Chapter 4

Amanda Boyd/USFWS

Greater shearwater

Management Direction and Implementation

- Introduction
- General Refuge Management
- Summary by Major Program Area
- Goals, Objectives, and Strategies

Introduction

This CCP includes an array of management actions that, in our professional judgment, work towards achieving the purpose, vision, and goals for the refuge, and State and regional conervation plans. In our opinion, it effectively addresses the key issues identified in chapter 2. We believe it is reasonable, feasible, and practicable.

In all program areas, this CCP will enhance the quality and sustainability of current compatible activities, develop long-range and strategic step-down plans, and promote partnerships.

General Refuge Management

The actions presented in this section represent those that were common to all three alternatives evaluated in the EA/draft CCP. These are actions required by law or policy, or represent actions that have undergone a separate NEPA analysis, public review, agency review, and approval. Or, they are administrative actions that do not necessarily require public review, but are actions we wanted to highlight in our implementation plan. Finally, most of the actions outlined in this part of chapter 4 support multiple goals and objectives, or represent general administrative or compliance activities. We present them below.

Adaptive Management

We will include flexibility in management to allow us to respond to new information, spatial and temporal changes, and environmental events, whether foreseen or unforeseen, or other factors that influence management. Our goal is to be able to respond quickly to any new information or events. The need for flexible or adaptive management is very compelling today because our present information on refuge species and habitats is incomplete, provisional, and subject to change as our knowledge base improves.

We will continually evaluate management actions, both formally and informally, through monitoring or research, to consider whether our original assumptions and predictions remain valid. In that way, management becomes a proactive process of learning what really works. On March 9, 2007, Secretary of the Interior Dirk Kempthorne issued Secretarial Order No. 3270 to provide guidance on policy and procedures for implementing adaptive management in Departmental agencies. In 2007, an intradepartmental working group developed a guidebook to assist managers and practitioners: "Adaptive Management: The U.S. Department of the Interior Technical Guide." It defines adaptive management, the conditions under which we should consider it, and the process for implementing it and evaluating its effectiveness. You may view the guidebook at: *http://www.doi.gov/initiatives/AdaptiveManagement/documents.html* (accessed March 2011).

Adaptive management, as it relates to refuge management, promotes flexible decision-making through an iterative learning process that responds to uncertainties, new information, monitoring results, and the natural variability in ecosystems. It is designed to facilitate more effective decisions and enhanced benefits. At the refuge level, monitoring management actions, outcomes, and key resources will be very important. The refuge manager is responsible for changing management actions and strategies if they do not produce the desired conditions. Significant changes from what we present in this CCP may warrant additional NEPA analysis and public comment.

Generally, we can increase monitoring and research that support adaptive management without additional NEPA analysis. Many of our objectives identify monitoring elements. Our Inventory and Monitoring Plan (IMP) will determine future survey efforts. Implementing an adaptive management approach supports all three goals of the refuge.

Strategic Habitat Conservation

SHC is a framework that utilizes adaptive management to redefine broad scale conservation from the general pursuit of conserving "more" habitat and species, to a more planned approach based on scientific data, at a landscape level, and in cooperation with partners. It starts with explicit, measurable objectives that are based on testable assumptions that can be evaluated, and is enacted through an iterative process of biological planning, conservation design, conservation delivery, assumption-driven research, and outcome-based monitoring. The goal is to set specific population objectives for species that are limited in some way by habitat (though this would be effective for other limiting factors as well), and to use targeted habitat management approaches to meet those objectives. Inherent in the process is a continual evaluation of biological outcomes and approaches, with the intent to adapt the overall conservation strategy to respond to changing circumstances and new information.

Controlling Pest Plants and Animals

At times, native plants and animals interfere with management objectives. The Refuge Manual (7 RM 14.4A) defines a pest as "Any terrestrial or aquatic plant or animal which interferes, or threatens to interfere, at an unacceptable level, with the attainment of refuge objectives or which poses a threat to human health." This definition also includes non-native invasive species (see below).

Integrated Pest Management

In controlling pests, whether non-native or native species, we use an integrated approach. The Refuge Manual (7 RM 14.4C) defines integrated pest management (IPM) as "A dynamic approach to pest management which utilizes a full knowledge of a pest problem through an understanding of the ecology of the pest and ecologically related organisms and through continuous monitoring of their populations. Once an acceptable level of pest damage is determined, control programs are carefully designed using a combination of compatible techniques to limit damage to that level."

The refuge's IPM program will be on file at the refuge complex headquarters when complete. The IPM is a step-down plan from the CCP and supplements both the CCP and Habitat Management Plan (HMP) with documentation on how to manage invasive or pest species. Along with a more detailed discussion of IPM techniques, this documentation describes the selective use of pesticides for pest management on the refuge, where necessary. Pesticide uses with appropriate and practical best management practices (BMPs) for habitat management would be approved for use on the refuge where there likely would be only minor, temporary, and localized effects to species and environmental quality based upon non-exceedance of threshold values in the chemical profiles. Our control program would address the most critical problems first and can be adjusted to reflect Regional Service priorities, the availability of new information, or a new resource.

Managing Invasive Species

The establishment and spread of invasive species, particularly invasive plants, is a significant problem that reaches across all habitat types. For the purposes of this discussion, we use the definition of invasive species contained in the Service Manual (620 FW 1.4E): "Invasive species are alien species whose introduction does or is likely to cause economic or environmental harm, or harm to human health. Alien species, or non-indigenous species, are species that are not native to a particular ecosystem. We are prohibited by Executive Order, law, and policy from authorizing, funding, or carrying out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere." This discussion focuses solely on invasive plant species.

Multiflora rose and sea poppy are the only invasive plant species which have been identified on Nantucket NWR (see chapter 3). Invasive species on adjacent lands could pose problems for the refuge in the future.

G.A. Cooper @ USDA-NRCS PLANTS Database

Multiflora rose

The unchecked spread of invasive plants threatens the biological diversity, integrity, and environmental health of all national wildlife refuge habitats. In many cases, they have a competitive advantage over native plants and form dominant cover types, reducing the availability of native plants as food and cover for wildlife. Over the past several decades, government agencies, conservation organizations, and the public have become more acutely aware of the negative effects of invasive species. Many plans, strategies, and initiatives target the more effective management of invasive species, including "The National Strategy for Management of Invasive Species for the National Wildlife Refuge System" (USFWS 2003a), "Silent Invasion—A Call to Action," by the National Wildlife Refuge Association (2002), and "Plant Invaders of Mid-Atlantic Natural Areas," by the Service and the National Park Service (Swearingen et al. 2002).

Guidance on managing invasive species on refuges appears in the Service Manual (620 FW 1.7G). The following actions define our general strategies on the refuge:

1. Manage invasive species on refuges under the guidance of the National Strategy for Invasive Species Management and within the context of applicable policy.

2. Manage invasive species to improve or stabilize biotic communities to minimize unacceptable change to ecosystem structure and function, and to prevent new and expanded infestations of invasive species.

3. Evaluate native habitat management activities with respect to their potential to accidentally introduce or increase the spread of invasive species and modify our habitat management operations to prevent increasing invasive species populations.

4. Conduct refuge habitat management (including working through partners) to prevent, control, or eradicate invasive species using techniques described through an IPM plan, or other similar management plan. The plans comprehensively evaluate all potential integrated management options, including defining threshold/risk levels that will initiate the implementation of proposed management actions.

5. Refuge IPM planning addresses the abilities and limitations of potential techniques including chemical, biological, mechanical, and cultural techniques. See the additional discussion on IPM below.

The following actions define our specific strategies for the refuge:

1. Treat the most problematic species as funding and staffing permit, in accordance with the selected alternative.

2. Develop early-detection/rapid-response readiness regarding new invasions.

3. Remove the parent sources of highly invasive species (e.g., species that are high seed producers or vigorous rhizome producers).

4. Maintain accessibility to affected areas for control and monitoring if possible.

Monitoring and Abating Wildlife and Plant Diseases

The Service has not yet published its manual chapter on Disease Prevention and Control. In the meantime, we derive guidance on this topic from the Refuge Manual and specific directives from the Director of the Service or the Secretary of the Interior. The Refuge Manual (7 RM 17.3) lists three objectives for the prevention and control of disease:

1. Manage wildlife populations and habitats to minimize the likelihood of the contraction and contagion of disease.

2. Provide for the early detection and identification of disease mortality when it occurs.

3. Minimize the losses of wildlife from outbreaks of disease.

The Service published these objectives in 1982. Since then, in addition to diseases that cause serious mortality among wildlife, diseases transmitted through wildlife to humans have received more attention. One example is Lyme disease. In 2002, the Service published a Service Manual chapter (242 FW 5) on Lyme Disease Prevention to inform employees, volunteers, and national service workers about this disease, its prevention, and treatment.

Another serious wildlife disease that receives considerable attention worldwide is avian influenza. Of particular concern is the highly pathogenic Eurasian form (H5N1). In 2006, the Service instructed all refuges to prepare an Avian Influenza Surveillance and Contingency Plan. This plan covers all eight refuges in the Eastern Massachusetts NWR Complex, and was completed in 2007.

In addition to the diseases of wildlife, we will be attentive to the diseases and pests that affect the health of the ecosystems that Nantucket NWR supports. We will continue to opportunistically monitor for, and report, seabird mortality events on refuge beaches. In addition, we will record and report instances of seal entanglements or strandings, because these are instances that could lead to increased susceptibility to disease mortality. It is likely that other monitoring efforts will be minimal, and the occurrence of any wildlife or habitat disease element will be responded to only if they posed an immediate or serious threat to indigenous wildlife and habitat. The Service will respond at a level commensurate with staffing and funding.

These are the general strategies for preventing or controlling disease:

1. Continue to conduct disease surveillance in conjunction with other fieldwork.

2. Cooperate with State agencies, particularly MassWildlife, by providing access for sampling and following protocols in the event of an outbreak.

3. Inform volunteers and others who work in the field about the dangers of Lyme disease and measures to avoid contracting it.

4. Monitor habitats for indicators of the increased occurrence of pests or disease. For example, anecdotally note changes in flowering or fruiting phenology that do not appear to be linked to climate change, and be vigilant for signs of physical damage, decay, weakening, sudden death, particularly of major host species, and changes in wildlife use of habitats, such as the absence of breeding birds that used to appear regularly.

5. Follow the protocols in national, State, and refuge disease prevention and control plans.

Biological and Ecological Research and Investigations

The Refuge Manual and the Service Manual both contain guidance on conducting and facilitating biological and ecological research, and investigations on refuges. In 1982, the Service published three objectives in the Refuge Manual for supporting research on units of the refuge system (4 RM 6.2):

Karen Terwilliger/TCI

Staging terns on the refuge

1. To promote new information and improve the basis for, and quality of, refuge and other Service management decisions.

2. To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general.

3. To provide the opportunity for students and others to learn the principles of field research.

In 2006, the Service Manual provided supplemental guidance on the appropriateness of research on refuges: "We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must

review all research activities to decide if they are appropriate or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research" (603 FW 1.10D(4)).

All research conducted on the refuge must be determined in writing to be both appropriate and compatible, unless we determine it to be an administrative activity. Research projects also must contribute to a need identified by the refuge or the Service. In determining the appropriateness and compatibility of future research proposals, we will follow the guidance in the manuals, and will employ the following general strategies:

1. Seek qualified researchers and funding to help answer refuge-specific management questions.

2. Participate in appropriate multi-refuge studies conducted in partnership with the U.S. Geological Survey, or other entity.

3. Coordinate with partners to initiate or conduct research on priority issues identified at local and regional scales. For example, a landscape level roseate tern study is being planned that can better determine the timing and use of Nantucket, and adjacent islands, to determine the refuge's contribution and future need for active management and beach restrictions to benefit roseate terns.

All researchers will be required to submit detailed research proposals following the guidelines established by Service policy and refuge staff. Special use permits will also identify the schedules for progress reports, the criteria for determining when a project should cease, and the requirements for publication or other interim and final reports. All publications will acknowledge the Service and the role of Service staff as key partners in funding and/or operations.

Addressing the Threats of Accelerating Sea level Rise and Climate Change

Climate change is an issue of increasing public concern because of its potential effects on land, water, and biological resources. The issue was pushed to the forefront in 2007 when the Intergovernmental Panel on Climate Change, representing the world's leading climate scientists, concluded that it is "unequivocal" that the Earth's climate is warming, and that it is "very likely" (a greater than 90 percent certainty) that the heat-trapping emissions from the burning of fossil fuels and other human activities have caused "most of the observed increase in globally averaged temperatures since the mid-20th century" (IPCC 2007). The Northeast is already experiencing rising temperatures, with potentially dramatic warming expected later this century under some model predictions. According to the Northeast Climate Impacts Assessment (NECIA) team, "continued warming, and more extensive climate-related changes to come could dramatically alter the region's economy, landscape, character, and quality of life" (Frumhoff et al. 2007).

Other predicted climate-related changes, beyond warming temperatures, include changing patterns of precipitation, significant acceleration of sea level rise, changes in season lengths, decreasing range of nighttime versus daytime temperatures, declining snowpack, and increasing frequency and intensity of severe weather events (Inkley et al. 2004). Since wildlife species are closely adapted to their environments, they must respond to climate variations, and the subsequent changes in habitat conditions, or they will not survive. Unfortunately, the challenge for wildlife is all the more complicated by increases in other environmental stressors such as pollution, land use developments, ozone depletion, exotic species, and disease. Wildlife researchers and professionals, sportsmen, and other wildlife enthusiasts are encouraging positive and preemptive action by land managers. Some recommendations for action include:

reducing or eliminating those environmental stressors to the extent possible, managing lands to reduce risk of catastrophic events, managing for self-sustaining populations, and looking for opportunities to ensure widespread habitat availability (Inkley et al. 2004).

The Service is becoming more aware and knowledgeable about the impacts of climate change on national wildlife refuges. A proposed Climate Change Strategic Plan and a 5-Year Action Plan have been drafted to provide specific direction to the Service's climate change response initiatives (see chapter 1). Nantucket NWR could be a prime location for long-term and remote research and monitoring. To date, a Sea Level Affecting Marshes Model analysis has been conducted to predict refuge shoreline changes over the next century under four different sea level rise scenarios (see chapter 3 and Appendix H). At the refuge, we recognize the need for an increase in biological monitoring and inventories, two actions that are critically important for land managers to undertake in order to effectively respond to the uncertainty of future climate change effects. This would primarily be based on the availability of staff and funds. In addition, it will be important to coordinate with the State's climate change strategies as they are further refined. The establishment of the North Atlantic Landscape Conservation Cooperative (see chapter 3) will also facilitate the exchange of information and coordination among agencies in the region to implement climate change strategies.

Special Use Permits

It is up to the refuge manager to evaluate activities that require a special use permit for their appropriateness and compatibility on a case-by-case basis. Typically, there is a fee associated with these permits. We anticipate the number of special use permits that will be issued to be limited. We will only approve permit requests for activities that are appropriate and compatible uses, or for research that will strengthen our decisions on managing natural resources on the refuge. The refuge manager may also consider research requests that do not relate directly to refuge objectives, but to the protection or enhancement of native species and biological diversity in the region, and support the goals of recognized ecoregional conservation teams, such as the ACJV.

Protecting Cultural Resources

As a Federal land management agency, we are responsible for locating and protecting all historic resources; specifically, archeological sites and historic structures eligible for listing or listed on the National Register of Historic Places. This applies not only to refuge land, but also to land affected by refuge activities. Our consultation with the Massachusetts State Historic Preservation Officer (MA SHPO) indicates that no archeological sites are recorded on refuge land. However, no professional survey has been conducted, and Great Point is a dynamic landform with eroding and accreting areas. Archaeological sites might be exposed at any time through erosion.

We will continue to evaluate the potential for impact on archeological and historical resources as required. We will consult with the MA SHPO and the Tribal Historic Preservation Officers (THPO) for the Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe. These activities will ensure that we comply with Section 106 of the National Historic Preservation Act. Compliance may require a State Historic Preservation Records survey, literature survey, or field survey.

Conducting a Wilderness Review

As we described in chapter 1, refuge system planning policy requires that we conduct a wilderness review during the CCP process. The first step is to inventory all refuge lands and waters in Service fee simple ownership. Our inventory of this small refuge determined that the area does not meet the eligibility criteria for a wilderness study area as defined by the Wilderness Act. Therefore, we did not further analyze the refuge's suitability for wilderness

designation. The results of the wilderness inventory are included in appendix C. The entire refuge will undergo another wilderness review in 15 years as part of the next planning process. Specifically, any lands acquired in fee by the Service in the interim, along with existing refuge lands, will become part of that wilderness review in 15 years.

Wildlife-Dependent Recreational Program

The Improvement Act designated six priority public uses on national wildlife refuges: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. As detailed in the Service's "General Guidelines for Wildlife-Dependent Recreation," (605 FW 1), we will strive to meet the criteria for a quality, wildlife-dependent recreation program.

Of the six priority public uses, only hunting is currently not allowed on the refuge. The informal surveys conducted by the Service (USFWS 1999), as well as TTOR (Donnelly and Vaske 1991), indicate that opportunities for the remaining five priority uses are being provided in some degree on the refuge as well as elsewhere through partnerships, and are in demand by visitors and residents of Nantucket (see chapter 3). These activities, as well as hunting, are alsoy provided elsewhere on Nantucket, including on adjacent TTOR land. Refuge management decisions do not eliminate the opportunity for those public uses on the Coskata-Coatue Peninsula, or elsewhere on Nantucket.

In recent years, the Service has recognized the importance of connecting children with nature. Scholars and health care professionals are suggesting a link between a disconnection with the natural world and some physical and mental maladies in our Nation's youth (Louv 2005). We intend to promote the concept of connecting children and families with nature in all of our compatible recreational and educational programming. We look to our partners, TTOR, Maria Mitchell Association, NCF, and others, to help us expand environmental education and to develop and assist with programs for the other priority public uses on refuge lands.

Appropriateness and Compatibility Determinations

Chapter 1 describes the requirements for determinations of appropriateness and compatibility. Appendix B includes all approved findings of appropriateness and compatibility determinations consistent with implementing this plan. As required, future documents will address activities on newly acquired lands as part of the acquisition process. We will allow only the activities determined appropriate and compatible for meeting or facilitating refuge purposes, goals, and objectives.

Activities Not Allowed

According to Service policy (603 FW 1), if the refuge manager determines a use is not appropriate, it can be denied without determining its compatibility. An updated list of activities that have been found both compatible and appropriate are found in appendix B. Uses which are not included on this list are not allowed on the refuge.

Refuge Staffing and Administration

Our proposals in this document do not constitute a commitment for staffing increases or funding for operations or maintenance. Congress determines our annual budgets, which our Washington headquarters and regional offices distribute to field stations. Chapter 3 presents our levels of staffing, operating, and maintenance funds for the refuge. The activities we describe below pertain to staffing, administration, and operations. Some are new activities and others are ongoing.

The Service will investigate additional sources of funding to complement and augment existing budgets. We have the ability to raise revenues through the

establishment of a refuge access fee. Should we decide that we want to do so, we will develop a specific proposal and supporting documentation which will be released for public review and comment. We also have the opportunity to obtain funding through the issuance of a concessionaire license. We will pursue additional funding opportunities as well.

Permanent Staffing and Operational Budgets
Our objective is to sustain levels of annual funding and staffing that allow us to achieve refuge purposes, as interpreted by the goals, objectives, and strategies in this CCP. Often, many highly visible projects are conducted through special project funds that typically have a 1- to 2-year duration. Although those funds are very important, their flexibility is limited because we cannot use them for any other priority project that may arise. Additionally, we cannot anticipate when, or if we will receive these funds.

In response to declines in operational funding Nationwide, we developed a regional "Strategic Workforce Plan for the National Wildlife Refuge System in Region 5" (Phase 2; memo dated January 16, 2007) to support a new base budget approach. Its goal is a maximum of 75 percent of a refuge station budget to cover salaries and fixed costs, while the remaining 25 percent or more will be operating and maintenance funds. Our strategy is to improve the capability of each refuge manager to do the project work of the highest priority, and not to have the refuge budget tied up in inflexible fixed costs. Unfortunately, in a level or declining budget environment, that also may have implications for the level of permanent staffing.

In 2008, the Service approved a national staffing model which identifies the number of staff needed at each refuge or refuge complex throughout the country. The model indicated that the Eastern Massachusetts NWR Complex should have 39.5 permanent positions. As previously indicated, there are currently 16 permanent employees in the refuge complex. Within the guidelines of the new base budget approach, we will seek to fill positions which we believe are necessary to accomplish our highest priority projects, though it is unlikely that all 39.5 positions would be filled. We identify our recommended priority order for new staffing in the Refuge Operations Needs System (RONS) tables in appendix D. Appendix E identifies our plan for current and future staffing growth.

Facilities Construction and Maintenance
We will continue to make progress towards increasing the participation and presence of the Service by installing and maintaining interpretive and informational signs, and other printed materials. We will work with our partners, including TTOR, NCF, Maria Mitchell Association, and Massachusetts Audubon Society, to develop such signage, highlighting our collaborative partnerships. We will investigate opportunities to establish an offsite joint visitor contact facility with TTOR and/or NCF to provide a venue for educating and informing the public about the wildlife resources, habitat management activities, and visitor opportunities on the Coskata-Coatue peninsula. This facility would also provide a much-needed Service outpost on Nantucket Island for refuge staff and supplies. Any addition of signage or other examples of Service infrastructure on the refuge will be consistent with the intent and purpose of the proposed National Natural Landmark designation, and will endeavor to maintain the aesthetic value and quality of Great Point.

Refuge Operating Hours
The refuge is open for public use from ½ hour before official sunrise to ½ hour after official sunset, except at night for surfcasting, seven days a week, to ensure

visitor safety and protect refuge resources. The refuge manager does have the authority to issue a special use permit to allow others access outside those periods. For example, we may permit access for research personnel or volunteers at different times, or organized groups to conduct nocturnal activities, such as wildlife observation, and educational and interpretive programs.

Zone Management
In this CCP, we are proposing a zone management system for the refuge that will indicate areas closed to OSVs and/or pedestrian traffic based on time of year and species presence. Please see map 4-1 for an illustration of the refuge zones and see the visitor access objectives under goal 2.

Partnerships

We will continue to maintain the existing partnerships identified in chapter 3. These relationships are vital to our success in managing all aspects of the refuge, from managing habitats and protecting species, to outreach and education, and providing wildlife-dependent recreation. In particular, we are committed to further strengthening our partnerships with TTOR, NCF, and the Maria Mitchell Association. The Maria Mitchell Association is a local organization that promotes state-of-the-art research and science on Nantucket and offers unique collaborative opportunities for research and public engagement. TTOR has played an invaluable role in managing and monitoring refuge shorebirds, including federally listed and State-listed species, over the last decade and will remain our primary partner in the future. We will establish a new, updated Partnership Agreement which addresses resource management, visitor use, and additional funding sources and support to help contribute to refuge operations. Both TTOR and NCF are our conservation partners on the Coskata-Coatue Peninsula, and both coordinate and oversee public use, staffing, and facilities maintenance. Other important partners include MassWildlife and Massachusetts Audubon Society.

Preservation of Scenic and Aesthetic Qualities

There are important scenic and aesthetic qualities to the refuge which are not well addressed through the biological and cultural landscape analyses included in this plan. These qualities are also important to preserve. We will be careful under all alternatives to meet the guideline in the Service's wildlife-dependant recreational program policy (605 FW 1) that recommends planning "…facilities that … blend into the natural setting." We will also support the entire landform's designation as a National Natural Landmark as recommended by TTOR. The nomination of such landmarks includes a careful analysis of those qualities that make the landform eligible for designation, and will help identify what physical attributes must be protected in order to preserve the experience of visiting Great Point.

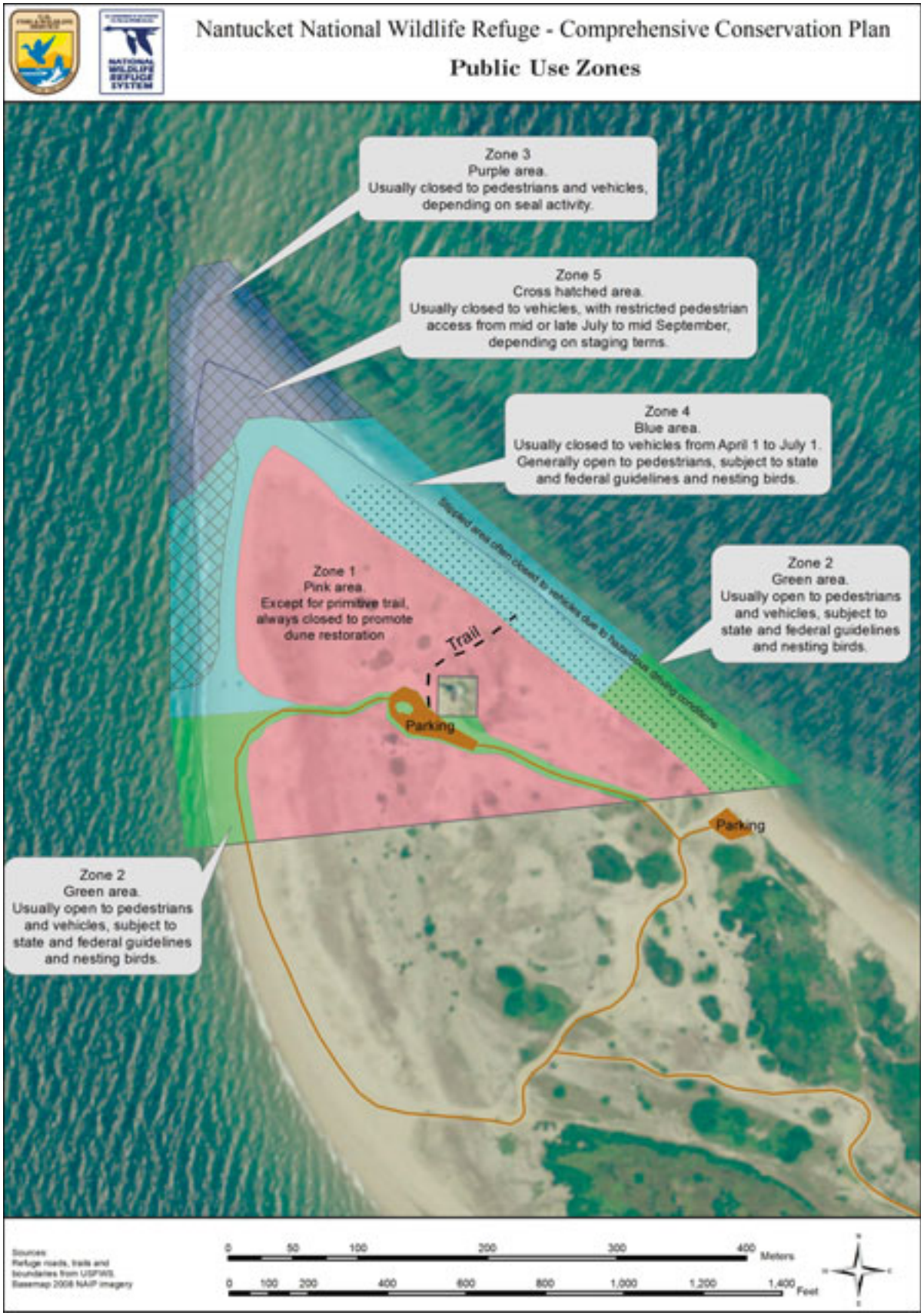
Protecting Land

We will continue to work with the U.S. General Services Administration (GSA) to acquire excess Federal lands in partnership with other agencies, organizations, and willing sellers. We have identified opportunities to increase land protection by 2,036 acres on both Nantucket and associated islands (see appendix G for more specific information).

The permanent protection of land is the keystone of wildlife and habitat conservation. Land brought into the refuge system will be available in perpetuity to support fish, wildlife, and plants. We can restore, enhance, or maintain the land we purchase in fee title to provide optimal conditions for priority species targeted for conservation, such as threatened or endangered species, and those whose populations are in decline. Further, the land we protect through conservation easements will never convert to uses that would remove permanently their value for fish and wildlife.

The refuge conservation easement program targets lands that contain natural resources whose importance merits their inclusion in the refuge system. These are not simply open space easements. The goal of our easement program

Map 4-1. Public Use Zones



is to protect existing natural resources and work with the landowners to enhance those resources, including water quality buffers, while promoting the continuation of traditional uses of the land. The Land Protection Plan (appendix G) elaborates on Service policies and procedures, as well as options and potential impacts under this CCP.

To continue our progress toward our shared objectives in protecting land, we will employ the following, ongoing strategies:

- Work with partners to identify willing sellers in areas of concentrations of priority natural resources.
- Use our criteria for prioritizing land protection for lands that become available for purchase.
- Continue to coordinate regular meetings of land protection partners to facilitate communication and cooperation.
- Continue to seek opportunities to expand our land protection partnerships.
- Seek opportunities for funding via grants and non-traditional means.
- Provide information to elected officials on land protection issues upon request.
- Work with partners and landowners to encourage land conservation outside the refuge boundary.
- Keep residents, organizations, and businesses in Nantucket informed about land protection issues through the distribution of outreach material and personal appearances by staff.

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Eastern kingbird

Developing Refuge Step-down Plans

Service planning policy identifies 25 step-down plans that may be applicable on any given refuge. Two have been completed for the refuge complex as a whole, which includes Nantucket NWR. We have identified 11 additional plans as the most relevant to this planning process for the refuge, and we have prioritized their completion. Several are ongoing as part of the refuge complex planning, but others will be completed depending upon the alternative chosen and its associated level of funding and staffing to complete them. We list those plans and their planned completion dates below. This CCP presents sections of the refuge HMP that require public review. We will incorporate them into the final version of the HMP within 3 years of approval of the final CCP.

We will develop an Annual Habitat Work Plan (AHWP) and Inventory and Monitoring Plan as the highest priority step-down plans. We describe them in more detail below. To keep them relevant, we will modify and update them as we obtain new information. The completion of these plans supports all refuge goals.

The following completed plans apply to the entire Eastern Massachusetts NWR Complex, including Nantucket NWR:

- Avian Influenza Surveillance and Contingency Plan—completed in 2007.
- Hurricane Action Plan—completed in 2009, updated in 2010.

An updated Fire Management Plan is scheduled to be completed in 2012. Please see appendix F for general fire program direction. Step-down plans scheduled for completion include:

- AHWP, annually beginning within 3 years of CCP approval.
- IPM Plan, within 2 years following CCP approval.
- HMP, within 3 years following CCP approval.
- Fishing Plan, within 3 years of CCP approval.
- Sign Plan, within 3 years of CCP approval.
- IMP, within 5 years of CCP approval.
- Law Enforcement Management Plan, within 5 years of CCP approval.
- Cultural Resources Management Plan, within 5 years of CCP approval.
- Visitor Services Plan, within 5 years of CCP approval.
- Migratory Bird Disease Contingency Plan, within 5 years of CCP approval.
- Continuity of Operation Plan, within 5 years of CCP approval.

Habitat Management Plan
The HMP will incorporate the habitat objectives developed herein, and will identify the "what, where, how, and when" actions and strategies we would implement over the 15-year period to achieve those objectives. Specifically, the HMP will define management areas and treatment units, identify the type or method of treatment, establish the timing for management actions, and define how we will measure success over the next 15 years. We base both the CCP and HMP on current resource information, published research, and our own field experiences. We will update our methods, timing, and techniques as new, credible information becomes available. To facilitate our management, we will regularly maintain our Geographic Information System (GIS) database, documenting any major changes in vegetation or shoreline at least every 5 years, as staffing and funding allow.

Annual Habitat Work Plan and Inventory and Monitoring Plan
The AHWP and IMP for the refuge are also priorities for completion upon CCP approval. These plans also are vital for implementing habitat management actions and measuring our success in meeting the objectives. Each year, we will generate an AHWP that will outline specific management activities for that year. The IMP will outline the methodology to assess whether our original assumptions and proposed management actions support our habitat and species objectives. The IMP may also be used to monitor the potential effects of climate change on refuge habitats and wildlife populations. We will prioritize our inventory and monitoring needs in the IMP. The results of inventories and monitoring will provide us with more information on the status of our natural resources and allow us to make more informed management decisions.

Distributing Refuge Revenue Sharing Payments

As described in chapter 3, we have provided funding in the form of shared revenues to the town of Nantucket for the refuge since the refuge was established. Those annual payments are calculated by formula determined by, and with funds appropriated by, Congress. We will continue those payments in

accordance with the law, commensurate with changes in the appraised market value of refuge lands, or new appropriation levels dictated by Congress.

NEPA Analysis

For all major Federal actions, NEPA requires the site-specific analysis and disclosure of their impacts, either in an EA or environmental impact statement (EIS). Generally, those include the administrative actions listed in chapter 4 of the EA/draft CCP. Most of the actions proposed were fully analyzed in the EA/draft CCP and were described in enough detail to comply with NEPA, and would not require additional environmental analysis. Although this list is not all-inclusive, the following projects fall into that category:

- Development of the HMP.
- Development of the IMP.
- Research, resource inventories, or other information collected.
- Small construction and improvement projects (including addition of a primitive foot trail, signage).
- Operations and maintenance of existing infrastructure and facilities (including addition of signage and/or a kiosk at the entrance gate, and minor renovations should a building be purchased for a visitor facility).
- Law enforcement activities.
- Control of invasive plants.
- Predator or pest management program implementation.
- Changes in our priority public use programs.

Summary by Major Program Area

Habitat Management and Protection

We will take a more active role in habitat and species management both on and off the refuge through partnerships and as facilitated by implementing the North Atlantic LCC (see chapter 3). This includes expanding the Nantucket NWR to include additional lands on Nantucket Island and associated islands identified by the Service totaling 2,036 acres. Our highest priority will be the protection of dynamic coastal beach and dune systems and the focal avian and mammalian species that rely on them for critical nesting, resting, foraging, and staging habitat. This includes identifying and symbolically fencing important wildlife habitat, and evaluating vehicle and pedestrian access routes on the refuge by April 1 annually to avoid and minimize adverse impacts to sensitive beach and dune ecosystems for beach-nesting birds. This adaptive management approach will allow changes in management within a given season or from year to year based on changing beach dynamics and species presence. The result could mean access restrictions and/or closures in some seasons and/or years (see Zone Management section and map 4-1). We will also evaluate the need for dune restoration and monitor for invasive species and treat them as staffing and funding permit.

Species management will follow Federal piping plover recovery guidelines and State plover and tern guidelines, and this will benefit other species such as nesting American oystercatchers. We will protect high quality habitat for staging terns in the late summer and early fall by managing vehicular and pedestrian access to minimize disturbance to terns. We will also maintain symbolic fencing

to minimize disturbance to hauled-out seals. Predator control measures will be employed as necessary to increase productivity of piping plovers, and least, common, and roseate terns potentially nesting on the refuge. We will continue to work closely with TTOR, NCF, and our other partners to accomplish these management actions with an emphasis on the larger landscape level conservation and more consistent management between partners on the peninsula.

Additionally, we will work with partners on partner lands to survey, monitor, and conduct habitat evaluations for New England cottontail on Nantucket, and to possibly assess the feasibility of a New England cottontail release on suitable properties. The Service's New England Field Office will be able to provide leadership and technical expertise as they have overseen New England cottontail monitoring and management throughout the Northeast.

Although we are not able to predict the extent of future acquisitions within the next 15 years, the Service will make a concerted effort to pursue Federal (surplus) land, including the former Coast Guard LORAN and FAA facilities, as well as easements and acquisitions on key parcels on the Coskata-Coatue Peninsula, and on Muskeget Island to further this landscape level conservation approach.

Inventories and Monitoring

We will implement inventories and monitoring protocols to provide key information on the trust resources as funding and time permits. Primarily, the focus will be on piping plover, nesting and/or staging least, common, and roseate terns, and seals. Monitoring resources of concern will allow us to judge success of our management actions, including seasonal pedestrian and vehicle closures. We will work closely with partners to conduct these inventories and surveys.

Visitor Services

We will continue, and where possible, expand existing opportunities for the five priority public uses allowed on the refuge, including fishing and interpretation. Additionally, we will work with current partners and seek new partners to help us achieve new and expanded environmental education and interpretation programs. We will develop and provide distributional materials on refuge wildlife and habitats, and conservation in the region. Closures will be continuously updated on the refuge Web site. We will collaborate with partners to sponsor and participate in additional outreach opportunities for visitors and residents of Nantucket, including fishing events. Offsite messaging (such as brochures and a kiosk at the gatehouse and some web page upgrades) will improve visitor awareness of habitat issues and reduce disturbance to wildlife when visitors are on the refuge. We will also seek alternative transportation study funds to determine the feasibility of implementing a system to transport more people to the refuge without the use of individual vehicles.

We will establish a primitive foot trail from the lighthouse to the refuge's eastern beach for pedestrian and fishing access. We will encourage visitors to help maintain and re-establish native vegetation that historically occurred as well by staying on the primitive trail and out of the dunes. This will enable us to preserve the health and integrity of the dynamic beach habitats on the refuge within the landscape scale and context. We will interpret the significance of the peninsula's proposed National Natural Landmark designation, and how the partners are preserving those qualities through low profile facilities and minimal administrative signs.

Refuge Administration

When funding is provided, we plan to achieve a level of staffing that meets the minimum requirements for a refuge complex of this size and importance by adding 1.5 positions to the refuge: a half-time, year round visitor services specialist and a full-time biologist. Additionally, when funding is available, we

plan to station a new law enforcement officer at Monomoy Refuge in Chatham. This officer will conduct regular patrols of all Cape Cod and island refuges in the complex, including Nantucket NWR. We will base any increases in staffing on available, permanent sources of funding, and will consider them in the context of regional and refuge priorities.

The Service will seek to partner with TTOR and NCF to establish a shared visitor contact facility. Our options include constructing a new building at the gatehouse, retrofitting a building already in use by TTOR or NCF, or purchasing a building. Development of a partnership facility and visitor contact station at a strategic location would allow the Service to better fulfill its mission and additionally provide refuge staff with an office, housing, and storage. For any site chosen, additional NEPA analysis will be required. Further, we will install a kiosk at the Wauwinet gatehouse, and use signs to highlight the conservation partnership on the Coskata-Coatue Peninsula with TTOR and NCF. We will also strive to increase visibility and awareness of Service and refuge policies, and help educate visitors about fish and wildlife and its conservation. Through our collaboration with TTOR and NCF, we will strive to achieve near-seamless management across the three properties on the peninsula. One exception is that we will continue our year-round ban on dogs on the refuge while at this time our partners allow dogs from September through March. Signage throughout the refuge will be augmented to include interpretive panels which will need to be updated and maintained. Any signage or additional infrastructure placed on or off the refuge will be with the intention of maintaining the aesthetics of the property and Nantucket Island.

Goals, Objectives, and Strategies

Relating Goals, Objectives, and Strategies

Refuge goals are intentionally broad, descriptive statements of the desired future condition of refuge resources. By design, they define the targets of our management actions in prescriptive rather than quantitative terms. They also articulate the principal elements of the refuge purposes and vision statement, and provide a foundation for developing specific management objectives and strategies.

Objectives are essentially incremental steps toward achieving a goal and further define management targets in measurable terms. They vary among the alternatives and provide the basis for developing detailed strategies that monitor refuge accomplishments and evaluate progress. “Writing Refuge Management Goals and Objectives: A Handbook” (USFWS 2004) recommends writing “SMART” objectives that are: (1) specific, (2) measurable, (3) achievable, (4) results-oriented, and (5) time-fixed.

Where possible, we incorporated the principles of Strategic Habitat Conservation (SHC) in the development of our objectives and strategies. According to “Strategic Habitat Conservation: A Report from the National Ecological Assessment Team” (USFWS 2006), SHC focuses on “…the ability of the landscape to sustain species as expressed in measurable objectives.” Developing a strategy to attain a biological outcome, such as a population objective, requires documented and testable assumptions to determine whether the objective is met.” Not only will this approach ensure refuges are contributing to the refuge system and Service mission and goals in a strategic, standardized, and transparent way, but also ensures that refuges contribute to local and regional conservation priorities and goals (USFWS 2008b).

A rationale accompanies each objective to explain its context and importance. We will use the objectives to write refuge step-down plans, which we describe later in this chapter.

We also identify strategies, or the actions, tools, or techniques we may use to achieve each objective. The list of strategies in each objective represents the potential suite of actions we may implement. We will evaluate most of them further as to how, when, and where we should implement them when we write our refuge step-down plans. We will measure our successes by how well our strategies achieve our objectives and goals.

GOAL 1. **Perpetuate and enhance the biological integrity and diversity of coastal habitats on and around Nantucket Island to support and enhance native wildlife and plant communities, with an emphasis on species of conservation concern.**

Objective 1.1. Dune and Shoreline Habitat

Over the next 15 years, protect the entire 21 acres of Nantucket NWR from anthropogenic disturbance and degradation to preserve its biological integrity, diversity, and environmental health. Through seasonal closures, predator management, and public education, manage approximately 9 acres of intertidal beach and beach berm to maintain a minimum productivity of 1.5 chicks per nesting pair of piping plovers and 1.0 chicks per nesting pair of terns over a 5-year period. Manage public access seasonally on approximately 4.4 acres of intertidal beach habitat to provide a viewing buffer distance of approximately 50 yards and minimize disturbance to staging terns and seals.

Rationale

Biological integrity and ecosystem health of dune and shoreline habitat: Throughout the Atlantic coast, quality beach habitat is imperiled due to increases in human uses and development. These naturally unstable, dynamic ecosystems are subject to erosion and accretion, which is dictated by wind and wave action (MA DFG 2006). Many species rely upon these dynamic processes to provide and continually revitalize coastal habitat and food resources. Despite their importance, human modification through beach stabilization, development, and recreational use interrupt these natural processes and result in greater risk to human coastal populations, and a reduction in quality habitat available for wildlife (CBTF 1992, USFWS 1996). According to the Coastal Barriers Task Force (1992), factors including population growth in coastal areas, and increases in affluence, leisure time, motorized vehicles, accessibility, and recreational diversity have led to a greater intensity in human use, development, and modification of coastal resources since World War II. These uses are the greatest threats to coastal habitats because of the subsequent alterations that result (MA DFG 2006). The refuge has the opportunity and responsibility to protect and maintain these important coastal hydrogeomorphological dynamics to maintain coastal dunes and shoreline processes that provide habitat for declining wildlife species.

Birds depending on these coastal beach habitats are some of the fastest declining bird groups because of the habitat loss and degradation of these key waterfront areas. Hence, several national bird conservation organizations and Federal and State agencies advocate management to benefit beach nesting birds in such plans as the PIF Physiographic Area 09 Plan, the BCR 30 Plan, and the MA CWCS. In fact, in these plans, coastal habitats contain the most species ranked as highest or high priority species of conservation concern in the region (Steinkamp 2008). Nantucket NWR and the greater Coskata-Coatue Peninsula have been identified as ACJV land and shorebird focal areas within BCR 30 because of their relative importance in the region and along the Atlantic Coast. Although Nantucket NWR is relatively small, its location on the landscape provides important habitat to a variety of migratory birds and marine mammals of conservation concern. Priority species of conservation concern listed in these plans that have been documented on the refuge include piping plover, American oystercatcher, roseate tern, least tern, and common tern. Nantucket NWR may also provide habitat for migrating shorebirds, but this has not been evaluated yet.

Though bird species make up the visibly predominant taxonomic group on the refuge and act as indicators of habitat quality, other protected species use the refuge and adjacent lands as well. The Coskata-Coatue Peninsula is listed as one of MA NHESP's BioMap Core Habitats. This is because of the extensive maritime dune community that supports rare plant species including the prickly pear cactus, the globally rare seabeach knotweed, American sea-blite, and historically seabeach amaranth.

Clearly, the refuge beach and dune ecosystem provides vital habitat for regional and local species of conservation concern amidst a declining trend in this habitat availability throughout the Atlantic Coast. While habitat protection is an important component of the conservation of priority species, other factors, such as human disturbance, can contribute to declines in available habitat or nesting success and productivity. It is widely acknowledged by Federal, State, and local governments that coastal ecosystems may be adversely impacted by vehicles through the churning of tires, substrate compaction, vegetation destruction, and the destabilization of dunes (Town of Nantucket 2005, Massachusetts General Laws Chapter 131, S 40; 310 Code of Massachusetts Regulations 10, specifically the Barriers Beaches Management 310 Code of Massachusetts Regulations 10.29, Leatherman and Godfrey 1979). In addition, pedestrians, dogs, fireworks, and other human recreational activities including kite-flying, can have adverse impacts on beach-dependent species.

We will assume a more active role in managing Nantucket NWR to optimize benefits for habitat and wildlife. This will include more site visits, especially during the critical wildlife nesting and migration seasons through additional biological, visitor services, and law enforcement positions. We will continue to work with partners to ensure that we protect dunes and that we follow other Service mandates including biological integrity and SHC. This process is also focused on minimizing adverse impacts to sensitive dune habitat by restricting OSV and pedestrian access to certain areas, and redirecting traffic as conditions warrant. It is also important to note that, although our objective statements focus on birds of priority conservation concern identified in regional and State plans, we are also striving through our management to "keep common birds common."

Based on the results of SLAMM analysis, we know that this habitat is subject to loss under sea level rise scenarios over the next century. Given that these are long-term scenarios, immediate action is not warranted; therefore within the context of this CCP over the next fifteen years, we will continue to reduce non-climate environmental stressors. In addition, we will monitor and evaluate shoreline conditions relative to climate change and sea level rise using aerial photos, cooperate with the State on their climate change priorities once refined, and utilize the North Atlantic LCC to facilitate climate change research, education, and collaboration.

Nesting piping plovers: The piping plover is a federally listed and State-listed threatened species. Massachusetts supports the second largest population of breeding piping plovers along the Atlantic Coast. Plovers return to Massachusetts in late March or early April and begin establishing nesting territories along dunes and beach strands. Their nesting season spans from late March through the end of August. Plovers forage along the waterline, on the mudflats, and along the wrack line (MA NHESP 1990). Habitat loss from development has decimated the piping plover along the Atlantic Coast. Predation on eggs and chicks by fox, skunk *(Mephitis mephitis),* raccoon *(Procyon lotor),* and other predators is increasing, while OSV users and other beach goers impede foraging or accidentally crush the cryptic plover eggs or chicks. Protection of

critical habitat from development and restricting recreational use in plover nesting areas is essential to maintaining healthy piping plover populations (MA NHESP 1990).


Gene Nieminen/USFWS

Piping plover

Since the piping plover was federally listed in 1986 and specific management guidelines were developed in 1993 by Massachusetts and 1994 by the Service (revised in 1996), both the Service and State (MA NHESP) have worked to coordinate consistent implementation and enforcement of these guidelines on all private and public coastal landowners in the State. The Federal and Massachusetts guidelines are provided in appendix I.

TTOR took the lead on managing piping plover habitat on the refuge from 1982 through 2009, and continue to assist with management under a partnership agreement with the Service. In 2001, a Section 7 evaluation was completed to initiate management of piping plover according to the 1996 Piping Plover Federal Guidelines. Since then, symbolic fencing has been established by early April, and beach closures for piping plover nest protection were instituted. Piping plovers have regularly nested on Great Point and Coskata-Coatue just south of the Nantucket NWR since at least 1983 (annual nesting numbers range from 0 to 12), but very few pairs have nested on the refuge in the last 25 years. The last recorded nest on the refuge was in 2006.

Piping plover recovery is often in conflict with human recreation, because they both utilize the area above the high tide line on coastal beaches. To mitigate these conflicts, piping plover recovery guidelines stipulate that suitable habitat on public beaches be delineated with symbolic fencing and signs prior to April 1 each year, and that a 50-meter radius be maintained around nests, above high tide line where possible, to minimize disturbance to nesting birds (USFWS 1996). Because of the highly dynamic nature of the timing, abundance, and distribution of these birds on the refuge, vehicular and pedestrian access needs to be assessed in real time as changing circumstances warrant.

Nantucket NWR will be managed according to Federal and State guidelines. Nesting piping plover numbers are consistently low on Nantucket NWR. Available habitat varies between years naturally through sediment deposition, erosion, and storm overwash events, but usually only a few acres are suitable nesting habitat. We, therefore, do not have a target number of nesting pairs, but rather a target productivity level of 1.5 fledged chicks per pair over a 5-year period. This is the minimum productivity to meet and sustain rangewide population goals in compliance with the Piping Plover Recovery Plan (USFWS 1996). Additional monitoring of potential impacts of predators and OSV will guide future management decisions.

Nesting terns: The least tern is a species of special concern in Massachusetts. The least tern was a common bird in Massachusetts in the late 1800s, but was decimated at the turn of the century by the millinery trade. Since recovering, the least tern now faces threats from development, predation, and beach use. Least terns nest on beaches and sandbars with a mix of sand, pebbles, and shells, and lacking in vegetation. The birds arrive in Massachusetts at nesting sites in early May. A high percentage of nests and eggs are lost each year to overwash from high tides and storm surges. Eggs and chicks suffer high predation from avian and mammalian predators including crows, gulls, raptors, coyotes *(Canis*

latrans), red fox *(Vulpes vulpes),* skunk, and raccoon. Historically, Great Point (including Nantucket NWR and adjacent land to the south) has been the site of one third of Massachusetts' breeding least terns (TTOR booklet 1998). Since 1978, numbers of least tern pairs have fluctuated on Great Point, ranging from 0 in 1991, to over 1,000 in two consecutive years (1996 and 1997; USFWS undated), but many of these nests were not on Nantucket NWR.

Common terns are also a species of special concern in Massachusetts. Common terns likely numbered in the hundreds of thousands in the mid-1800s, but are much more scarce today, with approximately 15,000 pairs nesting in Massachusetts in recent years (MA NHESP 2007). Common terns nest on beaches with a mix of sand and vegetation starting in mid-May in Massachusetts. Threats to reproductive success include increasing predator populations and storms. Common terns have nested sporadically on Great Point in low numbers, ranging from one nesting pair in the early 1980s and again in the early 1990s up to 35 nesting pairs in 1996. In 2008, one nesting pair was located at Great Point, but the nest was predated (TTOR 2008).

Prospecting least and common terns may benefit from the closures implemented for piping plovers. In addition, we will protect additional high quality habitat for terns by directing public use away from sensitive areas during critical times. We will also more closely monitor prospecting pairs, nesting attempts, and causes of nest failure.

Staging and migrating terns: The post-breeding dispersal period is an especially sensitive time for terns because parental care may continue well into fall migration and even after arrival at their wintering areas (Ashmole and Tovar 1968, Feare 2002, Nisbet 1976). At fledging, young terns usually have not achieved adult mass, and several studies have demonstrated that post-fledging parental care given prior to departure from their breeding colony sites provides for an increase in mass and later post-fledging survival probability (Feare 2002, Schauroth and Becker 2008, Stienen and Brenninkmeijer 2002). During the post-breeding dispersal period, young terns start to transition to independence, learning skills needed to fish independently, and increasing body condition and strength of flight muscles needed for the 7,000 kilometer (4,350 mile) migration to South America. Much of the presumed recent reduction in post-fledging to first-breeding survival likely results from events that take place during this period (Spendelow et al. 2002). After an initial period of more widespread dispersal, most (if not all) northwestern Atlantic roseate terns congregate at locations around Cape Cod and the offshore islands of Martha's Vineyard and Nantucket, Massachusetts (Gochfeld et al. 1998, Shealer and Kress 1994). Staging roseate and common terns have been recorded on Nantucket NWR beginning in mid-July, but consistent surveys had not been conducted to evaluate the importance of this site prior to 2010. In 2009, high counts of 600 or more staging terns were recorded in late July on Nantucket NWR and both common and roseate terns were observed from mid-July through the end of August, suggesting Nantucket NWR may be an important site. During 2010 and 2011, staging tern counts were conducted multiple times each week, in conjunction with seasonal closures to minimize disturbance. In 2010 and 2011, average high counts peaked at near 600 terns in mid-August (see chapter 3 for more details).

We will continue to proactively establish seasonal closures to vehicles and pedestrians to protect habitat for staging terns. Closures are not fixed, but rather evolve as staging tern use evolves through the season. Closures are generally very small at the start of the staging period, and are expanded to accommodate the increasing number of terns as the staging period progresses. Experimental seasonal closures in 2010 and 2011 minimized most disturbance

to staging terns. In 2010, we conducted 20 surveys to evaluate disturbances to staging terns and only about 15 percent of pedestrians passing by the closure disturbed terns. Additionally, disturbances on average lasted less than a minute (more details are included chapter 3; 2011 data are still being analyzed). We will continue to work with partners to ensure that refuge data can be incorporated in larger landscape studies evaluating importance of staging sites throughout Cape Cod and the Islands.

Migrating shorebirds: Many species of shorebirds *(Charadrii)* that breed in North America migrate up to 30,000 kilometers (over 18,000 miles) annually, traveling from non-breeding grounds as far south as Argentina to breeding grounds as far north as the Arctic Ocean (Brown et al. 2001, Morrison 1984, Myers et al. 1987). During these long distance migrations, shorebirds rely on strategically located stopover sites which provide abundant food and adjacent resting habitat (Helmers 1992, Myers et al. 1987, Senner & Howe 1984). Coastal stopover sites in particular are increasingly being subjected to development and human disturbance, and loss of suitable stopover habitat may contribute to declines in local abundance and overall populations of shorebirds in North America (Brown et al. 2001, Myers et al. 1987, Pfister et al. 1992). In the northeastern United States (Maine to Virginia) "77 percent of the region's human population resides along the coast" (Crossett et al. 2004). Thus, this region is one of the most heavily populated areas in North America and the U.S. Shorebird Conservation Plan has noted the importance of reducing disturbance to migrating shorebirds at key stopover sites in this region (Brown et al. 2001). The importance of Nantucket NWR to migrating shorebirds is currently unknown, but it is likely that Nantucket NWR, in conjunction with Coskata-Coatue, provides important stopover habitat. Migrating shorebirds will likely benefit from the closures that are established for seals and staging terns and use will be monitored in conjunction with other biological work.

Seal haul-out sites: Gray and harbor seals are both protected under the MMPA. In recent years, the tip of Nantucket NWR has become a haul-out site for both species, especially gray seals. While their pupping grounds were historically further north on Sable Island and in the Gulf of Saint Lawrence in Canada, there has been a year-round breeding population around Cape Cod and associated islands since the late 1990s. Muskeget Island and the associated shoals support the largest breeding population of gray seals in the United States. There is evidence that gray seals are now pupping in low numbers on Great Point. The only other site in Massachusetts where gray seals pup is Monomoy NWR. With our permission, TTOR installed symbolic fencing at the tip of Great Point in 2008 to protect the seals from disturbance and prevent potential injury to visitors that wander too close. This symbolic fencing has been maintained since that time to protect both seals and visitors.

Strategies

Continue to:

- Work with partners or volunteers to identify other potential priority resources (flora and fauna) for management consideration at Nantucket NWR and manage for biological integrity, diversity, and ecosystem health.

Piping plovers

- Annually protect existing piping plover habitat refugewide by establishing and maintaining symbolic fencing (sign posts connected with twine) that prevents vehicular and pedestrian access through nesting habitat in accordance with Federal guidelines by April 1. Additionally prohibit vehicle access on most of the beach no later than April 1 to at least July 1, or until nesting piping plovers have fledged chicks.

- Work with TTOR to maintain a vehicle-free area for piping plover chicks extending 1,000 m on each side of a line drawn through the nest site and perpendicular to the long axis of the beach. Closures in areas with piping plover chicks remain in effect until chicks are at least 35 days old, or capable of at least 15 m of sustained flight.

- If no territorial piping plovers have established by July 1, and areas are not part of other zoning closures (see map 4-1), then areas may be opened for vehicular and/or pedestrian access.

Staging Terns

- Annually establish a seasonal closure with symbolic fencing to vehicles and pedestrians on the northwest tip of the refuge (but this location may vary) where staging terns have occurred in recent years. This closure will generally be from mid- or late-July to mid-September. Closure options will be adapted to accommodate shifting habitat and bird use, and closure dates will vary some annually, depending on staging and migration chronology.

- Continue to gain knowledge about relative importance of Nantucket NWR compared to other staging sites in Cape Cod and the islands, and better understand movement patterns of staging terns between sites.

Staging tern habitat on northwest tip of the refuge

Elizabeth Wunker/USFWS

Seals

- Protect seal haul-out sites from human disturbance by annually implementing a closure with symbolic fencing to establish a public viewing distance of 50 yards, in accordance with MMPA and Cape Cod Stranding Network guidelines. The closures will usually be at the very north tip of the refuge where seals are most common, and the closure will remain in effect as long as seals are present at the tip.

- Coordinate with National Marine Fisheries Service and other organizations to continue collecting pertinent data regarding seal use, diet, entanglements, and other interactions with humans.

Within 1-5 years
Biological integrity, diversity, and ecosystem health:

- Maintain a year round closure in the beach dune habitat, with the exception of a pedestrian access trail from the lighthouse to the east beach, to protect dune ecosystem integrity.

- Evaluate the appropriateness of restoring trampled dune vegetation (including beach plantings) resulting from trespass.

- Control invasive species using mechanical, biological, and/or chemical methods.

- Determine impacts of predators and non-native animals (feral cats, rats, gulls, and others) to nesting piping plovers and terns, and implement predator control (lethal and non-lethal) if appropriate.

- Identify data gaps and participate in research relevant to Nantucket NWR which may include: determining refuge importance to migratory shorebirds and bats; human-seal interactions; impacts of recreational use to nesting and migrating birds, and; impacts of vehicles to shoreline and dune integrity. Other research needs and opportunities may be identified in the future.

Nesting terns:

- Annually protect common and least tern nesting habitat refugewide in accordance with State recommendations. Establish and maintain symbolic fencing to prevent vehicular and pedestrian access through suitable habitat by May 15 and until at least July 1. If terns are not established by this date, access restrictions may be lifted. Maintain a buffer of 50 meters around nesting areas in accordance with State regulations.

- When unfledged least tern chicks are present, vehicle closures will be enforced to provide a 100-yard buffer perpendicular to the long axis of the beach, from the perimeter of the colony. Closures are in effect until terns are observed to be capable of flight.

Staging terns:

- Collaborate with partners to initiate a study of staging terns and anthropogenic disturbances on Nantucket NWR that can be incorporated in studies initiated throughout Cape Cod and the Islands. Implement changes to beach management where scientific data support this.

Monitoring Elements
Conduct appropriate inventory and monitoring program as funding and staffing permit to measure our success in achieving our objectives. The results may trigger adjustments to management strategies or refinement of our objectives. Examples of monitoring or surveys that are likely to occur include:

Biological integrity, diversity, and ecosystem health:

- Systematic surveys (4-5 times/week) of all wildlife using Nantucket NWR for 1 additional year (two years already collected) from April–October and compare survey results with regional and national conservation plans to identify additional conservation priorities.

- Refugewide survey for seabeach amaranth and appropriate habitat to evaluate potential for introduction of this species.

- Comprehensive refugewide vegetation survey of native and non-native plants, to establish baseline non-native infestation extent and identify rare plants.

- Annual survey for non-native invasive species to determine future control priorities and evaluate success of control treatments.

- Coastal shoreline change using regional, standardized protocol to determine time periods and geographical locations of erosion and deposition, and potential long-term impacts of sea level rise.

- Survey to help determine importance of refuge to migrating shorebirds.

Nesting Terns:
- Annual surveys of all nesting terns during the breeding season (June) and annually monitor productivity according to State and Federal recommendations.

Staging Terns:
- Systematic surveys of staging terns 4-5 times/week (during pre and post-breeding times) to inform location and timing of closures, evaluate effectivenss of closures as an ongoing effort to determine relative importance of site.

- Resight surveys of staging terns during post-breeding times in collaboration with other partners to characterize movements between sites as an ongoing effort to determine relative importance of site.

Seals:
- Systematic counts of seals refugewide nearly daily from April–October, and weekly during other times of the year, to inform location and timing of closures, evaluate effectiveness of closures, as an ongoing effort to determne relative importance of site.

- Record and report all incidents of seal mortalities, strandings, and entanglements to NOAA and the New England Aquarium.

Objective 1.2. Landscape-level Conservation

Over the next 15 years, upon the invitation of other conservation landowners, we will work cooperatively with partners on their lands to assist in resource protection. We will focus our efforts to minimize the disturbance and degradation of marine intertidal beach, beach berm, and dune habitat in order to preserve biological integrity and benefit breeding and staging birds and marine mammals. When staff is available, up to 25 percent of staff time may be dedicated to habitat management, wildlife management, and inventory and monitoring on partner lands in support of focal species. Our work could include a focus on federally listed species that are found elsewhere either on Nantucket or in the Cape Cod/ Islands area, and could include efforts to introduce or reintroduce species into their former historic range. All this work would be done with permission of and in cooperation with other partners.

Rationale
The Nantucket NWR is part of a larger ecological landscape that has significant coastal bird and marine mammal resources. Our conservation efforts and our ability to balance wildlife protection and public use would be enhanced if we share our expertise and staff resources and work at the invitation of other conservation partners on their lands to benefit habitat and wildlife as well. Conservation efforts both on and off the refuge could be facilitated through the implementation of the Service's North Atlantic LCC, particularly with its focus on representative species. This is an effort to promote regional partnerships to address resource management issues, share latest scientific information, and integrate conservation efforts. We will endeavor to collaborate with partners for resource management on and off the refuge, encourage and participate

in research on and off the refuge on coastal resources of concern and/or the importance of coastal islands for migrating taxa, share latest scientific findings, and become better integrated with the Nantucket and Cape Cod scientific community.

We will also work with partners on partner lands to survey, monitor, evaluate habitat and explore the option of releasing New England cottontail on suitable properties. New England cottontail is a candidate species under consideration for Federal listing under the ESA due to population declines. This species is particularly suited to shrubland habitats and is geographically restricted to the Northeast. New England cottontails were known to historically occur on Nantucket and Martha's Vineyard, but with the introduction of eastern cottontails in the late-1800s and early 1900s, along with other factors, are now considered extirpated from these islands.

Current populations of New England cottontails on Cape Cod are genetically distinct from other known populations and as such should be managed as a distinct unit. These populations exist in an area with tremendous anthropogenic influences, competition from non-native eastern cottontails *(Sylvilagus floridanus),* mammalian predation, and loss of habitat from succession. While densities of New England cottontails in coastal scrub communities have not been assessed, densities of one to two cottontails per acre (target densities for the Region are 1.5 cottontail per acre) is a reasonable estimate (A. Tur, personal communication, 2010). The decision to release New England cottontails would depend on the amount and connectivity of available habitat.

In the last several years, efforts throughout New England have been made to locate remnant New England cottontail populations, and to fill in knowledge gaps about their home ranges, habitat requirements, genetic diversity, and population dynamics. Despite these efforts, there is still much that remains unknown about the ecology of the species. This includes evaluating similar introductions on coastal islands, evaluating the genetic viability of a population on portions of Nantucket, the feasibility of New England cottontail management over time, and assessing the impact of such an introduction on other rare or sensitive species located on potential release sites. Coordination has already begun with State and Federal experts to make the New England cottontail a regional priority, and the Service's New England Field Office will provide leadership and technical expertise in making these determinations.

Many organizations, including the MMA, NCF, Roger Williams Park Zoo, MassAudubon, UMass Boston, and Nantucket Islands Land Bank Commistion have been working together for many years, with support from the Service, to recover the American burying beetle *(Nicrophorus americanus* Oliver). This Federally endangered species was reintroduced to Nantucket at Eastern Moors in 1994. Previously, the last known sighting of the burying beetle on Nantucket was in 1926. (Johnson 1930 in LoPresti et al, 2011). Release and provisioning of captive bred beetles continued until 2006. Currently, the reintroduction effort involves provisioning 25 adult breeding pairs each year with carrion to enhance reproduction and ongoing monitoring of the population. Although the population is not yet considered self sustaining, there is evidence that numbers have continued to increase and biologists are cautiously optimistic that the reintroduction effort will result in the successful establishment of a self sustaining population containing 2,500 individuals. The adult population at the beginning of the 2011 summer season was the largest population recorded to date on Nantucket (LoPresti et al. 2011). Success of this effort will ultimately depend upon the size of the population that can be supported by the Island. This capacity will be determined by the amount of suitable carrion that is available, along with

the amount of open habitats with loamy soils that provide suitable conditions for carcass burial.

Another beetle, the Federally threatened Northeastern beach tiger beetle *(Cicindela dorsalis dorsalis),* was historically found on Nantucket. It has since been extirpated primarily due to the use of offroad vehicles along the beaches. Currently there are only two populations of northeastern beach tiger beetle in New England, one on South Monomoy Island and the other on Martha's Vineyard. Providing long-term protection of priority sites and the reintroduction at appropriate locations within the historical range are key objectives for recovery as outlined in the Northeastern Beach Tiger Beetle Recovery Plan (1994 9.3). Beach dependent species such as the Northeastern beach tiger beetle require separate self-sustaining populations to counter inevitable losses from catastrophic events such as storms. Increasing the number of Northeastern beach tiger beetle sites in New England would provide additional protection for this species. Muskeget Island currently has the best potential to support a reintroduction effort if there is suitable habitat since there is no offroad vehicle use. We would be interested in working with partners off-refuge lands to help conserve the Northeastern beach tiger beetle.

The last recorded record of the federally threatened Seabeach amaranth *(Amaranthus pumilus)* anywhere in the state of Massachusetts was from Nantucket in1849 (Seabeach Amaranth Recovery Plan, 1996). The recovery plan focuses restoration efforts in the more southern portion of the historic range and adjacent to currently extant sites. None the less, there have been new populations discovered since the listing of the species in other states and there is the potential that additional sites in the northern part of the historic range would become desirable for establishment of future populations of this species. Muskeget Island in particular, since there is currently no offroad vehicle use, may be a potential site for reestablishing a population of seabeach amaranth. We would like to work with partners to explore this possibility on Nantucket.

Strategies

- Provide assistance to symbolically fence suitable bird nesting habitat on partner lands.
- Provide assistance to conduct inventory and monitoring actions on partner lands.
- Provide assistance in surveying, monitoring, and conducting habitat evaluations for New England cottontail on partner properties. With partners, determine appropriateness and feasibility of a New England cottontail release on suitable sites.
- Participate in Nantucket shorebird meetings.
- Participate in Nantucket Biodiversity Initiative.
- Conduct research to fill data gaps. Potential research includes importance of conservation lands on Nantucket to migratory shorebirds and bats, seals, and impacts of recreational use to nesting and migrating birds. (see objective 1.1)
- Determine impacts of predators (feral cats, rats, gulls, and others) to nesting piping plovers and terns, and implement predator control (lethal and non-lethal) if necessary.

- Discuss a role for Service involvement and support in the conservation of other federally listed species off refuge lands in Nantucket, working in cooperation with and at the invitation of landowners and conservation partners.

Monitoring Elements
- Number of acres protected by string fencing.
- Number of shorebird meetings.
- Number of partnerships resulting in research and management actions for New England cottontail, shorebirds, seabirds, and other federally listed species.

GOAL 2. **Promote awareness and stewardship of our coastal natural resources by providing compatible, wildlife-dependent recreation and education opportunities on the refuge and within the local and visitor community on and around Nantucket Island.**

Objective 2.1. Visitor Access Over the next 15 years, utilize a system of zone management to provide pedestrian and/or OSV access to at least some portions of the refuge while maintaining closures that reduce disturbance to wildlife from visitors. Zones will be used to delineate and protect areas of suitable habitat for breeding and staging birds, as well as hauled-out seals. Flexibility in maintaining zone closures will be incorporated if, after a specified period of time, no species of concern are present; in general, at least some portion of the refuge will be closed between April 1 and September 15, and dates may vary annually depending on the suitability of habitat and/or the presence of protected species. Visitors may participate in any compatible public use on the refuge in areas that are open to the public.

Rationale
We must maintain the values of the refuge for wildlife, and we are committed to providing quality public use, so managing a compatible balance between wildlife and habitat protection and visitor use, which includes pedestrian and OSV access, is of utmost importance. Most refuge visitors use individually owned or rented OSVs to get to the refuge and fish, observe or photograph wildlife, and enjoy the beach. Some visitors are transported to the refuge by TTOR as part of a natural history, lighthouse, or fishing tour. We have observed visitor use and traffic patterns on the refuge and in recent years have been directing OSV traffic and pedestrians to less sensitive areas and around or away from nesting and/or migrating wildlife to avoid and minimize adverse impacts or conflicts. This has been successful from a wildlife management perspective. These closures are established in compliance with plover and tern guidelines, to increase nesting success for plovers and terns, and provide an undisturbed area for staging federally endangered roseate terns and for hauled-out gray seals. Map 4-1 depicts these areas known as "Zones 1-5." Closures would be regularly updated on our refuge Web site.

At times the refuge is open for public use, but TTOR has to close portions of Coskata-Coatue refuge to protect nesting piping plovers. When this happens, the number of visitors to the refuge is markedly decreased. Finding an alternative way for visitors to get to the refuge would increase opportunities for the public to engage in wildlife-dependent activities on the refuge.

We will also pursue opportunities to identify alternative ways that the public can get to the refuge. We will assess alternatives to individually driven vehicles for access to the refuge. We will open a primitive trail from the lighthouse to the east beach so that areas otherwise inaccessible due to closures for wildlife can be visited.

Given the dynamic nature of coastal ecosystems and the variability in wildlife presence, abundance, and distribution on the Coskata-Coatue Peninsula, we will continue to use an adaptive management approach to provide conservation measures and allow public access.

Strategies

Within 1 year:

- Provide up-to-date, accurate information about visitor access opportunities and seasonal closures in an understandable way on the web and through handouts available at the Wauwinet Gatehouse, and other information distribution mechanisms.
- Manage pedestrian and vehicle access as shown in map 4-1 for the purpose of wildlife protection in goal 1.

Within 3 years:

- Establish a pedestrian access trail from the lighthouse to the east beach in Zone 1 to provide pedestrian access to the beach and to protect dune ecosystem integrity.

Within 5 years:

- Apply for alternative transportation study funding to determine feasible access alternatives to the refuge with the goal of reducing the number of individually operated OSVs travelling to the refuge.
- Engage the public in the alternative transportation system process so they can provide suggestions for transportation options and review of draft alternative transportation proposals.

Within 10 years:

- Obtain funds to implement preferred alternative transportation options.

Monitoring Elements

- Number of refuge visitors engaged in priority public uses.
- Number of alternative transportation trips.
- Amount and timing of seasonal closures by zone.
- Size and productivity of bird and seal populations within closed areas.

Objective 2.2. Environmental Education

Over the next 15 years, we will work with partners to develop and implement a quality environmental education program, based on existing curricula, and conduct activities that highlight the benefit of landscape-level management, and to further communicate our knowledge and understanding of Nantucket's coastal ecosystems and the migratory birds, marine mammals, and endangered and threatened species that depend upon them.

Rationale

The National Wildlife Refuge System Improvement Act identifies environmental education as priority wildlife-dependent recreation. We teach students the history and importance of conservation and ecological principals and scientific knowledge of our Nation's natural resources. Through that process, we can develop a citizenry that has the awareness, knowledge, attitudes, skills, motivation, and commitment to work cooperatively toward the conservation of our Nation's environmental resources.

We will support current endeavors provided by our partners and expand all of our visitor services capabilities with the addition of onsite visitor services staff.


Amanda Boyd/USFWS

Refuge visitors observing closed bird nesting area

This includes environmental education programming in coordination with partners that incorporates education about the refuge, its role in the refuge system, and management actions in the context of local and regional conservation issues. We will work with local schools and the conservation community that is already providing environmental education on Nantucket to assist in the development and delivery of programs that achieve national and State curriculum guidelines. Environmental education incorporates onsite and offsite programs and activities that address the audience's course of study, refuge purposes, physical attributes, ecosystem dynamics, conservation strategies, and the refuge system mission. We will work within this framework to determine how we can assist ongoing efforts throughout the community to provide workshops, field trips, day camps, and other outdoor education opportunities.

Strategies

Continue to:

- Coordinate with partners for environmental education opportunities as staffing and funding allow.

Within 1 year:

- Provide resources and information upon request from partners and local organizations who conduct a coordinated environmental education program that highlights a landscape level conservation approach as well as on the refuge.

Within 5 years:

- Coordinate with partners to refine an existing environmental education curriculum that highlights the importance of a landscape-level approach to resource management, to be provided both on and off the refuge, upon request.

Monitoring Elements

- Number of visitors reached by programs.
- Number of programs and materials produced.

Objective 2.3. Interpretation and Public Outreach

Over the next 15 years, provide quality interpretation and outreach programs by providing enhanced tours of the refuge and the Coskata-Coatue peninsula, identify additional opportunities for partnerships within the community that increase awareness of the Service presence on Nantucket and define how the biological resources on Nantucket NWR contribute to the Refuge System.

Rationale

The Improvement Act identifies interpretation as one of the six priority wildlife-dependent recreation uses. Interpretation is one of the most important ways to increase visitor awareness of the refuge, the National Wildlife Refuge System, and why we do the work we do to benefit wildlife and the American public. On Nantucket, our role in the partnership on the Coskata-Coatue Peninsula and the local, regional, and national value of the refuge and how our management enhances the value of the refuge for wildlife, will be better understood with

enhanced interpretation. Helping visitors understand the habitat on the peninsula and in the water, the geological dynamics of the refuge, the importance of protecting and managing lands for endangered and protected species will increase compliance with refuge, State, and Federal regulations. Additionally, interpretative programs can provide visitors with an understanding and appreciation of fish and wildlife ecology and help people understand their own role in the environment.

New Service policy in 605 FW 7 defines interpretive programs as management tools to accomplish the following:

- Provide opportunities for visitors to become interested in, learn about, and understand natural and cultural resource management and our fish and wildlife conservation history.
- Help visitors understand their role within the natural world.
- Communicate rules and regulations to visitors, thereby promoting understanding and compliance to solve or prevent potential management problems.
- Help us make management decisions and build visitor support by providing insight into management practices.
- Help visitors enjoy quality wildlife experiences on the refuge.

Further, the new policy provides these guiding principles for interpretive programs:

- Relate what is being displayed or described to something within the personality or experience of the visitor…provide meaningful context.
- Reveal key themes and concepts to visitors based on information.
- Inspire and develop curiosity.
- Relate enough of the story to introduce concepts and ideas and pique visitor interest, discussion, and investigation so that visitors will develop their own conclusions.
- Organize activities around theme statements.

The addition of visitor services staff onsite would allow us to meet Service mandates and comply with public use policies. In addition, it will enable us to provide additional interpretive programs on the refuge to complement and enhance partner programs. Visitor services staff will expanding our interpretive capabilities by designing brochures and rack cards, updating the web site and Facebook page as needed and when possible work with partners to offer quality programs.

Highlighting the partnership on the Coskata-Coatue Peninsula, and increasing our role in that partnership, is important, and to accomplish this we will install a kiosk at the gatehouse, and interpretive panels at the gatehouse and lighthouse. All structural additions to the refuge will be consistent with the intent and purpose of the National Natural Landmark program to maintain aesthetics on the peninsula.

We will work with our partners, including TTOR and NCF to promote conservation and natural resources stewardship on Nantucket. To accomplish this, we will explore additional signage, brochures, and other avenues to promote our conservation partnerships and conservation programs both on- and offsite. We will also work with MMA and other partners to provide offsite interpretive displays for the refuge.

Some examples of important interpretive messages that we will expand upon, if resources are available, are:

- The roles that fishing and coastal beach protection have traditionally played in wildlife conservation over the past centuries.
- The importance of managing for native species and habitats as the best way to benefit fish and wildlife that depend upon healthy, functioning coastal ecosystems.
- Management actions in the context of local and regional conservation issues.

The Service strives to provide opportunities for compatible outdoor recreational opportunities. We hope to contribute to communities around the refuge, both in terms of health and well-being, and economically. We partner with other agencies and organizations to promote connecting adults and children with nature, thereby reducing "nature-deficit disorder." A growing body of research suggests that a lack of direct involvement with the outside world may be contributing to a variety of maladies affecting children in today's society (Louv 2005). By offering places and programs where children and their parents can observe wildlife in natural settings, and learn to appreciate wildlife and fishing, we will contribute to the growing national initiative to reconnect children with nature.

Strategies

Continue to:

- Educate and explain the value of pedestrian and vehicle closures for endangered wildlife and seals.
- Specifically highlight the requirement under the Marine Mammal Protection Act that a 150 foot buffer be maintained for seals so that they are left undisturbed, even when seals are located outside the established, marked closure.
- Encourage partners, especially TTOR, to conduct van tours that deliver the message about wildlife conservation and the value of the refuge and the other conservation lands on the Coskata-Coatue Peninsula and Nantucket, particularly from a regional and national perspective.
- Coordinate with partners for additional interpretation and outreach opportunities as staffing and funding allow.
- Update and improve the refuge Web site and Facebook page.
- Establish and maintain Service-compliant regulatory signs.
- Explore opportunities for offsite interpretive displays and information, including the Maria Mitchell Association, and other locations downtown.

Within 1-3 years:

- Create a general refuge brochure and rack card. Develop primitive access trail through from the lighthouse to the east beach.

- Provide interpretive materials to partners.
- Coordinate with TTOR to install/use webcam at lighthouse to highlight/monitor wildlife and visitor activity.
- Collaborate with local nonprofit organizations to develop an interpretive guide that highlights not only the refuge but our colloboration with TTOR and NCF on the Coskata-Coatue peninsula.
- Develop community partnerships with elected officials, and Tribal, regional, and local governments and agencies to increase support for the refuge, and to strengthen our outreach capabilities.
- Work with partners to develop and install interpretive panels at the lighthouse.
- Develop a wildlife list for all animal and plant taxa.
- Conduct seasonal interpretive walks on the refuge.

Within 5 years:
- Develop quality seasonal interpretative programming in collaboration with partners.
- Install interpretive panels and/or brochures on Steamship Authority ferries and/or at harbor visitor centers.
- Establish an annual tour of the refuge with elected officials.
- Work with partners to install a kiosk at the gatehouse, with interpretive panels (which includes information on partnerships, roles, rules, boundaries, and refuge system/refuge panels).
- Explore the acquisition of an Americans with Disabilities Act (ADA)-compliant Service van on Nantucket Island available to Service staff when on the island, and for partners to use for tours, etc. (magnetic decals).
- Assist conservation partners with interpretation on their properties, particularly when that interpretation helps inform and educate the public about coastal resources and resources that are also specifically found on Nantucket NWR.

Monitoring Elements
- Number of visitors reached by programs on and off site.
- Number of programs and materials produced.
- Number of tours provided.

Objective 2.4. Wildlife Observation and Photography

Over the next 15 years, provide quality, compatible experiences for the public to enjoy and capture the refuge's wildlife and habitat diversity. Within 5 years, we will develop additional opportunities for observation and photography of the wildlife and habitats on the refuge.

Rationale
The Improvement Act identifies wildlife observation and photography as priority wildlife-dependent recreation. These activities promote the understanding and

appreciation of natural resources and their management on all lands and waters in the refuge system. We have been providing daily wildlife observation and photography opportunities on the refuge since its acquisition in 1973. Providing a disturbance free area for wildlife might stabilize or increase populations, providing more opportunities for visitors to see or photograph these species, including Federally listed species.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, wildlife observation and photography was an activity enjoyed by nearly one-third of the U.S. population in 2006. Of all the wildlife in the United States, birds attracted the biggest following. Approximately 19.9 million people took trips away from home to observe wild birds. Anotherr 3.4 million people observed or photographed marine mammals, such as seals, on away-from-home trips. Wildlife watching expenditures nationwide in 2006 were $45,654,960. (U.S. Department of Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau, 2006). Wildlife observation and photography are big business, and improving opportunities on the refuge for these activities may have a positive economic business on Nantucket Island and Cape Cod.

Strategies

Continue to:

- Provide daily, sunrise to sunset, access to the refuge as coordinated with and implemented by TTOR when possible.

- Coordinate with TTOR and other partners and volunteers to implement and maintain wildlife observation and photography opportunities, including TTOR van tours.

Within 1-3 years:

- Develop a primitive trail through refuge lands that keeps foot traffic on an established path.

Amanda Boyd/USFWS

Hauled-out seals at Nantucket National Wildlife Refuge

- Work with partners to open the lighthouse at certain hours for photographic opportunities.
- Install a web cam on the Great Point Lighthouse.
- Create a habitat/species checklist brochure.
- Identify and publicize the best locations and seasonal subjects for observation and photography (through brochures, at the kiosk, Web site etc.).

Within 5 years:
- Work with partners to conduct an annual photography contest on Nantucket including a Youth Photo Contest.

Monitoring Elements
- Number of visitors reached by programs on- and off-site.
- Number of programs and materials produced.

Objective 2.5. Fishing

Over the next 15 years, continue to provide quality, compatible experiences for those who come to the refuge for its unique fishing opportunities. In the next 5 years, develop additional programs with the community and partners to provide quality fishing on the Coskata-Coatue Peninsula.

Rationale
The Improvement Act identifies fishing as a priority wildlife-dependent recreation. It states, "Compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System." We recognize fishing as a healthy, traditional outdoor past time. It, too, promotes public understanding and appreciation of natural resources and their management on all lands and waters in the refuge system.

We have provided for recreational fishing access along the beach at the refuge since it was established in 1973. We recognize its importance as a sport fishing destination and we will continue to provide recreational fishing opportunities in coordination with TTOR, as they manage and monitor the area. We will require anglers to comply with State and Federal regulations, which includes obtaining a saltwater fishing license. State law enforcement is located on Nantucket Island and enforces the State and Federal fishing regulations to the extent possible. In addition, a refuge complex law enforcement officer will be available to monitor and enforce refuge guidelines and policies.

TTOR has a strong presence on the Coskata-Coatue Peninsula, and we will continue to work with them to communicate fishing regulations to anglers, and also to provide fishing tours and instruction to the general public. The Service will play a more active role and manage fishing more closely to assure that it is compatible with the other refuge goals and mandates, particularly the protection of overall biodiversity and threatened and endangered species management.

We will endeavor to promote fishing on the refuge by participating in local fishing tournaments, contracting with vendors to provide guided fishing tours for the general public, and by providing distributional materials describing local sport fish of interest and applicable fishing regulations. We will explore partnerships with the Nantucket Anglers Club, and other groups to ensure quality fishing opportunities and experiences on the refuge.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, saltwater fishing was an activity enjoyed by 7.7 million people. Expenditures nationwide in 2006 for saltwater fishing were $8.9 billion.

(U.S. Department of Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau, 2006). Providing opportunities on the refuge saltwater fishing will have a positive economic impact on Nantucket Island and Cape Cod.

Strategies
Continue to:
- Provide fishing access in appropriate zones and date closures required by State and Federal law for habitat and species protection (see objective 1.1).

Within 1-3 years:
- Require commercial fishing tours/guides on refuge to operate only under special use permits.
- Post and distribute seasonal harvest and other current fishing information and regulations on the refuge kiosk and Web site.
- Work with partners to become involved with annual tournaments and provide increased Service presence.
- Conduct "Take me Fishing" event for the general public which is focused on children in collaboration with the State and other partners.

Monitoring Elements
- Number of fishermen and/or OSVs.
- Frequency of quality fishing experiences on the refuge.
- Number of programs and/or activities and materials produced for fishing.

GOAL 3. **Perpetuate and enhance long-term conservation and management of wildlife resources on and around Nantucket Island through partnerships and land protection with public and private landowners, Federal, State, and local entities.**

Objective 3.1. Protecting Land

Working with other Federal, State, and local partners, protect important wildlife habitat within Nantucket County by initiating protection of key habitats identified in a larger landscape approach within 3 to 5 years.

Rationale
Nantucket NWR was established for its benefit as a wildlife sanctuary for migratory birds. Migratory birds utilize the refuges in the refuge complex and other adjacent refuges as stepping stones along the Atlantic Flyway. Monomoy, Nomans Land Island, Nantucket, Block Island, and Stewart B. McKinney NWRs work in concert to provide important stopover habitat for shorebirds, wading birds, neotropical migrants, and other birds. As coastal areas change due to erosion, storms, climate change, and sea level rise preserving these and other important wildlife habitat areas become critical for their lifecycles. The ability of the Nantucket NWR to meet its purpose is currently limited by its small area and popularity as a fishing destination. In order to maintain these important wildlife habitat areas for the long-term, we propose to protect and enhance additional habitat outside of the approved NWR boundary that support Federal trust wildlife resources and State-listed or regionally significant wildlife and plant communities on the island of Nantucket. By working with partners, additional land protection on Nantucket allows the Service to fulfill its mission in conserving and protecting outstanding wildlife and habitat to benefit the refuge system and the American people.

Strategies

Continue to:

- Coordinate with the town of Nantucket and other partners to protect the 195-acre Head of the Plains (former FAA property) as a no-cost transfer from the GSA.

- Work with the Coast Guard for the Service for right of first refusal for any Coast Guard properties, including acquiring the former Loran Station in Siasconset, Massachusetts (which includes potential housing and facility options).

Within 1 year:

- Send official letter from the Service to the Coast Guard documenting Service interest in acquiring the Great Point Lighthouse as a no-cost transfer from the Coast Guard.

- Send official letter from the Service to the Coast Guard documenting Service interest in acquiring the Nantucket Loran Station as a no-cost transfer from the Coast Guard.

Within 3 years:

- Work with partners (TTOR and NCF) and the National Park Service to pursue designation of National Natural Landmark Status for the Coskata-Coatue Peninsula.

- Work with partners to enhance the protection of adjacent conservation lands currently owned by the NCF and The Trustees of the Reservations through conservation easements and management agreements.

- Work with the town of Nantucket, the Nantucket Land Bank, the Nantucket Land Council, and private landowners to protect the 175-acre Muskeget Island and to cooperatively manage the wildlife resources on the island.

Within 5 years:

- Work with the town to acquire portions of the town owned property at Lower Beach Road through possible land exchange with the town of Nantucket.

Within 10 years:

- Work with the owners of the current Lohmann and Jellamie properties for long-term protection of these properties through fee title, land exchange, or conservation easement or develop a management agreement.

- Work with partners to explore options along bus/bike route to acquire property for a joint visitor contact station on or off the refuge.

Monitoring Elements

- Number of acres protected through easement or acquisition.

- Number of new sites protected.

- Number of new Management Agreements for lands owned by partners.