife Refuge System. This commitment will strengthen with the future, revitalizing the southern New England ecosystem for generations to come."

Refuge Complex Goals

Our planning team developed the following goals for the Refuge Complex after reviewing applicable laws and policies, regional plans, the Refuge Complex vision statement, the purpose of each refuge, and public comments. All the goals fully comply with Service policy and national and regional mandates.

Our Refuge Complex goals are intentionally broad, descriptive statements of purpose. They highlight specific elements of our vision statement and provide the foundation for our management emphasis. We identified Goal 1 as the top priority for the Refuge Complex; Goals 2-5 are not presented in any particular order.

Each goal is further refined by a series of objective statements. Objectives are incremental steps to be taken toward achieving a goal and define the management emphasis in measurable terms, where possible. Some of our objectives relate directly to habitat management, while others strive to meet population targets tied to species' recovery plans, or state or regional species plans. The strategies for each objective are specific actions, tools, techniques,

considerations, or a combination of these, which may be used to achieve the objective. Objectives will be used directly in respective step-down plans, while strategies may be revised or modified to achieve the desired outcome.

Together, the goals and objectives are unifying elements of successful refuge management. They identify and focus management priorities, provide a context for resolving issues, and offer a critical link between refuge purpose(s), and the National Wildlife Refuge System Mission.

Integral to all the objectives under Goal 1 and Goal 2 is development in 2003 of a Habitat Management Plan (HMP) for the Refuge Complex. This will be the highest priority step-down plan to accomplish. We will write the plan using current resource information, but will update it based on new information, as needed. The purpose of the HMP will be to prevent the loss or degradation of habitat types, species assemblages, or natural processes significant to the Refuge Complex. It will identify habitat management actions that, to the extent practicable, restore and sustain viable populations of our focus species. The objectives and strategies identified below will all be incorporated into the HMP.

Once the HMP is developed, the Refuge Complex will develop a Species and Habitat Inventory and Monitoring Plan in 2004. Critical elements of the biological program to be inventoried or monitored will be identified, prioritized, and scheduled. This plan will also describe inventory and monitoring procedures, determine where data will be stored, and identify the interim and final reports to include. It will provide a critical connection between the HMP and credible, adaptive refuge management.

In addition, the Region is currently developing a Regional National Wildlife Refuge System Strategic Resources Plan (SRP). This plan will establish Regional goals and objectives for species and habitats based on landscape-scale analyses. Each refuge staff will then determine their respective refuge's contribution to implementing these objectives. As such, once the SRP is completed, the objectives and strategies outlined below may be modified.

The following goals, objectives, and strategies provide management direction for the refuge over the next 15 years. Unless otherwise noted, all work will be accomplished by the Service, primarily by Refuge Complex staff.

Goal 1: Protect and enhance federal trust resources and other species and habitats of special concern.

Objective 1.1
Protect and improve the habitat quality for shorebirds at feeding and staging areas on the refuge.

Background:
Shorebirds annually migrate hundreds or thousands of miles between breeding and wintering grounds, often in one or a few long-distance non-stop flights. As such, migration staging areas, where birds rest and accumulate fat reserves before and during flight, are vitally important to many shorebird populations. Along the east coast, beaches are key locations. Long-term declines of shorebird

numbers at migration staging areas along the Massachusetts coast have been attributed to conflicts between shorebirds and heavy human recreational use. Monitoring shorebirds during migration has not occurred consistently on Sachuest Point Refuge, so information is limited on whether it is a key staging area.

Strategies:

- Use the U.S. Shorebird Conservation Plan (once completed) to update management strategies based on any newly identified imperiled species (draft Shorebird Prioritization System 1999).
- By 2005, determine if there are key staging areas on the refuge; if so, map in a GIS database.
- By 2006, determine potential threats and disturbances for key areas and implement a plan to reduce their impact. Use outreach and education, and if necessary, restrictions on public use and access.

Objective 1.2

Promote resting and feeding of wintering harlequin ducks off Sachuest Point,and to the extent possible, maintain public viewing opportunities.

Background:

In 1998, the Service was petitioned to list the Eastern States population of the harlequin duck due to concerns that population levels were very low. While the Service determined listing was "unwarranted" at this time, studies were initiated to better understand habitat use and impacts at nesting locations in Canada, and at wintering sites along the northern U.S. Atlantic coast. Just off Sachuest Point Refuge each winter, up to 105 harlequin ducks have congregated to feed and roost near Island Rocks. This congregation is the second largest winter population off the U.S. East Coast. Since they typically forage and rest in open water or on offshore rocks, opportunities to manage on their behalf is limited. Further, while on open water, they are not on refuge lands and any undertaking would necessarily be a joint effort with RI DEM.

This congregation of harlequin ducks attracts significant visitation to the refuge, especially during October through March. The refuge is well known by birding afficionados who come from all over to view the birds so rarely seen from shore.

Strategies:

- Refuge staff or volunteers will continue weekly counts of harlequin and other wintering sea ducks between September and April each year. Refuge staff will develop standard protocol for counts by 2003.
- In 2003, work cooperatively with RI DEM to regulate a shoreline waterfowl (sea duck) hunting closure, including both refuge lands (above high water mark) and state lands (below mean high water). This action will enhance Sachuest Point Refuge as a Watchable Wildlife Area for observing harlequin duck and will reduce conflicts between shoreline sea duck hunters and other refuge visitors.
- By 2004, begin monitoring public use in association with harlequin duck viewing, to determine if the amount or timing of refuge visitors affects the activities of wintering harlequin duck.

Objective 1.3
Within two years of CCP completion, establish specific habitat management objectives for those birds considered to be a high conservation priority in the Partners In Flight Area 9 (PIF) Plan, and for which the refuge could make an important contribution to their conservation.

Background:
PIF Bird Conservation Plans are written for physiographic provinces with an overall goal to ensure the long term maintenance of healthy populations of landbirds. Rhode Island refuges lie within PIF Area 9, Southern New England. These plans identify species and habitats most in need of conservation, describe desired habitat conditions for these species, develop biological objectives, and recommend conservation actions.

Although the final PIF Plan for Area 9 is not yet available, this CCP incorporates habitat objectives for certain landbird species identified in the draft PIF Plan (October 2000). These include shrub and grassland dependent coastal Neotropical migrants, and maritime marshland species. Using information from the surveys identified below and the completed PIF Plan, we will be able to refine our landbird objectives in the near future.

Strategies:

- Continue to conduct refuge-wide Breeding Bird Surveys on a 3- to 5- year interval, biweekly during the breeding season according to established protocol.
- In 2003, utilize the "Partners in Flight Landbird Conservation Plan for Southern New England (Area 9)" (draft Oct 2000), and the Regional Strategic Resources Plan (in preparation) to identify and prioritize those landbirds of highest management concern on the refuge, and assess how current management practices are impacting them. Determine which of these landbirds should be a focus for future management on the refuge, and write landbird objectives for the HMP.
- In conjunction with development of the HMP, update refuge cover-type maps, adhering to the National Vegetation Classification Standards.

Objective 1.4
Protect and sustain all marsh, wading, and waterbird breeding habitat on the refuge, especially maritime high marsh habitat capable of supporting salt marsh sharp-tailed sparrows.

Background:
According to the PIF Plan, maritime marsh habitat is the habitat most in need of immediate conservation attention in this physiographic area due to the large number of priority species and the tremendous pressure from human development along the coastline. Substantial threats exist in the form of human disturbance, pollution, increasing predator populations, and invasive, exotic species. Reducing these threats is the highest conservation concern to be addressed. Restoration of high salt marsh is also a priority.

Strategy:

- Use the North American Waterbird Conservation Plan (once completed) to update management and monitoring strategies for species of conservation priority.
- By 2003, conduct saltmarsh sharp-tailed sparrow surveys in suitable habitat according to Regional protocol.
- By 2005, initiate an inventory for marsh and wading birds, according to Regional protocol, at all high probability sites. Determine seasonal occupancy and nesting status. If occupied habitat is located, develop a site plan.

Objective 1.5
Within five years of CCP completion, determine if specific management actions are warranted to insure seals are protected at refuge haul out areas.

Background:
There are no significant concentrations of seals known on the refuge. Generally, small groups of two to six seals will haul-out together. Both harbor and gray seals are observed on Block Island Refuge's Beane Point and Sachuest Point Refuge's rocky shoreline. Neither of these species are imperiled, but they are protected under the Marine Mammal Protection Act. Neither refuge site has been monitored to determine the extent and timing of use by seals, or whether activities are occurring that may be discouraging full use by seals.

Strategies:

- Beginning in 2005, work with partners to survey seal haul-out areas on the Refuge Complex and determine if human disturbance is a threat. Reduce human disturbance through public outreach efforts and, restrict access if necessary.

Objective 1.6
Promote an appreciation of amphibian and reptile conservation, and actively manage to protect and sustain current populations on the refuge.

Background:
Increasingly, there are concerns about declining amphibian and reptile populations throughout the United States. This is especially troubling as amphibians are recognized as biological indicators of ecosystem health. Recent studies conducted by the University of RI have revealed that Ninigret and Trustom Pond refuges are very important to the reptile and amphibian populations in southern Rhode Island. The investigators suggest that one reason these species are concentrated here is because the refuges offer contiguous habitat in a landscape that is becomingly increasingly fragmented by suburbanization (Paton, et al. 1998). We know very little about amphibian and reptile populations on Sachuest Point Refuge. It is desirable to know how amphibians and reptiles utilize refuge habitats seasonally, in particular during the spring amphibian migrations, and during the breeding seasons.

In cooperation with the University of Rhode Island, we hope to continue reptile and amphibian inventories on the refuges.

Strategies:

- By 2003, conduct annual anuran call counts according to Regional protocol.
- By 2005, develop environmental education and interpretation programs to promote the significance of the refuges to Rhode Island's herptofauna.
- By 2005, work with conservation partners, RI DEM, and the Friends Group to identify opportunities to reduce amphibian and reptile road mortality during spring migration.
- By 2005, evaluate and incorporate applicable recommendations (pending) made by Partners for Amphibian and Reptile Conservation (PARC) into refuge management, as warranted.
- By 2005, implement monitoring plan for reptile and amphibian concentration areas identified by inventories.

Objective 1.7
Protect, reestablish, and sustain rare plant sites on the refuge.

Background:
The Service has established new policy which provides guidance for maintaining and restoring, where appropriate, the biological integrity, diversity, and environmental health of refuges (FWS Manual, Chapter 3, part 601). One goal of the policy is to prevent the further loss of natural biological features and natural processes on refuges and within their respective landscapes. Included in this goal is the focus on sustaining native species and natural communities, such as those found under historic conditions, including single plant species or communities that may now be rare.

Sachuest Point Refuge is an historic site for sea beach amaranth (*Amaranthus pumilus*), a Federal-listed threatened species, but has not been observed in well over a decade.

Strategies:

- By 2006, survey and map all historic or potential rare plant sites on the refuge.
- By 2008, with the Service's New England Field Office, RI DEM, and other partners, assess the potential for establishing or restoring Federal and State listed, or former candidate, plant species on the refuge.

Goal 2: Maintain and/or restore natural ecological communities to promote healthy, functioning ecosystems.

Objective 2.1
Within three years of CCP completion, design and implement a baseline inventory on refuge lands to determine the occurrence of species and habitats of management concern (Appendix A), and to serve as a basis for future management decisions.

Background:
To keep the HMP relevant, we will need to improve our general knowledge of important refuge resources, including their presence,

distribution, and condition, to insure management actions are sustaining biological integrity, diversity, and ecosystem health as required by Service policy (FWS Manual, Chapter 3, part 601).

As stated in the introduction for this chapter, a Species and Habitat Inventory and Monitoring Plan will be completed in 2004. The following strategies will be incorporated into this plan.

Strategies:

- By 2004, develop a priority list of baseline biological inventory needs to better understand and document the biodiversity on the refuge, especially the presence and distribution of species and habitat types listed in Appendix A.
- In 2004, begin inventories on the highest priority projects, incorporating results into the CENSUS database, or other regional databases with GIS capabilities, to facilitate future analyses. Revise digital cover type maps as warranted.

Objective 2.2

Within 15 years of CCP completion, maintain at least 100 acres as native, coastal maritime grassland and shrubland (< 60 years old), to provide nesting habitat for landbirds of conservation concern (PIF Plan 10/00) such as bobolink, eastern meadowlark, and yellow-breasted chat.

Background:

Refuge staff are actively involved in restoring native, coastal maritime grassland and shrubland (< 60 years old) on 42 refuge acres. We are managing to restore native vegetation structure and composition and to maintain the natural physical components and processes associated with a coastal maritime community. The current vegetative communities on the refuge are highly altered from historic, natural conditions; they are drastically affected by past land use practices and the epidemic of invasive species. Approximately 40% of the plant species documented on the refuge are invasive plants and they cover 80% of the refuge. Restoring this refuge to native, maritime grassland and shrubland will improve the biological integrity and diversity of the refuge.

While the objective emphasizes the importance of nesting habitat, the grassland-shrubland mosaic will also provide important foraging and resting habitat during landbird and Monarch butterfly migrations. This is especially true with many of the shrub species producing berries, a staple of many migrating birds. Sachuest Point Refuge offers an opportunity for migrating birds to rest and accumulate fat reserves, and provide protected areas for migrating butterflies.

Native, coastal maritime grassland species include, but are not limited to, such plants as field goldenrods (*Euthamia graminifolia* and *E. tenuifolia*), bitter milkwort (*Polygala polygama*), white-topped aster (*Asster paternus*), rush (*Juncus greenei*). Native, coastal maritime shrubland species include, but are not limited to, such species as bayberry, sand rose (*Rosa rogosa*), beach plum (*Prunus maritima*), wild rose (*Rosa virginiana*), shadbush, arrowood , poison ivy (*Toxicodendron radicans*), eastern red cedar (*Juniperus virginiana*), and highbush blueberry .

All actively restored habitat areas will be at least 40 acres in size. Ideally we are working towards contiguous areas of 100 acres or larger to provide the greatest benefit to the widest diversity of grassland and shrubland dependent species. Restoration treatments include the use of mechanical, prescribed fire, biological, and chemical herbicide treatments. Mechanical treatments include brushhogging or hydroaxing woody vegetation, and discing, harrowing, plowing, packing, and drilling grassland fields. All herbicides used are on an approved Service list, and their use on the refuge is approved annually by the Regional Environmental Contaminants Specialist. All prescribed fires adhere to stipulations in the 1995 Fire EA.

Since the refuge habitats are in a highly altered landscape, continuous evaluation of project effectiveness and an adaptive management response is imperative.

Strategies:

- Continue to monitor the 42-acre habitat restoration project. Expand treatment area or change treatment method to insure success, and if warranted by monitoring.
- By 2004, develop and implement a plan to maintain an additional 40 acres (82 acres total) of native, coastal maritime grassland and shrubland habitat (< 60 years old) on the refuge. Utilize management tools identified above. All treatments will be detailed in the HMP.
- By 2005, hire a second maintenance worker for the Refuge Complex to implement the habitat restoration programs for the refuges.
- By 2010, evaluate restoration acres as potential regal fritillary butterfly reintroduction sites in consultation with the Service's Ecological Services Division.
- By 2015, maintain at least 100 acres of contiguous, native coastal maritime shrubland and grassland habitats, with invasive species dominating less than 50% of the area and with native species established on over 50% of the area. Target native vegetative species are identified above.

Objective 2.3

Augment refuge restoration projects and contribute to regional grassland and shrubland landbird conservation efforts by working with adjacent landowners.

Background:

Native grasslands and shrublands (< 60 years old), and those species dependent on them, have been dramatically declining throughout the Northeast, especially large contiguous grasslands over 100 acres. The Refuge Complex offers relatively few areas on which to maintain large expanses of this habitat. As such, cooperative management on adjacent ownerships enhances the restoration work on the refuge by creating a larger complex for area-sensitive species requiring habitat patches greater than 40 acres.

Strategies:

- By 2008, implement a "cooperative extension" outreach program and develop materials to provide technical support for interested landowners and conservation partners. The program may also include on-the-ground assistance.

Objective 2.4
Increase protection and restoration of beach strand habitats on the refuge, and promote their protection throughout coastal Rhode Island.

Background:
Beach strand (also known as barrier beach) is one of the most imperiled habitat types on or adjacent to the Refuge Complex because of the combined impacts of development and recreation. Many species associated with this habitat type are either Federal or State-listed as threatened or endangered due to the associated impacts of human disturbance and habitat loss. Management of these areas is extremely complex and controversial, especially when it includes restrictions on beach use. Protection, restoration, and enhancement of beach strand habitat and dependent species was identified as the number one priority in the Connecticut River/Long Island Sound Ecosystem Team Plan (July 1996).

Strategies:

- Each year, evaluate any opportunities to acquire beach strand property from willing sellers within our approved acquisition boundary. Beach strand habitat proximal to other undeveloped areas, or of a size and condition which allow us to maintain or restore biological integrity, will continue to be the highest acquisition priority.
- By 2003, promote increased protection and stewardship of beach strand habitat through an intensive outreach and education campaign with the Friends Group and other partners targeting beach front landowners, elected officials, and beach visitors.
- By 2003, hire two seasonal park aides to implement the project; they will also be shared amongst the other refuge programs.

Objective 2.5
Within 15 years of CCP completion, restore natural ecological conditions to 50 acres of salt marsh wetlands on the refuge.

Background:
Wetlands are among the most productive ecosystems on earth, and salt marsh wetlands rank among the highest of wetlands, in terms of productivity. The tidal influence, including nutrient import, water abundance, and vegetative growth, all contribute to this productivity. Healthy wetlands function in ways that benefit the natural ecosystem and provide socio-economic values. Ecosystem values include the fact that certain fish, shellfish, birds, and mammals are wetland-dependent, spending their entire lives in these wetlands. Many waterfowl, wading birds, shorebirds, and other migratory birds utilize wetlands for feeding or resting, or to breed and raise their young. Wetlands are also essential habitats for many rare species of plants and animals. Wetlands function in ways that filter sediments and pollutants, produce oxygen, and support healthy microbiota for

fish and wildlife. Socio-economic values include flood control, wave damage protection, hunting, trapping, fishing and shellfishing, aesthetics, education and research.

As noted in objective 1.4 above, maritime marsh is the habitat in most need of immediate conservation attention in this physiographic area due to the large number of priority species and the tremendous pressure from human development along the coastline. While we have identified restoration of only 50 acres on refuge lands, when coupled with the partnership effort described in objective 3.1, significant ecosystem and socio-economic benefits are expected.

Strategies:

- Continue to work with USGS Biological Resources Division to monitor the 15 acre tidal salt marsh restoration project on the refuge. The project included realigning a culvert to restore tidal flow to a creek and treatment of Phragmites. Refine or expand project if warranted by monitoring.
- Continue to coordinate with the EPA, or delegated authority, in restoring the 21 acre CERCLIS site (the former Town of Middletown landfill) on the refuge, at least 10 acres of which lie in tidal salt marsh.
- By 2008, develop site plan and implement restoration of an additional 25 acres of Phragmites-dominated tidal salt marsh on the refuge. Utilize the Corps of Engineer's feasability study for restoring the natural hydrologic flow to the area. This project may be affected by the other wetlands projected noted above, as these areas are adjacent and subject to the same hydrologic influences.

Objective 2.6

Within three years of CCP completion, treat at least 5 acres/year dominated by invasive, non-native plants on the refuge to (1) enhance native habitat, (2) eliminate new invasions, and (3) control the spread of established plants.

Background:

Issue 4 in Chapter 1 describes the implications of invasive plants on the refuges. These plants are a threat because they displace native plant and animal species, degrade wetlands and other natural communities, and reduce natural diversity and wildlife habitat values. They outcompete native species and can readily dominate a site. Early detection and consistent efforts at eradication are critical to maintain control over affected areas, or to prevent new invasions.

Strategies:

- By 2004, identify and map current distribution of invasive, non-native plant species on the refuge.
- By 2005, prioritize treatment sites to prevent new invasions or eradicate recently established plants. Also of high priority are threatened, endangered, or rare plant sites or "pristine rare and exemplary vegetative communities" (March 1999 Invasive Plant Control Initiative, Strategic Plan for the Connecticut River

Watershed/Long Island Sound).

- By 2005, establish a program to treat at least 5 acres/year on the refuge using chemical, mechanical, prescribed fire and biological treatments as necessary. Strategies will be adapted based on monitoring and new information. A maintenance worker will be hired to administer treatments; this position will be shared among the other Rhode Island refuges.

Objective 2.7

Within two years of CCP completion, develop a deer management plan for the Refuge Complex to address overabundant deer populations and evaluate recreational hunting opportunities.

Background:

Overabundant deer numbers are a concern on the refuge when they degrade habitat through excessive browsing or threaten human health and safety through increased vehicle collisions and incidences of Lyme disease. Since deer are highly mobile, it is difficult to effectively control a population unless they are managed throughout most or all of their range. The refuge has not closely monitored deer activities, including their impacts on refuge habitats. However, the RI DEM has reported that complaints from citizens have increased in recent years about private property damage and worries of Lyme disease and vehicle collisions. RI DEM recommends hunting as the most effective tool to manage deer populations on the refuge.

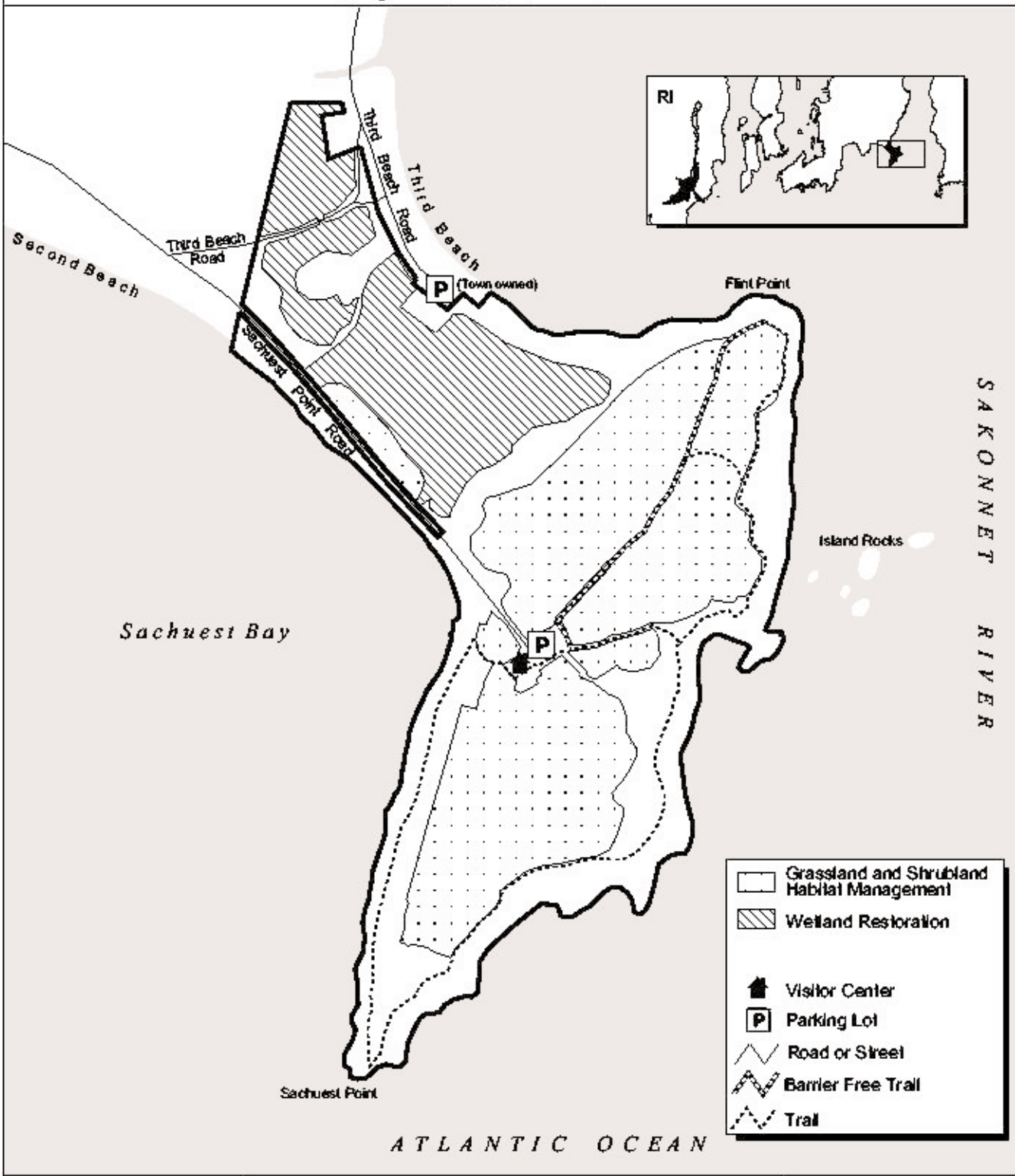
Strategies:

- In 2002, cooperate with RI DEM to develop a deer management plan and environmental assessment for the Refuge Complex. The plan will evaluate hunting to help manage deer numbers and provide a priority public use opportunity. A separate public involvement process will be initiated.

Sachuest Point National Wildlife Refuge

Habitat Improvements

Comprehensive Conservation Plan



Data Sources:

USGS 1:24,000 Roads & Hydrography
All other data provided by USFWS, RIGIS & So. New England/NY Bight Coastal Program.

Map prepared for Rhode Island NWR Complex Comprehensive Conservation Plan.
June 2002
Refuge boundary has been modified for clarity. Not to be used for legal purposes.

0 1000 2000 3000 Feet

0 300 600 900 Meters

N

Goal 3: Establish a land protection program that fully supports accomplishment of species, habitat, and ecosystem goals.

Objective 3.1
Actively strive towards permanent protection of all trust resource at risk throughout southern Rhode Island.

Background:
Consistently mentioned in the PIF Area 9 Plan, the NAWMP, Joint Venture Plans, relevant Species Recovery Plans, and Ecosystem Plans is the need to protect, restore, and enhance additional high quality coastal habitats to contribute to the conservation of federal trust species. While land acquisition by the Service and other state, federal, and local partners is a primary strategy for species conservation, each of these plans also recognizes the need to work in cooperation with private landowners to achieve conservation objectives. Technical and resource support, outreach, and education will all compliment land acquisition efforts.

The Draft CCP/EA (Chapter 3: Developing Land Protection Strategies) described our method of identifying acquisition lands of high conservation priority on Rhode Island's South Shore. During the planning process we determined that the Service is the logical leader in coastal land and water quality protection along the South Shore and on Block Island, with the existing refuges serving as anchors. Refuge expansions will significantly increase protection of the ecological values on current refuge lands, while also expanding protection and restoration of significant coastal habitats. We completed a Land Protection Plan for the Refuge Complex which identifies specific tracts for Service acquisition. The LPP incorporates the following acquisition priorities:

- Has documented occurrences of federally listed endangered or threatened species, or other priority federal trust resources;
- Lies contiguous to existing refuge land, which could further enhance or protect the integrity of refuges by assembling the land base necessary to accomplish refuge goals;
- Connects refuge land with other protected lands withing the South Shore and Block Island to help restore and promote the ecological integrity of the coastal wetland and beach strand complexes; and
- Protects and sustains important natural communities that can be managed tin cooperation with other conservation partners in a manner that will contribute toward refuge goals and the conservation of federal trust resources.

Strategies:

- Continue to assist partners in identifying land protection needs, opportunities, and priorities in southern Rhode Island.
- Continue to help partners seek funding sources for their land protection programs.
- Beginning in 2002, expand the refuge acquisition boundary for Sachuest Point Refuge by the 35 acres approved in the Land

Protection Plan (LPP) (Appendix E). Pursue acquisition from wiling sellers, in either fee purchase or conservation easement, as identified in the LPP.

Goal 4: Provide opportunities for high quality, compatible, wildlife-dependent public use with particular emphasis on environmental education and interpretation.

Integral to all of our public use objectives is development of a Visitor Services Plan in 2004 for the Refuge Complex. This plan will provide a coordinated strategy for implementing quality visitor services programs. We will emphasize the following six priority, wildlife-dependent uses identified in the 1997 Refuge Improvement Act where they are compatible with protecting wildlife resources: hunting, fishing, environmental education and interpretation, and wildlife observation and photography. The Visitor Services Plan will also accomplish the following:

- Establish strategic goals and priorities for Visitor Services across the Refuge Complex;
- Identify target audiences and partnership opportunities for each refuge;
- Establish a methodology for determining visitor numbers, capacity limits, limits on visitor impacts to wildlife and habitats, and a means for assessing quality of visitor experiences;
- Evaluate recreational fee opportunities; and
- Establish an implementation schedule for priority Visitor Service's projects.

We will hire four outdoor recreation planners to implement the Visitor Services Plan and staff the planned Refuge Complex Visitor Center (see Chapter 5 - Staffing). As new lands are acquired, opportunities to provide compatible, priority public uses will be pursued, following guidance in the Pre-acquisition Compatibility Determination (Appendix D).

The objectives below are designed to enhance existing, compatible, wildlife-dependent activities.

Objective 4.1

Provide high quality surf fishing opportunities along the refuge shoreline, while minimizing impacts to natural resources.

Strategies:

- Continue to allow surf fishing, including night fishing, from refuge shorelines on the Atlantic Ocean and Sakonnet River, under State regulations. Access is on foot using designated trails.
- In 2002, designate access points to the shoreline to minimize erosion and to better enforce refuge regulations against littering

and bonfires.

- In 2002, develop and enforce a regulation requiring spear-fishing gear to be unloaded and encased while on refuge land to avoid intimidating other refuge visitors and to ensure their safety.
- In 2002, implement a fee permit system for fishing after sunset. Permits will allow only anglers to park in the refuge parking lot and access refuge lands between sunset and sunrise. This is a solution to the problem of non-wildlife dependent activities (e.g. bonfires, refuse dumping, parties, etc) occurring in the refuge parking lot after sunset.
- In 2004, evaluate the effectiveness of the present system in controlling non-wildlife dependent activities.

Objective 4.2

Increase opportunities for high quality interpretive experiences on the refuge, which raise visitor's awareness of the Refuge System and Sachuest Point Refuge's particular contribution to protecting trust resources and significant habitats.

Strategies:

- Continue to maintain the existing kiosks, updating information to keep it relevant and current.
- Continue to use volunteers and the Friends Group to help staff the Visitor Center and conduct interpretive programs.
- By 2004, complete renovation of Visitor Center and exhibitry.
- By 2005, develop an interpretive program tiered to the Visitor Services Plan, including development of an interpretive trail describing the natural and cultural history of the area. Develop two additional interpretive kiosks, and provide multi-lingual literature to explain refuge resources and regulations.
- By 2008, coordinate with the Town of Middletown to develop interpretive signs, kiosks, and/or exhibits on Second and Third Beaches, and an exhibit at Newport Visitor Center.

Objective 4.3

Improve opportunities for high quality wildlife observation and photography on the refuge, while minimizing impacts to natural resources.

Strategies:

- Continue to maintain the existing Flint Point observation platform.
- In 2002, designate shoreline access points and enforce their use to minimize erosion. Foot travel on the uplands will also be restricted to designated trails. Foot travel, snowshoeing, and cross-country skiing are allowed in support of priority public uses.
- By 2004, modify or eliminate Trails 3 and 4 where determined to be redundant with other trails and likely to impact future habitat restoration project areas. Move impacted observation platforms as necessary.
- By 2004, develop watchable wildlife pamphlets and species checklists for the refuge.

- By 2008, reconstruct the trail to Flint Point to provide barrier-free access to the observation platform.

Objective 4.4

Increase opportunities for high quality environmental educational experiences on the refuge, while minimizing impacts to natural resources.

Strategies:

- Continue to work in partnership with staff from The Norman Bird Sanctuary (NBS), which is located adjacent to the refuge, in conducting environmental education on the refuge. By 2005, develop a formal partnership with NBS to facilitate sharing of resources and cooperate in developing curriculums.
- By 2005, sponsor at least one "Teach the Teacher" workshop/year.
- Also by 2005, cooperate with towns of Middletown and Newport and local schools to develop a curriculum-based program featuring refuge resources. A volunteer environmental education corps will be established to help implement programs. Develop two low-impact outdoor education sites to interpret the grassland, shrubland and wetlands restoration projects.

Objective 4.5

Within two years of CCP completion, develop a deer management plan for the Refuge Complex to address overabundant deer populations and evaluate recreational hunting opportunities.

Background:

See objective 2.7.

Strategies:

- In 2002, complete a deer management plan and environmental assessment evaluating opportunities for deer hunting across the Refuge Complex. A separate public involvement process will be initiated.

Objective 4.6

Within three years of CCP completion, eliminate incompatible, non-wildlife dependent public uses on the refuge.

Background:

Incompatible, non-wildlife dependent activities detract from our ability to fulfill refuge purposes and often conflict with other management priorities. None of these uses are necessary for the safe, practical, or effective conduct of a priority public use, and in fact, are often disruptive to priority public uses. Limited refuge resources should not be expended to manage activities that do not contribute to the public's understanding and appreciation of the refuge's wildlife or cultural resources, or to activities that do not directly benefit these resources.

Strategies:

- Beginning in 2002, we will initiate an intensive outreach and education effort to phase out dog walking and jogging on the refuge.
- In 2002, we will establish a consistent Service presence by

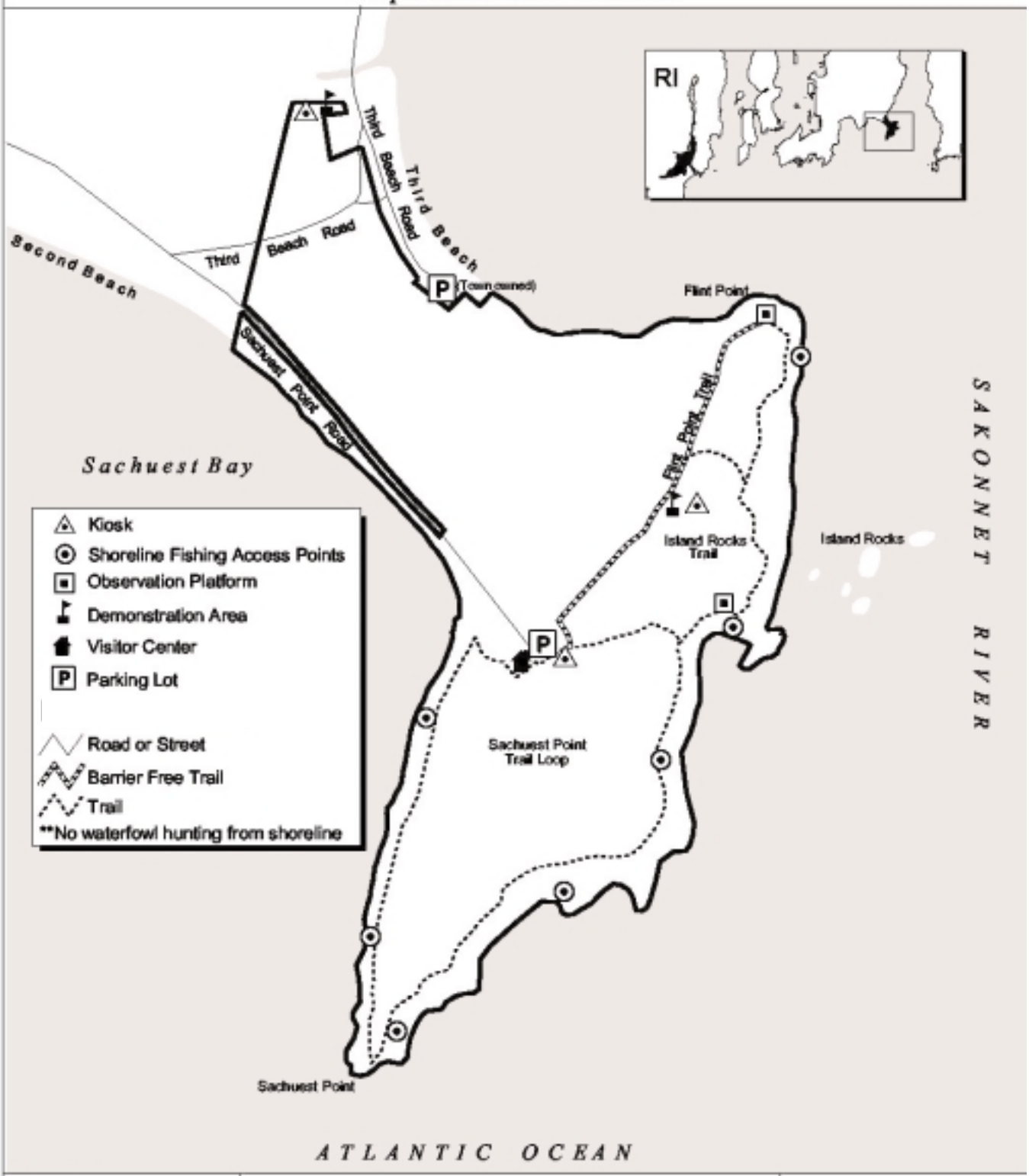
assigning permanent staff to this station and by staffing the Visitor Center.

- In 2002, we will begin implementing a fee permit system for fishing after official sunset. Only anglers with permits will be allowed to park in the refuge parking lot and access the refuge after sunset. The purpose is to reduce the continual problem of non-wildlife activities (e.g. bonfires, refuge dumping, parties, etc) occurring on the refuge after dark.
- In 2004, evaluate the effectiveness of the present system in controlling non-wildlife dependent activities.
- By 2004, increase resource protection and management of public use by utilizing law enforcement personnel to provide more consistent and thorough outreach and enforcement of refuge regulations. In particular, the following activities will be targeted on the refuge: dog walking, jogging, bicycling, swimming, sunbathing, horseback riding, and bonfires.

Sachuest Point National Wildlife Refuge

Public Use

Comprehensive Conservation Plan



Data Sources:

USGS 1:24,000 Roads & Hydrography
All other data provided by USFWS, RIGIS & So. New England/NY Bight Coastal Program

Map prepared for Rhode Island NWR Complex Comprehensive Conservation Plan. June 2007.
Refuge boundary has been modified for clarity. Not to be used for legal purposes.

0 1000 2000 3000 Feet

0 300 600 900 Meters

N

- By 2004, hire at least one additional Law Enforcement Officer for the Refuge Complex (see Chapter 5 - Staffing).

Goal 5: Provide refuge staffing, operations, and maintenance support to effectively accomplish refuge goals and objectives.

Staffing, operations, and maintenance needs are addressed in Chapter 5.

General Refuge Management Direction

The following management direction applies to all of the refuge goals and across all program areas. Some of this direction is required by Service policy or legal mandates.

Maintaining Biological Integrity, Diversity, and Environmental Health

The Service finalized its policy on Maintaining the Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System in January 2001 (FWS manual, Part 601, Chapter 3). This policy directs us, first and foremost, to maintain existing levels of biological integrity, diversity, and environmental health on refuges. Secondarily, we will restore lost or severely degraded elements of integrity, diversity, and environmental health on refuges where it is feasible and supports refuge purpose(s). To implement the policy on refuges, refuge managers are directed to determine: each refuge's relationship between refuge purpose(s) and biological integrity, diversity, and environmental health; what conditions constitute biological integrity, diversity, and environmental health; how to maintain existing levels of all three; and how, and when to appropriately restore lost elements of all three (Chapter 3, section 3.9)

The objectives and strategies laid out in this CCP generally improve the biological integrity, diversity, and environmental health of the refuge. Management actions emphasize maintaining current species and habitat diversity, recovering endangered and threatened species, and restoring natural ecosystem processes and functions. Implementation of the CCP will increase our understanding of the refuge's current resources, sustainable natural conditions, and the effects of our management actions. In addition, our strategy of adaptive management will provide continuous improvement toward meeting this policy's intent.

Protecting and Managing Cultural Resources

By law, we must consider the effects of our actions on archeological and historic resources. We will comply with Section 106 of the National Historic Preservation Act before disturbing any ground. Compliance may require any or all of the following: a State Historic Preservation Records survey, literature survey, or field survey.

In addition to basic compliance requirements, we will undertake the following projects to better protect and interpret cultural resources on the refuge:

- By 2005, initiate a cultural resources overview of the Refuge Complex to increase the available data on cultural resources.
- Also by 2005, develop a Memorandum of Understanding (MOU) with the Narragansett Indian Tribal Council to facilitate cooperation on environmental education and interpretation, to improve our understanding of the context of natural resources, and to increase site identification and protection.
- By 2006, train at least one law enforcement officer on the refuge in regulations associated with the Archeological Resources Protection Act (ARPA).

Tribal Coordination

Increasing communication with the Narragansett Indian Tribal Council is very important for the Refuge Complex. As noted above, we plan to develop an MOU by 2005 to establish a mutually beneficial working relationship that includes cooperating in environmental education and interpretation and protecting cultural resources.

Coastal Resources Management Council Coordination

The federal Coastal Zone Management Act (16 U.S.C. §1451, as amended) requires the Service to work with the State Coastal Resources Management Council (CRMC) to insure refuge programs and activities are consistent to the maximum extent practicable with the enforceable policies adopted by the state. The CRMC's concurrence with the Service's Federal Consistency Determination on the CCP was predicated on meeting the following management direction:

1) Provide Separate Consistency Determinations for Major Construction Projects. Major construction projects such as buildings, parking lots, roads, and boardwalks, which the Service determines may effect coastal resources, will require separate federal consistency determinations for each project.

2) Annual Coordination Meetings. Refuge Complex and CRMC staff will meet at least once annually to review general plans and projects which the Service has determined may effect coastal resources. These meetings will cover proposals for the forthcoming calendar year. The objective of these meetings will be to provide CRMC staff with available details on what is being proposed and to address their concerns. It is mutually understood that some projects may not be fully developed at the time of meeting.

Refuge Revenue Sharing Payments

Annual refuge revenue sharing payments to the Town of Middletown will continue. Future increases in payments will be commensurate

with increases in the appraised fair market values of refuge lands, new acquisitions of land, and new Congressional appropriations.

Contaminant Sites Remediation

The obvious concerns with human health and safety, and impacts to wildlife from contaminants, requires timely and thorough remediation of contaminated sites. Refuge Complex staff will continue coordinating with the Environmental Protection Agency (EPA), Rhode Island Department of Environmental Management (RI DEM), Army Corps of Engineers (ACOE), or delegated authorities, to finalize remediation plans and begin cleaning up the CERCLIS site (the Town of Middletown's former landfill).

Controlling Mosquitos

Within the past few years, incidences of mosquito-borne Eastern Equine Encephalitis and West Nile virus have elevated public health concerns about mosquito control in the Middle Atlantic States. Mosquito control has been very limited on the Refuge Complex, and has occurred only at the direct request of the State's Mosquito Abatement Office. During the last 5 years, we used two very localized applications of the larvicide Bti on two problem breeding sites. Our Regional Contaminants Specialist pre-approved those applications.

In general, we will not use larvicides on the Refuge Complex to control mosquitos. However, in cooperation with neighboring towns and the Mosquito Abatement Office, we will consider applying larvicides on a case-by-case basis, particularly when there is an elevated public health risk. The Service is now evaluating this issue on a regional basis, and has begun preparation for an environmental impact statement. This may result in Service policy or Regional guidelines being developed and incorporated into this CCP in the future.

Permitting Special Use (including Research)

Requests for special use permits will be evaluated by the Refuge Manager on a case-by-case. All permitted activities must be determined appropriate and compatible through a compatibility determination. At a minimum, all commercial activities and all research projects require a special use permit. Research projects that will improve and strengthen natural resource management decisions on the Refuge Complex will generally be approved. The Refuge Manager will encourage partnerships with local universities and colleges to facilitate research that will help evaluate CCP objectives and strategies, or the assumptions on which they are based.

The Refuge Manager may also consider research not directly related to refuge objectives, but which contributes to the broader enhancement, protection, or management of native species and biological diversity within the region.

Each refuge will maintain a list of research needs to provide prospective researchers or organizations upon request. The Refuge Manager will determine on a case-by-case basis whether they can directly support a project through funding, in-kind services (e.g. housing or use of other facilities), field assistance, or through sharing

data and records. Research results will be shared within the Service, and with RI DEM.

All researchers on refuges, current and future, are required to submit a detailed research proposal following Service policy in the FWS Refuge Manual, Chapter 4 Section 6. Special use permits must also identify a schedule for progress reports (at least annual), criteria for determining when a project should cease, and publication or other final reporting requirements. The Regional Refuge Biologists, other Service divisions, and state agencies will be asked to review and comment on research proposals.

Some projects, such as depredation and banding studies, require additional Service permits. These projects will not be approved until all Service permits and Endangered Species Act consultation requirements are met. Also, to maintain the natural landscape of the refuge, projects which require permanent or semi-permanent structures will not be allowed, except for extenuating circumstances unforseen at this time.

Chapter 5

Laughing gull
USFWS photo

Implementation and Monitoring

- Refuge Complex Staffing
- Refuge Complex Funding
- Step-down Management Plans
- Partnerships
- Volunteer Program
- Monitoring and Evaluation
- Adaptive Management
- Compatibility Determinations
- Additional NEPA Analysis
- Plan Amendment and Revision

Refuge Complex Staffing

The five Rhode Island Refuges are managed as a Refuge Complex, with centrally stationed staff taking on duties at multiple refuges. A total of 26 full time personnel, one Student-to-Career Experience Program (SCEP) trainee, and 17 seasonal personnel, are needed to fully implement all five Refuge CCPs. Permanent staff serving all five refuges may be stationed at the Refuge Headquarters in Charlestown, RI, or at Sachuest Point Refuge in Middletown, RI. Some permanent and temporary staff may be stationed seasonally on Block Island Refuge. Appendix G identifies currently filled positions, recommended new positions, and the overall supervisory structure. The new positions identified will increase visitor services, biological expertise, and visibility of the Service on refuge lands.

Refuge Complex Funding

Successful implementation of the CCPs for each refuge relies on our ability to secure funding, personnel, infrastructure, and other resources to accomplish the actions identified. Full implementation of the actions and strategies in all five Refuge Complex CCPs would incur one-time costs of $8.9 million. This includes staffing, major construction projects, and individual resource program expansions. Most of these projects have been identified as Tier 1 or Tier 2 Projects in the National Wildlife Refuge System's Refuge Operations Needs System database (RONS). Appendix F lists RONS projects and their recurring costs, such as salaries, following the first year. Also presented in Appendix F is a list of projects in the Service's current Maintenance Management System (MMS) database for the Refuge Complex. Currently, the MMS database lists $3.85 million in maintaenance needs for the Refuge Complex.

Land acquisition costs are identified separately. The Land Protection Plan (LPP, Appendix E) expanded the Refuge Complex acquisition boundary by 2,681 acres, increasing the total unacquired acreage to 3,130. We estimate the value of these lands to be $83 million at current, fair-market prices. In all probability, the Refuge Complex will protect these lands at a lower cost, as some parcels may be protected through conservation easements or acquired through donation or land exchange.

Step-Down Management Plans

The Refuge System Manual (Part 4 Chapter 3) lists more than 25 Step-Down Management Plans generally required on most refuges. Step-down plans describe specific management actions a refuge will follow to achieve objectives or implement management strategies. Some require annual revision, others are revised on a 5- to 10-year schedule. Some require additional NEPA analysis, public involvement, and compatibility determinations before they can be implemented. A status list of Rhode Island Refuge Complex step-down plans follows.

These plans are current :

- Fire Management Plan, 1995 (Refuge Complex); updated with annual burn plans
- Grasslands Management Plan, 1994 (Trustom Pond Refuge); will be incorporated into the Habitat Management Plan for the Refuge Complex in 2003
- Continuity of Operations Plan, 1998 (Refuge Complex)
- Animal Control Plan, 1995 (Refuge Complex); will be updated with Integrated Predator Management and Trapping Plans for the Refuge Complex

These plans are now in draft form or being prepared:

- Safety Program and Operations Plan (Refuge Complex)
- Law Enforcement Plan (Refuge Complex)

These plans exist, but we consider them out-of-date and needing revisions as indicated:

- Water Management Plan (Trustom Pond Refuge); incorporate into Habitat Management Plan by 2003
- Hunting Plan (Trustom Pond Refuge); incorporate into Hunt Plan for the Refuge Complex in 2003
- Sign Plan (Refuge Complex); expand to Facilities and Sign Plan by 2005
- Croplands Management Plan (Trustom Pond Refuge); incorporate into Habitat Management Plan for Refuge Complex in 2003

These step-down plans need to be initiated and will be completed by the indicated dates:

- Refuge Complex Habitat Management Plan (highest priority step down plan) in 2003
- Refuge Complex Hunt Plan in 2003
- Refuge Complex Species and Habitat Inventory and Monitoring Plan in 2004
- Integrated Predator Management Plan in 2004
- Refuge Complex Visitor Services Plan in 2004
- Fishing Plan by 2005
- Trapping Plan by 2004

Partnerships

The Refuge Complex staff is proud of its long history of partnerships. More than 45 partnerships have supported the refuges, including four universities and colleges, numerous departments within Rhode Island State government, town administrations, conservation commissions, school districts, conservation groups and land trusts, environmental education centers, historic preservation groups, adjacent landowners, and other federal agencies. These partnerships have resulted in

biological research, cooperative management of threatened and endangered species and declining habitats, protection of open space, and environmental education programs.

Refuge staff were particularly delighted by the establishment in 1998 of a "Friends of the National Wildlife Refuges of Rhode Island" group. The Friends are a non-profit advocacy group dedicated to supporting Refuge Complex goals within the community through public education and interpretation, project funding, and volunteer coordination. Their mission is "…[to be] devoted to the conservation and development of needed healthy habitat for flora and fauna at the National Wildlife Refuges of Rhode Island and to the provision of a safe, accessible ecological experience for our visitors…."

We will strengthen and formalize refuge partnerships to promote coordinated management and facilitate sharing of resources. Our partnership with the Friends Group is vitally important to us for community relations and for support in implementing our resource programs. Partnerships help us build support for the refuge, facilitate the sharing of information, and supplement the efforts of refuge staff.

Strategies:

- By 2003, we will conduct at least semi-annual meetings with the Friends Group to promote communication and evaluate implementation of the MOU. We will continue to actively support and promote the Friends Group's vital efforts in funding and implementing outreach and environmental education programs, which enhance our ability to meet refuge goals.
- By 2005, develop formal agreements with current partners, such as the South County Tourism Council, local land trusts, and conservation organizations, to identify mutual goals, and opportunities for cost sharing, technical exchange and environmental education and interpretation.

Volunteer Program

Volunteers are vital to accomplishing all Refuge Complex goals. For example, in fiscal years 2000 and 2001, volunteers donated 9,332 and 10,000 hours respectively, assisting in environmental education programs, monitoring public use, maintaining facilities, and managing habitats. This translates to more than $110,000 worth of services contributed to the refuges in 2000 and $117,900 in 2001. Volunteers are also largely responsible for staffing the visitor contact station at Trustom Pond Refuge.

In 1999 we hired a permanent staff Volunteer Coordinator to improve the quality of the program through better coordination, supervision and training of volunteers, and to better integrate volunteers into all refuge programs. The coordinator compiles and distributes a quarterly newsletter to volunteers, refuge partners, and interest groups, keeping them informed about management activities and upcoming interpretive programs on the Refuge Complex.

Maintaining Existing Facilities

Periodic maintenance of existing facilities is critical to ensure safety and accessibility for Refuge Complex staff and visitors. Existing facilities include the Trustom Pond Refuge visitor contact station, Refuge Complex maintenance compound, and numerous parking areas, observation platforms, and trails. Many of these facilities are not currently Americans With Disabilities Act (ADA) compliant; upgrading is needed. Appendix F displays the fiscal year (FY) 2000 Maintenance Management System (MMS) database list of backlogged maintenance entries for the Refuge Complex.

We will also undertake the following strategies to improve the visibility of the Service:

- By 2005, complete construction of the Visitor Center/Headquarters for the Refuge Complex, implementing recommendations for interior facility design from the August 1999 Project Identification Document. At least one Visitor Services Specialist will be hired to administer the new facility.
- By 2005, complete a Refuge Complex Facilities and Sign Plan.

Monitoring and Evaluation

Monitoring and Evaluation for this CCP will occur at two levels. The first level, which we refer to as implementation monitoring, responds to the question, "Did we do what we said we would do, when we said we would do it?" Annual implementation monitoring will be achieved by using the checklist in Appendix H for the Refuge Complex.

The second level of monitoring, which we refer to as effectiveness monitoring, responds to the question, "Are the actions we proposed effective in achieving the results we had hoped for?" Or, in other words, "Are the actions leading us toward our vision, goals, and objectives?" Effectiveness monitoring evaluates an individual action, a suite of actions, or an entire resource program. This approach is more analytical in evaluating management effects on species, populations, habitats, refuge visitors, ecosystem integrity, or the socio-economic environment. More often, the criteria to monitor and evaluate these management effects will be established in step-down, individual project, or cooperator plans, or through the research program. The Species and Habitat Inventory and Monitoring Plan, to be completed in 2004, will be based on the needs and priorities identified in the Habitat Management Plan.

Adaptive Management

This CCP is a dynamic document. A strategy of adaptive management will keep it relevant and current. Through scientific research, inventories and monitoring, and our management experiences, we will gain new information which may alter our course of action. We acknowledge that our information on species, habitats, and ecosystems is incomplete, provisional, and subject to change as our knowledge base improves.
Objectives and strategies must be adaptable in responding to new information and spatial and temporal changes. We will continually

evaluate management actions, through monitoring or research, to reconsider whether their original assumptions and predictions are still valid. In this way, management becomes an active process of learning "what really works". It is important that the public understand and appreciate the adaptive nature of natural resource management.

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

Compatibility Determinations

Federal law and policy provide the direction and planning framework to protect the Refuge System from incompatible or harmful human activities and to insure that Americans can enjoy Refuge System lands and waters. The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, is the key legislation on managing public uses and compatibility.

Before activities or uses are allowed on a National Wildlife Refuge, we must determine that each is a "compatible use." A compatible use is a use that, based on the sound professional judgement of the Refuge Manager, " ...will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge." "Wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and not inconsistent with public safety. Except for consideration of consistency with State laws and regulations as provided for in section (m), no other determinations or findings are required to be made by the refuge official under this Act or the Refuge Recreation Act for wildlife-dependent recreation to occur." (Refuge Improvement Act)

Compatibility determinations were distributed (in the draft CCP/EA) for a 51 day public review in early 2001. These determinations have since been approved, and will allow the continuation of the following public use programs: wildlife observation and photography, environmental education and interpretation, fishing, and hunting. A pre-acquisition compatibility determination was also reviewed and completed, and identifies which existing public uses would be allowed to continue on new properties acquired by the Refuge complex. Since releasing the draft CCP/EA, we have also distributed compatibility determinations for trapping and waterfowl hunting for a public review period. All comments were considered and utilized in the revision. These new compatibility determinations are now final and included in Appendix D.
Additional compatibility determinations will be developed when appropriate new uses are proposed. Compatibility determinations

will be re-evaluated by the Refuge Manager when conditions under which the use is permitted change significantly; when there is significant new information on effects of the use; or at least every 10 years for non-priority public uses. Priority public use compatibility determinations will be re-evaluated under the conditions noted above, or at least every 15 years with revision of the CCP. Additional detail on the compatibility determination process is in Parts 25, 26, and 29 of Title 50 of the Code of Federal Regulations, effective November 17, 2000.

Additional NEPA Analysis

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

Most of the actions and associated impacts in this plan were described in enough detail in the draft CCP/EA to comply with NEPA, and will not require additional environmental analysis. Although this is not an all-inclusive list, the following programs are examples that fall into this category: protecting piping plover, restoring area-defined grasslands and wetlands, implementing priority wildlife-dependent public use programs (except deer hunting), acquiring land, and controlling invasive plants.

Other actions are not described in enough detail to comply with the site-specific analysis requirements of NEPA. Examples of actions that will require a separate EA include: construction of a new visitor center and headquarters, new deer hunting opportunities, and future habitat restoration projects not fully developed or delineated in this document. Monitoring, evaluation, and research can generally be increased without additional NEPA analysis.

Plan Amendment and Revision

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

The Service's planning policy (FWS Manual, Part 602, Chapters 1, 3, and 4) states that CCPs should be reviewed at least annually to decide if they require any revisions (Chapter 3, part 3.4 (8)). Revisions will be necessary if significant new information becomes available, ecological conditions change, major refuge expansions occur, or when we identify the need to do so during a program review. At a minimum, CCPs will be fully revised every 15 years. We will modify the CCP documents and associated management activities as needed, following the procedures outlined in Service policy and NEPA requirements. Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3C) will only require an Environmental Action Statement.