

Appendix B



USFWS

Snowy Egret

Other Federal Mandates and Relevant Plans and Initiatives

This appendix provides full summary descriptions of the ESA Recovery Plans listed in Section 1.8.4 and of those plans and initiatives discussed in Section 1.10.

1.8.4 Other Federal Mandates

Federal Endangered Species Act (ESA) Recovery Plans

Four Federal ESA Recovery Plans are in effect to protect and enhance threatened and endangered species which are residents of Chincoteague and/or Wallops Island NWRs: Atlantic Coast Piping Plover (*Chadradius melodus*) Recovery Plan (USFWS 1995), Delmarva fox squirrel (*Sciurus niger cinereus*) Recovery Plan (USFWS 1993b), Recovery Plan for Seabeach amaranth (*Amarantus pumilus*) Rafinesque (USFWS 1996b), and Recovery Plan for U.S. Populations of Loggerhead Turtle (*Caretta caretta*) (NMFS and USFWS 1993). Current refuge management with respect to these federally-listed species has been guided by these Recovery Plans and numerous ESA Section 7/Biological Opinions for refuge projects. Habitat Management Plans (HMPs) for Chincoteague and Wallops Island NWRs will incorporate and build upon these recovery plans but each plan is summarized below.

Atlantic Coast Piping Plover (*Chadradius melodus*) Recovery Plan (1996)

The primary objective of this recovery program is to remove the Atlantic Coast piping plover population from the List of Endangered and Threatened Wildlife and Plants by: (1) achieving well-distributed increases in numbers and productivity of breeding pairs, and (2) providing for long-term protection of breeding and wintering plovers and their habitat. Loss and degradation of habitat due to development and shoreline stabilization have been major contributors to the species' decline. Disturbance by humans and pets often reduces the functional suitability of habitat and causes direct and indirect mortality of eggs and chicks. Predation has also been identified as a major factor limiting piping plover reproductive success at many Atlantic Coast sites, and substantial evidence shows that human activities are affecting types, numbers, and activity patterns of predators, thereby exacerbating natural predation (USFWS 1995). This recovery plan follows the Atlantic Coast Recovery guidelines for managing and protecting piping plovers and describes specific policies concerning monitoring guidelines, protection efforts, disturbance issues, predator control, and reporting requirements. The refuge objectives are to maximize production of the piping plover (with mean productivity of 1.50 chicks fledged per nesting pair) and least tern on refuge lands. This will be accomplished through the reduction of predation and human disturbance, and through public educational efforts about the plight of the piping plover and least tern and the work conducted by the refuge to restore the bird populations.

Delmarva Fox Squirrel (*Sciurus niger cinereus*) Recovery Plan (1993)

The Delmarva Peninsula fox squirrel, generally called the Delmarva fox squirrel, was listed as federally endangered in 1967 because of concerns about a reduction in distribution to only 10 percent of its historical range. Three recovery plans have been written for this species, with the most recent completed in 1993 (USFWS 1993). This recovery plan focuses primarily on determining the current distribution and habitat requirements of the Delmarva fox squirrel and on implementing habitat protection within its remaining natural range. The plan also notes that successful establishment of translocated populations will be required for full recovery. The Delmarva fox squirrel's forested habitat is susceptible to continued loss and fragmentation through overcutting and land use changes, although this is balanced to some extent by regeneration of forest resources.

2011 Delmarva Peninsula Fox Squirrel 5-Year Review

This five-year status review (USFWS 2011) summarizes information obtained since the previous five-year review by the USFWS in 2007 and evaluates the status of the species' populations, habitat, and threats. It considers delisting criteria specified in the most current recovery plan and conducts an assessment of the five listing factors to determine the appropriate classification of this species under the ESA. USFWS will continue monitoring efforts on the refuge through the use of trapping and camera stations on the grounds.

Recovery Plan for Seabeach amaranth (*Amarantus pumilus*) (1996)

Seabeach amaranth is restricted to sandy ocean beaches, and its habitat consists of the sparsely vegetated zone between the high tide line and the toe of the primary dune. This plan seeks to establish the species in at least six of the coastal states within its historic range (Delaware, Massachusetts, Maryland, North Carolina, New Jersey, New York, Rhode Island, South Carolina, and Virginia). Recovery is defined as when a minimum of 75 percent of the sites with suitable habitat within each state are occupied by amaranth populations for 10 consecutive years. Habitat destruction and alteration, incompatible beach grooming practices, and recreational activities have all contributed to the decline of this species. Although some of the surviving populations are on public lands (national wildlife refuges, national seashores, and state parks), they are not completely protected from the threats that face almost all populations (Seabeach amaranth 1996b).

Recovery Plan for U.S. Populations of Loggerhead Turtle (*Caretta caretta*) (1993)

This plan reviews and discusses the species ecology, population status and trends, and identifies threats to the loggerhead turtle in the northwestern Atlantic. It lays out a recovery strategy to address the threats, based on the best available science, and includes recovery goals and criteria. In addition, the plan identifies actions needed to address the threats to the species and achieve recovery. This revised plan is significant in that it identifies five unique recovery units, which comprise the population of loggerhead turtles in the northwest Atlantic, and describes specific recovery criteria for each recovery unit (NMFS and USFWS 1993).

1.10 Other Relevant Plans and Initiatives**1.10.1 International and National Conservation Plans and Initiatives**

The plans and initiatives listed below, in chronological order, provide guidance for the CCP/EIS development and development of refuge management policies, goals, and objectives in regard to the significance of the refuge's natural environment and considerations for its protection and management.

North American Breeding Bird Survey (BBS; 1966 to present)

The BBS is an ongoing cooperative effort between the U.S. Geological Survey's Patuxent Wildlife Research Center and Environment Canada's Canadian Wildlife Service to monitor the status and trends of North American bird populations. BBS data are collected by thousands of participants along thousands of randomly established roadside routes throughout the continent. Professional BBS coordinators and data managers work closely with researchers and statisticians to compile and deliver these population data and population trend analyses on more than 400 bird species.

In the mid-twentieth century, the success of DDT (dichlorodiphenyltrichloroethane) as a pesticide ushered in a new era of synthetic chemical pest control. As pesticide use grew, concerns, as epitomized by Rachel Carson in *Silent Spring*, regarding their effects on wildlife began to surface (Carson, 2002). Local studies had attributed some bird kills to pesticides, but it was unclear how, or if, bird populations were being affected at regional or national levels. Responding to this concern, Chandler Robbins and colleagues at the Patuxent Wildlife Research Center developed the BBS to monitor bird populations over large geographic areas.

Although most concerns over pesticide use in North America have subsided in recent decades, bird populations continue to be subjected to numerous widespread threats including habitat loss, habitat fragmentation, land-use changes, and other chemical contaminants. Today, the BBS continues to monitor bird populations across North America and informs researchers and wildlife managers of significant changes in bird population levels. If significant declines are detected, their causes can then be identified and appropriate actions taken to reverse them before populations reach critically low levels.

North American Waterfowl Management Plan (NAWMP; 1986 and update 2004)

Originally written in 1986, the NAWMP describes a 15 year strategy for the United States, Canada, and Mexico to restore and sustain waterfowl populations by protecting, restoring, and enhancing habitat. The plan committee, including representatives from Canada, the United States, and Mexico, has modified the 1986 plan twice to account for biological, sociological, and economic changes that influenced the status of waterfowl and the conduct of cooperative habitat conservation. The most recent modification in 2004 updates the latest needs, priorities, and strategies for the next 15 years, and guides partners in strengthening the biological foundation of North American waterfowl conservation and stakeholder confidence in the direction of the plan (NAWMP Committee 2004).

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

The plans are implemented at the regional level in 14 habitat Joint Ventures and 3 species Joint Ventures: Arctic Goose, Black Duck, and Sea Duck. Chincoteague and Wallops Island NWRs lie in the Atlantic Coast Joint Venture, which includes all the Atlantic Flyway states from Maine to Florida and Puerto Rico.

Partners in Flight Conservation Plans (PIF; 1990)

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

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

Chincoteague and Wallops Island NWRs are included in the Mid-Atlantic Coastal Plain (physiographic area 44) and its plan (Version 1.0, April 1999). The plan includes objectives for the following habitat types and associated species of conservation concern.

- Barrier and Bay Islands: American oystercatcher, black skimmer, least tern, Forester’s tern, gull-billed tern;
- Salt Marsh: black duck, clapper rail, willet and seaside sparrow;
- Pine Plantation: brown-headed nuthatch, eastern wood pewee, and eastern towhee;
- Early successional: field sparrow, northern bobwhite, and yellow-breasted chat; and
- Fresh/Brackish Emergent Wetland: American black duck.

The Mid-Atlantic Coastal Plain plan is available on line at http://www.partnersinflight.org/bcps/pl_44sum.htm (Watts 1999).

Regional Wetland Concept Plan, Northeast Region (1990)

Congress enacted the Emergency Wetlands Resources Act in 1986 to promote the conservation of wetlands nationwide. Through this act, Congress directed the Department of the Interior to develop a national

wetlands priority conservation plan identifying the location and types of wetlands that should receive priority attention for acquisition by Federal and state agencies using Land and Water Conservation Fund appropriations. In 1990, the USFWS Region 5 completed a regional wetlands concept plan that complemented the national plan by providing more detailed information about the wetland resources of the northeastern states (USFWS 1990).

The regional wetlands concept plan identifies 850 wetland sites that warrant consideration for acquisition. It also describes wetland functions and values as well as identifies habitat loss and threats to wetlands remaining in the region. Of the 205 wetland sites identified in the Commonwealth of Virginia, 20 sites are located in Accomack County, including Cedar and Metompkin islands and Chincoteague Island. This information is important to consider for regional conservation efforts (USFWS 1990).

North American Bird Conservation Initiative (NABCI, 1998)

The NABCI is a coalition of government, private and academic organizations, and private industry leaders addressing bird conservation. The initiative's vision is to achieve regionally-based, biologically-driven, landscape-oriented partnerships that deliver the full spectrum of bird conservation across the North American continent and that support simultaneous, on-the-ground delivery of conservation for all birds. It evolved in 1998 out of recognition of the value of coordinating efforts of the NAWMP and PIF. Populations and habitats of North America's birds are protected, restored, and enhanced through coordinated efforts at international, national, regional, state, and local levels, guided by sound science and effective management. NABCI has designated 37 Bird Conservation Regions (BCR) that encompass landscapes having similar bird communities, habitats, and resource issues. NABCI defined BCRs as ecologically based units in a framework for planning, implementing, and evaluating bird conservation. Each BCR has its own implementation plan (NABCI n.d.a). Chincoteague and Wallops Island NWRs lie in the New England/Mid-Atlantic (NABCI n.d.b).

U.S. Shorebird Conservation (2001) and North Atlantic Regional Shorebird Plans

The U.S. Shorebird Plan Council is a partnership of state and federal agencies, non-governmental conservation organizations, academic institutions, and individuals that collaborated under a grant from USFWS in 2000 to develop the U.S. Shorebird Conservation Plan (USSCP), with a second addition published in May 2001. The plan develops conservation goals for each U.S. region, identifies important habitat conservation and research needs, and proposes education and outreach programs to increase public awareness of shorebirds and of threats to them. The USSCP is available online at <http://www.shorebirdplan.org/wp-content/uploads/2013/01/USShorebirdPlan2Ed.pdf> (Brown 2001).

In the Northeast, the North Atlantic Regional Shorebird Plan was drafted to step down the goals of the continental plan to smaller scales and identify priority species, habitats, and species goals, as well as prioritize implementation projects.

The North Atlantic Regional Shorebird Plan can be viewed online at <http://www.fws.gov/shorebirdplan/RegionalShorebird/downloads/NATLAN4.pdf> (Clark 2000).

North American Waterbird Conservation Plan (NAWCP; Version 1, 2002)

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

A copy of the continental plan can be requested at <http://www.nawcp.org/pubs/ContinentalPlan.cfm> (Kushlan et al. 2002).

Birds of Conservation Concern (BCC; 2002 and update 2008)

USFWS developed the BCC report, Birds of Conservation Concern 2002, and its update, Birds of Conservation Concern 2008, in consultation with the leaders of ongoing bird conservation initiatives and partnerships such as PIF, NAWMP, NAWCP, and USSCP. The report fulfills the mandate of the 1988 amendment to the Fish and Wildlife Conservation Act requiring the Secretary of the Interior, through the USFWS, to “identify species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973.”

The BCC report identifies the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities. The underlying philosophy behind BCC 2008 is that proactive bird conservation actions are necessary at a time when human impacts are at an all-time high to ensure the future of healthy avian populations and communities. BCC 2008 data and information serve as a barometer of the condition of the nation’s avifauna from a national landscape scale funneled down to regional details.

The 2008 report identifies species at three geographic scales: NABCI BCRs, USFWS regions, and national. The national BCC 2008 priority bird list provides an early warning for those bird species that have the potential to decline to levels requiring ESA protection; it is to be consulted before actions are taken on Federal lands, and for research, monitoring, and management funding in accordance with Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (2002). The national list serves as an outreach tool for educating the public about the precarious status of selected bird species across the United States and as a general rule is not used to foster bird conservation at smaller geographic scales; that is the purpose of the BCR 30 and USFWS region lists (USFWS 2008c). The relevant BCR list for the refuge is discussed below.

New England/Mid-Atlantic Coast Bird Conservation Region (BCR 30) Implementation Plan (2008)

The Atlantic Coast Joint Venture partnership created this plan in response to the NABCI challenge of building on existing partnerships to plan, implement, and evaluate cooperative bird conservation across North America. The plan outlines actions to restore and maintain healthy populations of birds native to the New England/Mid-Atlantic BCR (BCR 30).

Of the 134 bird species identified in the plan as priorities for conservation, 107 species occur on the refuge. Priority species include American black ducks, Atlantic brant, scoters, and bufflehead for waterfowl; piping plovers, American woodcock, red knots and American oystercatchers for shorebirds; least terns, gull-billed tern, glossy ibis and clapper rails for waterbirds; and northern bobwhite, field sparrow, eastern towhee, and prairie warblers for landbirds. We considered these species and priority habitats in developing management actions for this CCP.

The habitats of BCR 30 are a complex transition between the southern New England and the southern Atlantic coastal plains. Major threats to birds and habitats are invasive exotic species, climate change and sea level rise, and human disturbance from recreational uses and land development.

The implementation plan may be viewed online at http://www.acjv.org/BCR_30/BCR30_June_23_2008_final.pdf (Steinkamp 2008).

A Blueprint for the Future of Migratory Birds: A Strategic Plan 2004-2014 (2004)

In tandem with the BCC 2008 effort, USFWS also developed a 10-year national strategic migratory management plan to collaborate with its partners to recommit and set a successful course for migratory bird conservation over the next decade. The finalized plan describes the challenges facing migratory bird

conservation, with associated management strategies to meet these future challenges. We formulated a strong recommitment to migratory bird conservation with the following vision statement “*Through careful management built on solid science and diverse partnerships, the Service and its partners will restore and sustain the epic sweep of bird migration and the natural systems on which it depends --- fostering a world in which bird populations continue to fulfill their ecological roles while lifting the human spirit and enriching human lives in infinite ways, for generations to come*” (USFWS 2004a).

The plan points out that “birds enrich people’s lives and have intrinsic value as threads in the earth’s ecological tapestry, as pollinators, predators, and prey. Birds serve as excellent indicators of the health and quality of the environment as clean air, clean water and abundant, diverse natural habitats are essential for birds to survive and flourish” (USFWS 2004a). The plan also recognizes that birds are enjoyed by a large proportion of Americans, as more than 82 million residents of the U.S. (39 percent of adult population) participate in wildlife-related activities, and 64 million pursue bird-related recreation, contributing substantially to local economies throughout the nation by spending more than \$40 billion dollars annually on these pursuits.

The plan also identifies the major future challenges to conserve migratory birds. Declines in abundance of many landbird, shorebird, and waterbird populations are indicative of ecosystems that have been highly stressed and altered. The plan acknowledges that reductions in natural habitat quantity and quality are the primary causes of negative population trends in many bird species and are exacerbated by the direct loss of bird life from an array of environmental contaminants. Pesticides continue to poison birds and their food supplies. Invasive species and disease outbreaks also contribute to migratory bird mortality. Global climate change and demand for fresh water supplies pose current and future threats.

The plan explains that meeting these challenges will require consistent adherence to the principles of sound science. We will address many of these threats in this CCP/EIS and use the best available scientific information to mitigate environmental dangers to migratory birds. The refuge and its partners will focus on these challenges in the most cost-effective manner to perpetuate avian populations (USFWS 2004a).

Conserving the Future: Wildlife Refuges and the Next Generation (USFWS 2011)

USFWS created this report, *Conserving the Future*, using the previous Refuge System strategic plan, the 1999 report *Fulfilling the Promise* (USFWS 2009), as a foundation. It provides an updated vision for the future of America’s national wildlife refuges. The report recognizes that since the 2009 report, much of America has changed from a conservation standpoint, with an increasing focus on such topics as invasive species and changing climate. USFWS worked with the National Wildlife Refuge Association, a non-profit focused on policy, landscape-scale conservation efforts, grassroots development and public education, to develop this report, as well as over 100 USFWS staff members and input from over 10,000 public comments.

This report outlines a vision that states:

“The Service will enhance its close relationship with the state fish and wildlife agencies. We will coordinate with them on management of fish and wildlife within the Refuge System and on establishing population objectives. We will strive to increase hunting and fishing opportunities to a diverse constituency. We will also be a catalyst to find common ground with other refuge supporters with the goal of expanding the conservation constituency for the benefit of healthy wildlife and habitats for future generations” (USFWS 2011c).

Specifically, this document is split into three chapters that highlight the main ideas for conservation:

- “Conserving the Future: Wildlife and Wildlands,” which outlines how the USFWS will embrace a scientific, landscape-level approach to conserving, managing and restoring refuge lands and waters, and work to facilitate conservation benefits beyond our boundaries;

- “A Connected Conservation Constituency,” which explains how the USFWS will engage the American people to better understand their expectations and increase their awareness of the Refuge System and its role in conservation; and
- “Leading Conservation into the Future,” which speaks to developing a diverse workforce that embodies the Guiding Principles of the USFWS and demonstrates those principles in our daily activities and interactions.

USFWS recognizes the challenges that refuges face in coming years, and the report focuses on gaining conservation strength through partnerships with other agencies and individuals (USFWS 2011c). We have incorporated the importance of partnerships in the changing world into this CCP/EIS throughout, and specifically in Goal 5.

U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines (2012)

The USFWS developed these guidelines developed in conjunction with the Wind Turbine Guidelines Advisory Committee to acknowledge the growing concern of potential wildlife disturbance due to wind energy sources. We recognize that as the U.S. shifts to renewable energy production to supplant the need for carbon-based fuel, wind energy will be an important source of power. As wind energy production increases, both developers and wildlife agencies have also recognized the need for a system to evaluate and address the potential negative impacts of wind energy projects on species of concern. These voluntary guidelines provide a structured, scientific process for addressing wildlife conservation concerns at all stages of land-based wind energy development. They also promote effective communication among wind energy developers and federal, state, and local conservation agencies and tribes. When used in concert with appropriate regulatory tools, the guidelines form the best practical approach for conserving species of concern (USFWS 2012b).

1.10.2 National Public Use Plans and Initiatives

America's Great Outdoors: A Promise to Future Generations (AGO; 2011)

On April 16, 2010, President Obama launched the America's Great Outdoors (AGO) initiative and charged the Secretaries of the Departments of the Interior and Agriculture, the Administrator of the Environmental Protection Agency (EPA), and the Chair of the White House Council on Environmental Quality to develop a 21st-century conservation and recreation agenda. Multiagency teams conducted more than 50 listening sessions in communities throughout the U.S., engaging a full range of interested groups, including tribal leaders, farmers and ranchers, sports enthusiasts, foresters, motorized recreationists, youth groups, businesspeople, educators, historic preservationists, state and local governments, and land trusts. Many thousands of Americans provided feedback and comments through e-mail and the AGO website. In all, more than 105,000 comments contributed to the conversation. These comments and recommendations provide the basis for the AGO report to the President, and a starting point for a continuing conversation on conservation in the 21st-century. The report was created in consultation with the American people; it reflects their ideas on how to reconnect people with America's lands, waters, and natural and cultural treasures and builds on the conservation successes in communities across the nation (Department of the Interior, et. al. 2012.).

Let's Move! And Let's Move Outside

Let's Move is an initiative launched by First Lady Michelle Obama, with the goal of solving the problem of obesity within a generation. The program is focused on children, and helping them and their parents focus on healthy eating and physical activity. At the launch of the initiative, President Barack Obama signed a Presidential Memorandum creating the first-ever Task Force on Childhood Obesity to conduct a review of every single program and policy relating to child nutrition and physical activity and develop a national action plan to maximize federal resources and set concrete benchmarks toward the First Lady's national goal. The five pillars of the initiatives are: creating a healthy start for children, empowering their parents

and caregivers, providing healthy food in schools, improving access to healthy, affordable foods, and increasing physical activity.

Let's Move has an outgrowth initiative, Let's Move Outside, administered by the DOI in partnership with the U.S. Forest Service and U.S. Army Corps of Engineers with the goal of connecting children to nature through active, outdoor recreation. The initiative's website has several ways to search by type of activity or type of location for nearby recreational opportunities. Let's Move Outdoors is an initiative of the AGO.

Youth in the Great Outdoors

Youth in the Great Outdoors is a U.S. Department of Interior initiative to employ, educate, and engage young people from all backgrounds in exploring, connecting with and preserving America's natural and cultural heritage. This initiative aims to promote outdoor and educational programs as well as employment opportunities for youth throughout the Department and reach out to audiences who have never visited their public lands. The hope for this initiative is to help tackle some of the many challenges facing youth today, from high unemployment rates to declining health, by reconnecting youth with the outdoors and building pathways to careers in resource stewardship.

Connecting People with Nature

Connecting People with Nature is a USFWS initiative that recognizes the need to connect children, their families and communities to nature through innovative ideas, evidence-based resources and tools, broad-based collaboration, and the support of grassroots leadership. Through this initiative, we partner with companies and educators across the country as well as other initiatives to develop programs that inspire people to get outside and become more connected with nature.

1.10.3 Climate Change and Sea Level Rise Studies

USFWS is concerned with the potential effects of climate change on Assateague Island and the Virginia Eastern Shore, and the potential impact on refuge facilities, infrastructure, and access. We therefore consider climate change to be a key consideration for this CCP/EIS. These concerns are further described in section 1.14.

The two most relevant climate change plans are the following:

- *Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change.* Our climate change strategic plan identifies key goals and objectives for the agency centered around three areas: adaptation, mitigation, and engagement. Key adaptation goals and objectives include the creation of regional Climate Science Centers and Landscape Conservation Cooperatives, development of a National Fish and Wildlife Adaptation Strategy over a 5 year period (see below), conduct species and habitat vulnerability assessments, and incorporate climate change into agency activities and decisions (USFWS 2010b). A draft supplemental, "Appendix: 5-Year Action Plan for Implementing the Climate Change Strategic Plan," details the specific actions the USFWS will take through 2013 to achieve each of the goals and objectives (USFWS 2009).
- *The National Fish, Wildlife and Plants Climate Adaptation Strategy (2012)* was called for by Congress in 2010. USFWS, the National Oceanic and Atmospheric Administration, the Council on Environmental Quality, state wildlife agencies, and Tribes co-led the development of this Strategy using the best available science. Working with a broad range of conservation interests, including local governments, states, tribes, conservation organizations, federal agencies, industry and private landowners, the strategy provides "a unified approach—reflecting shared principles and science-based practices—for reducing the negative impacts of climate change on fish, wildlife, plants, and the natural systems upon which they depend." The strategy is a blueprint for action, and includes scientific support, policy and legal frameworks, best management practices, processes for integration and communication, and a framework for implementation.

The relevant work on climate change for the refuge includes the following studies and plans, presented in chronological order:

- *A Case Study on Chesapeake Bay and Assateague Island*, part of the 2001 Climate Change, Wildlife, and Wildlands Toolkit by the U.S. EPA in partnership with the National Park Service (NPS) and USFWS, recognizes the constant change in the shape and geographical position of Assateague Island and predicts that the island is likely to continue to move landward, as sand is pushed across the island to the bay side. It finds that similar habitats will probably not suffer serious net losses, but that infrastructure such as the Wildlife Loop Road may be destroyed (EPA, NPS, USFWS 2009)
- *Refuges at Risk: the Threat of Global Warming*, a 2006 report by the Defenders of Wildlife, warns of the threat of global warming to National Wildlife Refuges and details its potential effects on ten national wildlife refuges that it considers the most endangered. Chincoteague NWR is included in those ten. The report states that scientists predict that Assateague Island will narrow due to sea level rise leading to a loss in wildlife habitat and impacts to roads and visitor facilities (Schlyer 2006).
- *The Virginia Climate Change Action Plan*, published in 2008 by the Governor's Commission on Climate Change, identifies sea level rise as a major concern for coastal Virginia. The Plan projects that sea levels in the Chesapeake Bay region will be 0.7 to 1.6 meters (2.3 to 5.2 feet) higher by 2100, with great local variability as a result of subsidence. The Plan recommends that local governments in coastal Virginia and the Secretary of Transportation include projected climate change impacts, especially sea level rise and storm surge, in all planning efforts, including transportation planning, project design, and prioritization of projects for funding as well as transportation systems management, operations, and maintenance (Governor's Commission on Climate Change 2008).
- *Sea Level Rise and Coastal Habitats in the Chesapeake Bay Region*, published by the National Wildlife Federation, used the Sea Level Affecting Marshes Model (SLAMM)¹ to predict coastal changes, including impacts on coastal wildlife habitats, in the Chesapeake Bay region over the 21st century. The report notes that because of its expansive coastline, low-lying topography, and growing coastal population, the Chesapeake Bay region is one of the most vulnerable places in the nation to the impacts of sea level rise. Many places along the Chesapeake Bay have seen a one-foot increase in relative sea level rise over the 20th century, including six inches due to global warming and six inches due to naturally subsiding coastal lands. In looking at the Chesapeake Bay area, the report concluded that there would be significant inundation of dry-land and conversion to marshes by 2100 (Glick 2008).
- *Application of the SLAMM 5.0.2 in the Lower Delmarva Peninsula* was commissioned by Chincoteague NWR to project the effects of sea level rise on barrier islands extending from Ocean City Inlet, Maryland to Fisherman Island, Virginia in the Delmarva Peninsula with a main focus on Chincoteague NWR and Assateague Island National Seashore. The study used three scenarios, which reflect the projections adopted by the Virginia Climate Change Action Plan, including:

¹ SLAMM is one of the models used to study the impact of coastal processes, such as sea-level rise, on an area and simulate the dominant processes and forecast long-term effects. SLAMM takes into account five processes that determine the impact of sea level rise impact on wetlands: inundation (the rise of water levels and the salt boundary); erosion; overwash (beach migration and transport of sediments); saturation (migration of coastal swamps and fresh marshes onto adjacent uplands due to the water table responding to rising sea level); and accretion (vertical rise due to buildup of organic and inorganic matter).

- Intergovernmental Panel on Climate Change (IPCC) A1B scenario: 0.7 meter global sea level rise by 2100
- 1.0 meter global sea level rise by 2100
- 1.5 meter global sea level rise by 2100

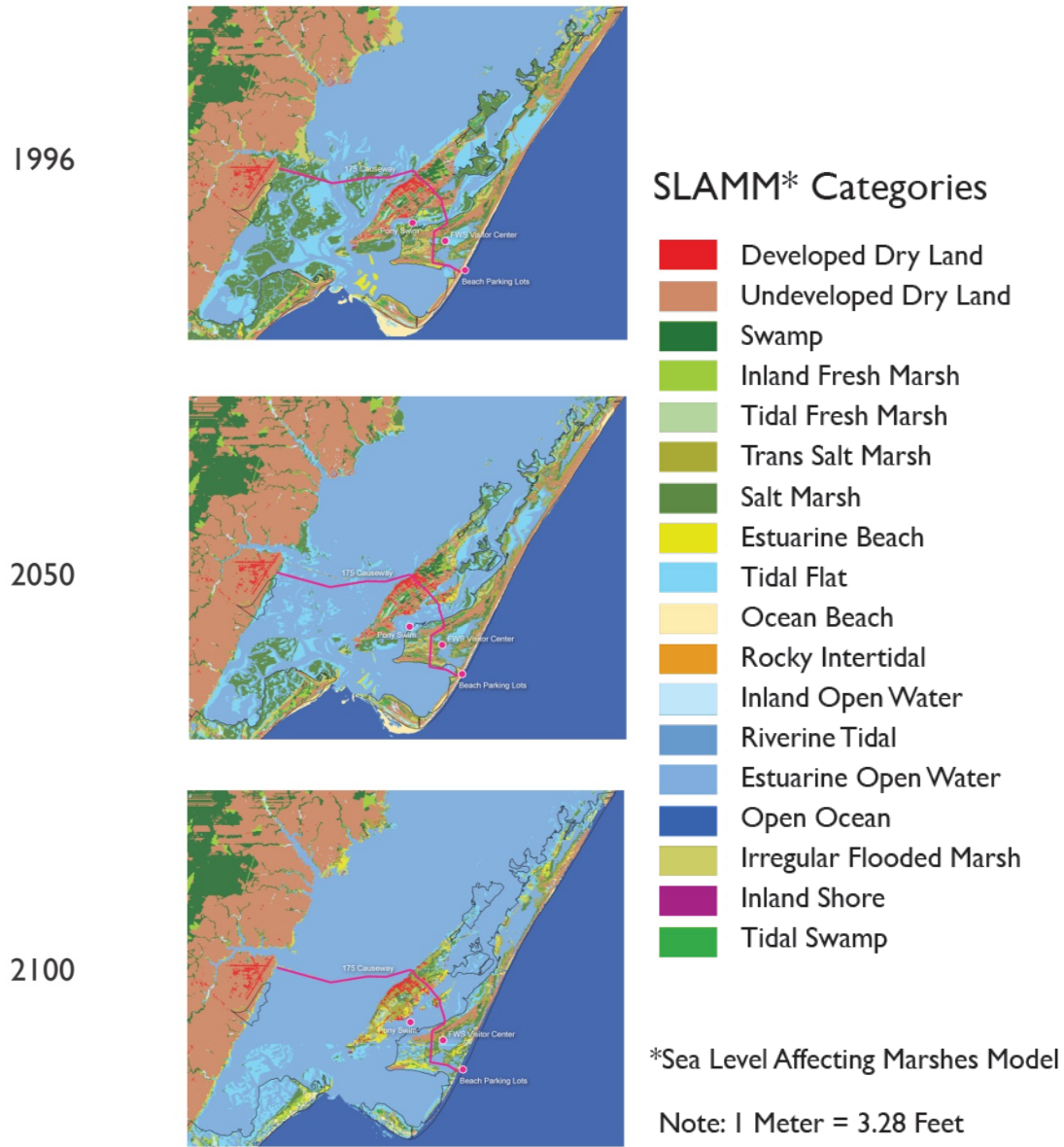
These three scenarios and the resulting habitat changes are shown in Figure 1-3. The study executed simulations in 25 year increments from the date of available existing conditions (1988-2003) until 2100 and found that the most significant changes would occur on the eastern shore beaches and marshes. Breaching is expected along areas near Toms Cove and significant loss of coastal habitats is anticipated for Assateague Island and other barrier islands within Chincoteague NWR by 2075 or 2100 in the 1.0 and 1.5 meter rise scenarios, respectively. Assuming a 0.69 m to 1.5 m sea-level rise, Brackish Water marshes would decline 68% to 91% and saltmarsh would decline 37% to 49% by 2100. Under the same sea-level rise scenarios, transitional salt marsh (scrub shrub) may gain 88% to 156% habitat. Furthermore, Ocean beach habitat would decline by 80 percent by the year 2100 in the 1.0 meter sea level rise scenario. Estuarine beaches, on the other hand, are projected to gain habitat. As with all ecological models, SLAMM does not currently account for all of the feedback and functions of coastal ecosystems.

The study indicates that critical transportation infrastructure is under threat of overwash and inundation in the future, including the Route 175 Causeway, the bridge and causeway between Chincoteague and Assateague Islands, and low-lying stretches of Beach Road. As noted in the Chincoteague NWR Master Plan (1993), the land now beneath current beach parking areas will eventually be reduced due to the natural movement of the barrier island, a movement that would most likely be exacerbated and added to by effects of climate change (Nieves 2009).

- *National Parks in Peril: The Threats of Climate Change Disruption*, published by The Rocky Mountain Climate Organization and the Natural Resources Defense Council, identifies 25 national parks, including Assateague Island National Seashore, as most at risk to climate change impacts. The report recommends that parks focus on reducing emissions of NPS operations and visitor activities, in particular due to transportation, through demonstrating model programs and becoming climate-neutral² (Saunders 2009).

² The term climate neutral, which is often used interchangeably with carbon-neutral, reflects the fact that it is not just carbon dioxide (CO₂), that is driving climate change, but also encompasses other greenhouse gases regulated by the Kyoto Protocol, such as: methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulphur hexafluoride (SF₆).

Figure 1-1. SLAMM Analysis Results for Chincoteague and Wallops Island NWRs (Nieves 2009).



1.10.4 State, Regional, and Local Plans

Virginia's Comprehensive Wildlife Conservation Strategy and Wildlife Action Plan

In 2002, Congress created the State Wildlife Grant Program (SWG), and appropriated \$80 million in state grants. The purpose of the program is to help state and tribal fish and wildlife agencies conserve fish and wildlife species of greatest conservation need. The funds appropriated under the program are allocated to states according to a formula that takes into account their size and population.

To be eligible for additional Federal grants and satisfy the requirements for participating in the SWG program, each state and U.S. territory developed a statewide “Comprehensive Wildlife Conservation Strategy” and submitted it to the National Advisory Acceptance Team by October 1, 2005. Each plan addressed eight required elements and identified and focused on “species of greatest conservation need,” while still addressing other wildlife and wildlife-related issues.

The Virginia Department of Game and Inland Fisheries developed the Virginia Wildlife Action Plan as to meet that charge. The goal of the plan is to create a vision for conserving wildlife and stimulate other states, Federal agencies, and conservation partners to think strategically about their individual and coordinated roles in prioritizing conservation. The eight elements addressed in the Virginia Wildlife Action Plan supplement and validate the information on species and habitat and their distribution on Chincoteague and Wallops Island NWRs – which helps identify conservation threats and management strategies for species and habitats of conservation concern on the refuge. The plan identifies 925 species in need of greatest conservation concern in Virginia and groups them into four tiers of relative risk of imperilment. The plan also identifies the “top 10” threats faced by terrestrial wildlife; seven are related to habitat destruction or fragmentation (Virginia Department of Game and Inland Fisheries 2005).

State Comprehensive Outdoor Recreation Plan (2007)

The 2007 *Virginia Outdoors Plan (VOP)* is the ninth VOP created since 1965, and provides guidance and direction in meeting the state’s needs for outdoor recreation and for the conservation of natural, cultural, and scenic resources important to Virginians’ quality of life. The document recognizes that with the growing population, decrease in undeveloped natural landscape, and increase in anthropogenic stimuli, the preservation of natural lands and the provision of outdoor recreation opportunities are high public demands. The 2007 VOP offers specific statewide recommendations for program areas, land management agencies responsible for outdoor recreation, and land conservation. It also includes numerous recommendations for each planning region throughout the Commonwealth; the refuge is located within the Accomack-Northampton Planning District. Region-specific recommendations include working with USFWS on optimizing compatible recreation activities while still protecting sensitive beach habitats and working with partners on wildlife corridor protection and migratory bird habitat. It highlights several issues and trends that Virginia faces in the coming years, with the most critical being funding and economics, outdoor recreation, and land conservation and key infrastructure planning (Virginia Department of Conservation & Recreation 2007).

Accomack County Comprehensive Plan (2008)

The Accomack County Comprehensive Plan provides an inventory of existing conditions, list of issues and concerns, future land use plan, and goals, objectives, and recommendations. The plan identifies natural resource preservation as an important issue and goal for the future. The plan recognizes that the County’s natural resources base, including forests, fields, marsh, creeks, bays, and barrier islands, has economic, aesthetic, and recreational value, as well as being valuable habitat for a variety of wildlife. The plan states that the County will enact a variety of policy, regulatory, and program tools to preserve farmland, shorelines, water resources, and other natural resources (County of Accomack 2008).

Town of Chincoteague Comprehensive Plan (2010)

The Town of Chincoteague Comprehensive Plan provides a community profile, with information on the history, socioeconomic characteristics, natural features, and land use of the Town of Chincoteague, and goals, objectives, and implementation strategies for land use, economic development, community facilities, transportation, and housing. The plan focuses on balancing growth and economic development with economic and environmental sustainability. The plan identifies tourism and aquaculture as two primary areas of concern for economic development and establishes a resource conservation planning area to complement the purpose and objectives established by the NPS and the USFWS for Assateague Island National Seashore and Chincoteague NWR. This includes maintaining the protections afforded by barrier islands from storm events and protecting the diverse and unique ecology that serves as the basis for the Town's economy and visitation to the area (Town of Chincoteague 2010).