U.S. Fish & Wildlife Service

Elizabeth Hartwell Mason Neck National Wildlife Refuge and Featherstone National Wildlife Refuge

Comprehensive Conservation Plan

September 2011

Front cover:

Little Marsh on Mason Neck National Wildlife Refuge
Bill Wallen

Bald eagle
Bill Wallen

Prothonotary warbler
©Jeff Lewis

Wood ducks
Dave Menke/USFWS

Great blue heron
Steve Hillebrand/USFWS

Back cover:

Little Marsh on Mason Neck National Wildlife Refuge
Bill Wallen

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

The U.S. Fish and Wildlife Service is the principal Federal agency responsible for conserving, protecting, and enhancing fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The Service manages the 150-million acre National Wildlife Refuge System comprised of more than 550 national wildlife refuges and thousands of waterfowl production areas. It also operates 69 national fish hatcheries and 81 ecological services field stations. The agency enforces Federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal Assistance Program which distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

U.S. Fish & Wildlife Service

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September 2011

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9/1/2011

U.S. Fish & Wildlife Service

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Potomac River National Wildlife Refuge Complex Vision Statement

The Potomac River National Wildlife Refuge Complex provides exceptional forested, grassland, and wetland habitats for wildlife in a dynamic, highly urbanized region of Northern Virginia. We will maintain and enhance those quality habitats along the middle tidal Potomac River for native wildlife, particularly bald eagles and other species of conservation concern.

The proximity of the Refuge Complex to our Nation's capital provides unparalleled opportunities to demonstrate the importance of the natural world in enhancing the quality of human life and raise public awareness about the value of the National Wildlife Refuge System. Through outreach, education, and partnerships, we will foster stewardship of the living resources of the tidal Potomac River and the Chesapeake Bay watershed. Visitors will have diverse opportunities for quality, compatible, wildlife-dependent recreation.

Elizabeth Hartwell Mason Neck Refuge Vision Statement

Elizabeth Hartwell Mason Neck National Wildlife Refuge is dedicated to the protection of the bald eagle and exemplifies the significant efforts, contributions, and successes of conservationists in Virginia. The refuge will continue to protect and enhance regionally important habitat for the bald eagle, migratory birds, and native wildlife and plant species along the tidal Potomac River. We will provide quality wildlife-dependent recreational and educational opportunities, in particular, wildlife viewing and photography. In cooperation with the other agencies in the Mason Neck Management area, we will work to resolve resource issues on the Mason Neck Peninsula.

Featherstone Refuge Vision Statement

Featherstone National Wildlife Refuge provides valuable acres of 'wild woods and wetland' which are rapidly disappearing within this region of Virginia. The refuge will continue to protect wetlands, bottomland hardwoods, and associated native wildlife and plants in an otherwise highly urbanized setting along the tidal Potomac River. Assuming access issues are resolved, the refuge will provide limited, quality, wildlife-dependent recreational opportunities, in particular, wildlife viewing and fishing.

U.S. Fish & Wildlife Service

Elizabeth Hartwell Mason Neck National Wildlife Refuge and Featherstone National Wildlife Refuge

Comprehensive Conservation Plan

September 2011

Summary

Type of Action: Administrative – Development of a Comprehensive Conservation Plan

Lead Agency: U.S. Department of the Interior, Fish and Wildlife Service

Location: Elizabeth Hartwell Mason Neck National Wildlife Refuge—
Fairfax County, Virginia
Featherstone National Wildlife Refuge—
Prince William County, Virginia

Administrative Headquarters: Potomac River National Wildlife Refuge Complex
14344 Jefferson Davis Highway
Woodbridge, VA 22191

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This Comprehensive Conservation Plan (CCP) for the 2,277-acre Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge) and the 325-acre Featherstone National Wildlife Refuge (Featherstone Refuge) is the culmination of a planning effort involving the U.S. Fish and Wildlife Service, Virginia State agencies, local partners, refuge neighbors, private landowners, the Friends of Potomac River Refuges, and the local community. This CCP establishes 15-year management goals and objectives for the refuges' wildlife and habitats, public use programs, and administration and facilities.

Under this plan, we make improvements to both refuges' biological and public use programs. On Mason Neck Refuge, our highest priority is to protect and enhance the diversity, integrity, and health of Great Marsh, other refuge wetlands, and the refuge's mature hardwood-mixed forest habitats to support Federal trust resources and species of conservation concern, particularly bald eagles, waterbirds, and forest-dwelling songbirds. We also plan to work with partners to design and implement measures to protect the refuge's shoreline from erosion. We will enhance our visitor services program by improving infrastructure and the quality of our wildlife observation, nature photography, white-tailed deer hunting, interpretation, and environmental education opportunities. We will also offer new opportunities, such as a youth turkey hunt.

On Featherstone Refuge, our highest priority is to monitor and protect sensitive wildlife habitat, such as shoreline and riparian forest, from human disturbance. For the first time, we will open Featherstone Refuge to public use by allowing non-motorized boat access at one designated location along Farm Creek. In order to open the refuge to further public use, we will continue to work with Prince William County and other stakeholders to secure public parking and safe, legal public access to the refuge. Once public access is secured, we will construct trails and viewing and fishing platforms to facilitate wildlife observation, nature photography, and recreational fishing. When we have additional staff in place, we will evaluate a detailed proposal to offer a hunting program in cooperation with the Virginia Department of Game and Inland Fisheries.

For both refuges, we will improve our outreach and visibility in the community through new or enhanced partnerships. Finally, we will employ an adaptive management approach that includes adjusting our objectives and strategies as a result of new information.

Chapters

Chapters (cont.)

Bibliography

Glossary (including list of acronyms and abbreviations)

Appendixes

Appendix A Species Known or Suspected on the Refuges and Their Conservation Status

Appendix B Findings of Appropriateness and Compatibility Determinations

Appendixes (cont.)

List of Figures

List of Tables

List of Tables (cont.)

List of Maps

List of Maps (cont.)

Chapter 1

USFWS

Mason Neck Refuge

The Purpose of, and Need for, Action

- Introduction
- Document Organization
- The Purpose of, and Need for, this Comprehensive Conservation Plan
- Regional Context and Project Analysis Area
- The Service and Refuge System Policies and Mandates Guiding Planning
- Conservation Plans and Initiatives Guiding the Project
- Refuge Management Profiles
- Vision Statements
- Refuge Goals

Introduction

The U.S. Fish and Wildlife Service (Service, we) prepared this Comprehensive Conservation Plan (CCP) for Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge; refuge) and Featherstone National Wildlife Refuge (Featherstone Refuge; refuge) pursuant to the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Pub. L. 105-57; 111 Stat. 1253; Refuge Improvement Act). An Environmental Assessment (EA), required by the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4321 *et seq.*; 83 Stat. 852) was prepared concurrent with the draft CCP. The decision to adopt this plan and its "Finding of No Significant Impact" are included as appendix H.

Mason Neck and Featherstone Refuges, together with Occoquan Bay National Wildlife Refuge (Occoquan Bay Refuge), comprise the Potomac River National Wildlife Refuge Complex (Refuge Complex) in northern Virginia (map 1.1).

Mason Neck Refuge was established in 1969 as the first national wildlife refuge specifically created to protect a federally listed endangered or threatened species. The bald eagle *(Haliaeetus leucocephalus)*, which was federally listed as threatened in 1969 was, and continues to be, the focal species of concern on the refuge. Due to successful recovery efforts throughout its range, the bald eagle was officially removed from the Federal list of endangered and threatened species in 2007. It continues to be protected, however, under other Federal laws and by Virginia law. Mason Neck Refuge encompasses 2,277 acres of forest, marsh, and riverine habitat along Occoquan Bay and the mainstem of the tidal Potomac River (map 1.2).

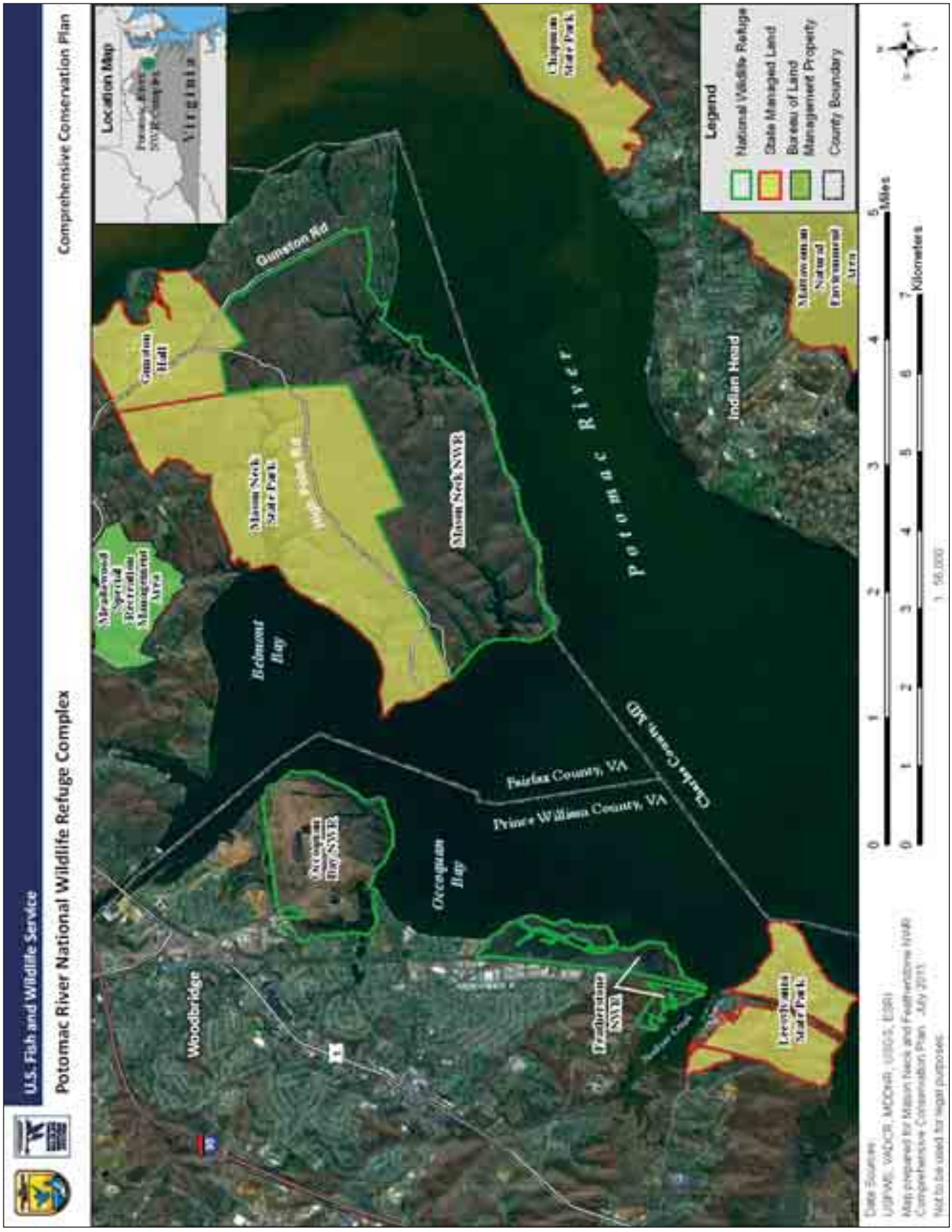
Featherstone Refuge was established in 1979 with land acquired from the District of Columbia. It was further expanded in 1992 with lands donated by Prince William County. It presently encompasses 325 acres of marsh and forested riverine habitat along the southwest edge of Occoquan Bay (map 1.3). Its wetlands are important habitat for bald eagles, wading and waterbirds, waterfowl, and other native species of conservation concern.

This document presents the combination of management goals, objectives, and strategies that will guide the management decisions and actions on Mason Neck and Featherstone Refuges over the next 15 years. It also helps Virginia natural resource agencies, our conservation partners, local communities, and the public understand our priorities and work with us to achieve common goals.

Bald eagle

Tim Williams

Map 1.1. Potomac River National Wildlife Refuge Complex



Map 1.2. Mason Neck National Wildlife Refuge Boundary and Existing Features

Map 1.3. Featherstone National Wildlife Refuge Boundary and Existing Features

Document Organization

This CCP has six chapters and eight appendixes. Chapter 1 sets the stage for the rest of the document by

- describing the purpose of, and need for, a CCP and EA;
- defining our planning analysis area;
- presenting the mission, policies, and mandates affecting the development of the plan;
- identifying other conservation plans we used as references; and
- clarifying the vision and goals that drive refuge management.

Chapter 2, "The Planning Process," describes our planning process, including public and partner involvement, and its compliance with NEPA regulations, and identifies public issues or concerns that surfaced during plan development.

Chapter 3, "Existing Environment," describes the two refuges' regional and local settings, physical attributes, habitats and species, and human-built infrastructure.

Chapter 4, "Management Direction and Implementation," presents the actions, goals, objectives, and strategies that will guide our decisionmaking and land management for each refuge. It also outlines the staffing and funding needed to accomplish that management.

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

Chapter 6, "List of Preparers," credits this plan's writers and contributors.

Eight appendixes provide additional supporting documentation and references:

- Appendix A: Species Known or Suspected on the Refuges and Their Conservation Status
- Appendix B: Findings of Appropriateness and Compatibility Determinations
- Appendix C: Refuge Operations Needs System (RONS) and Service Asset Maintenance Management System (SAMMS)
- Appendix D: Endangered Species Act and National Historic Preservation Act Consultation Documents
- Appendix E: Staffing Chart
- Appendix F: Archaeological and Historical Resources Overview
- Appendix G: Summary of Public Comments and Service Responses on the Draft Comprehensive Conservation Plan and Environmental Assessment for Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges
- Appendix H: Finding of No Significant Impact (FONSI)

The Purpose of, and Need for, this Comprehensive Conservation Plan

The *purpose of* this CCP is to provide strategic direction to meet the management goals for each refuge, as detailed below. Other broad purposes are to

- best achieve the refuges' establishment purposes and visions;
- contribute to the missions of the Service and the National Wildlife Refuge System (Refuge System);
- adhere to Service policies and mandates;
- address significant issues; and
- incorporate sound principles of fish and wildlife science.

There are several reasons we identify a *need for* a CCP for these refuges. First, Federal law— the Refuge Improvement Act—requires us to write a CCP for every national wildlife refuge to help fulfill the mission of the Refuge System. Also, new Service policies providing specific guidance on implementing the Refuge Improvement Act have been developed since the refuges were established. A CCP incorporates those policies, and further fulfills the need to provide each refuge with specific strategic management direction for the next 15 years by

- stating clearly the desired future conditions for refuge habitat, wildlife, visitor services, staffing, and facilities;

White-tailed deer

Elizabeth Wunker/USFWS

- explaining the reasons for management actions to State agencies, refuge neighbors, visitors, and partners;
- ensuring that present and future wildlife-dependent public uses are compatible with the purposes of the refuge;
- providing long-term continuity and direction in refuge management; and
- justifying budget requests for staffing, operating, and maintenance funds.

In addition, both refuges lack master plans to accomplish the actions above in a regional landscape and economy that has changed considerably since the refuges were established. Additionally, pressures for public access have continued to grow, and new ecosystem and species conservation plans bearing directly on management of the two refuges have been developed.

Also, in recent years, we have developed strong partnerships vital for our continued success, and we must convey our vision for the refuges to those partners and the public.

Finally, we need CCPs to guide us in conserving Federal trust species along the shoreline of the tidal Potomac River that are consistent with the overarching vision of the Potomac River Refuge Complex.

All of these reasons underscore the need for the strategic direction a CCP provides. To help us resolve management issues and public concerns, our planning process incorporates input from State natural resource agencies, affected communities, individuals, organizations, our partners, and the public.

Mason Neck Refuge Goals

Goal 1. Protect, enhance, and restore the biological integrity, diversity, and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities, including species of conservation concern.

Goal 2. Protect, enhance, and restore the biological integrity, diversity, and environmental health of wetland habitats and shorelines to support native wildlife and plant communities, including species of conservation concern.

Goal 3. Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation, wildlife observation, and photography.

Goal 4. Enhance efforts to promote awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.

Goal 5. Enhance efforts to protect and interpret refuge cultural resources.

Featherstone Refuge Goals

Goal 1. Protect forest, wetland, and shoreline habitats to support native wildlife and plant communities, including species of conservation concern.

Goal 2. Provide compatible wildlife-dependent recreational opportunities to increase the enjoyment and appreciation of the refuge's resources to visitors and nearby residents.

Goal 3. Promote awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.

Regional Context and Project Analysis Area

Early in the planning process we defined a regional context to identify a broad expanse of landscape that potentially could influence or affect both refuges' resources. The regional context (map 1.4) is the Chesapeake Bay and the portion of the Chesapeake Bay watershed drained by the Potomac River.

Within the regional context, we also defined a project analysis area. The project area is a smaller landscape within which more direct influences on both refuges' natural, cultural, and visitor resources would occur. The project analysis area (map 1.5) includes the following:

- The local watershed of the three refuges in the Potomac River Refuge Complex–the Middle Potomac–Anacostia–Occoquan subwatershed
- The migratory bird conservation area defined by the Atlantic Coast Joint Venture (ACJV) as the Tidal Potomac River focus area
- The Lower Potomac River Important Bird Area (IBA) designated by the National Audubon Society (NAS, 2007)
- The Coastal Plain-Potomac Ecological Drainage Unit (EDU), defined by the Virginia Department of Game and Inland Fisheries (VDGIF) for conservation of State aquatic species of concern (VDGIF, 2005)

The mainstem of the Potomac River is under the jurisdiction of Maryland. Tributaries, embayments, and backwaters on the east side—outside of the mainstem—such as Occoquan Bay, are under the jurisdiction of Virginia.

Socioeconomic Context

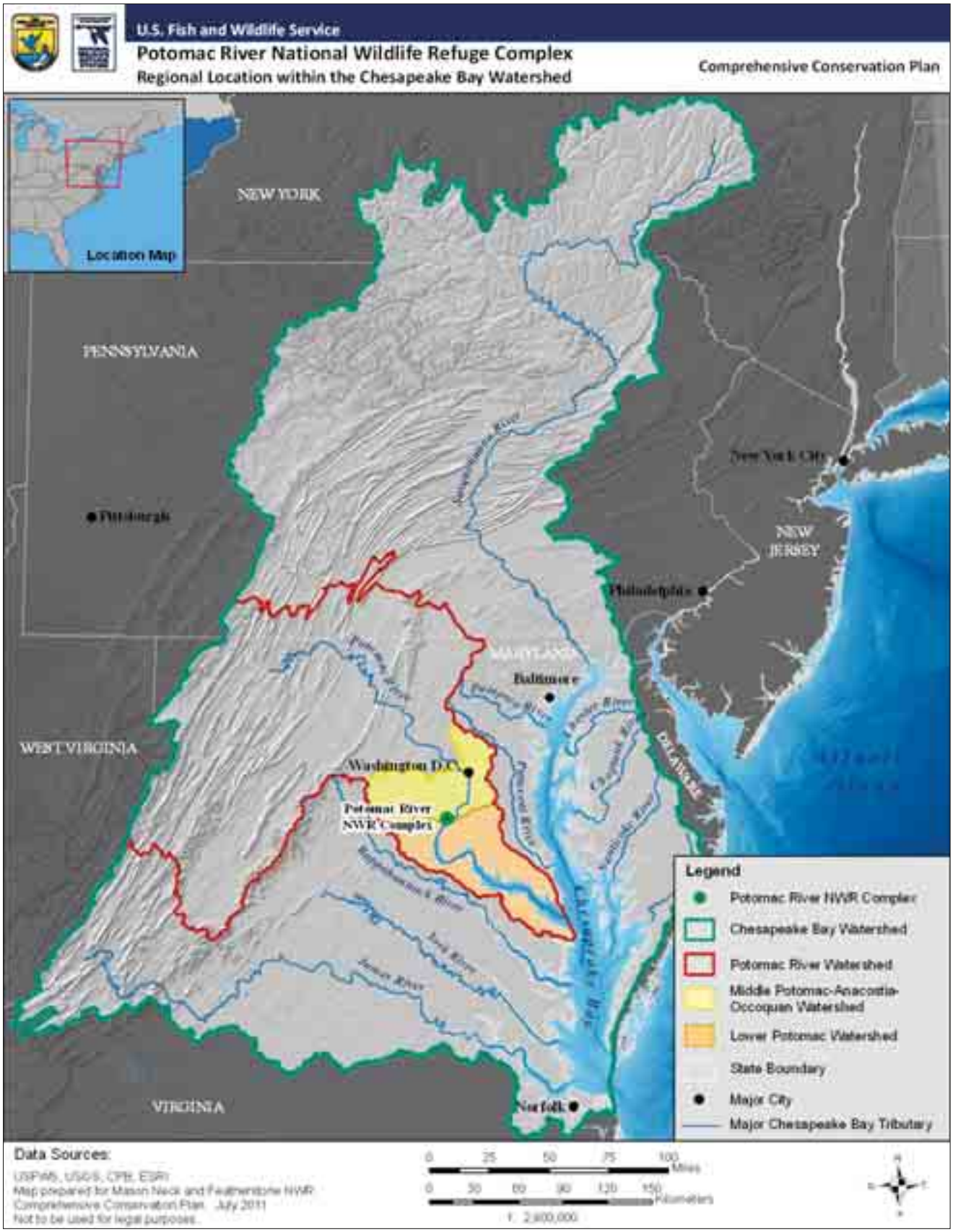
The socioeconomic context for both refuges is northern Virginia, which has a geographic area of approximately 1,304 square miles and is home to over 2,000,000 residents (NVRC, 2010). Northern Virginia is a sub-area of both the State of Virginia and the Washington, D.C. metropolitan area. It borders Maryland and Washington, D.C. along the Potomac River and is found at the northeastern reaches of Virginia (map 1.6).

The Northern Virginia Regional Commission (NVRC) compiles a wide range of information about the demographic, social, and economic characteristics of the northern Virginia population. The NVRC is a regional council representing the local governments. Its 14 members comprise 4 counties: Arlington, Fairfax, Loudoun, and Prince William; 5 independent cities: Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park; and 5 incorporated towns: Dumfries, Herndon, Leesburg, Purcellville, and Vienna. The NVRC's Northern Virginia Databook (2003) presents a range of demographic information including data on income, education, taxes, employment, economics, housing, and transportation. The Northern Virginia Databook, with data organized by city and county, is available online from: *http://www.novaregion.org/index.aspx?NID=227* (accessed June 2011).

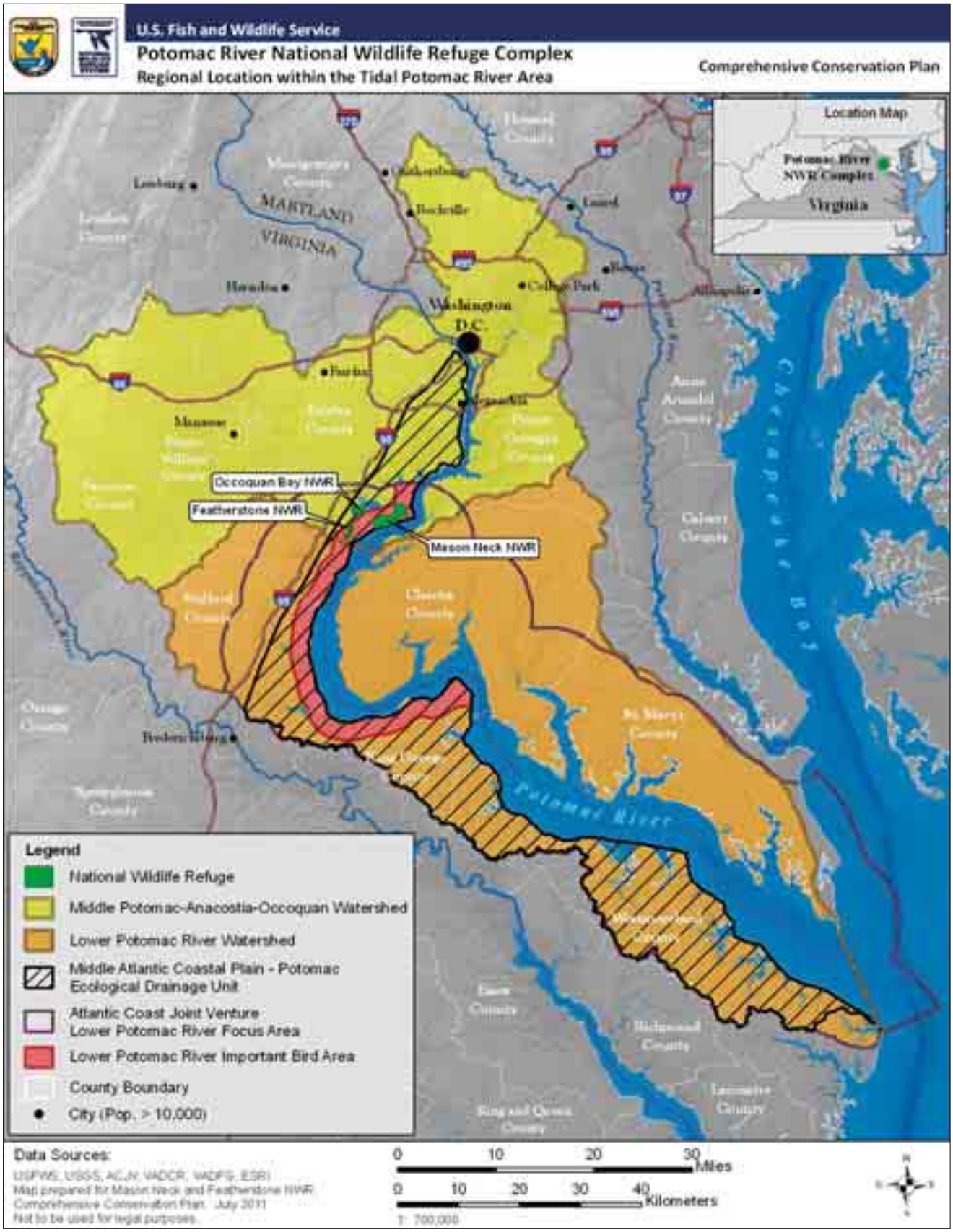
George Gentry/USFWS

Red-tailed hawk

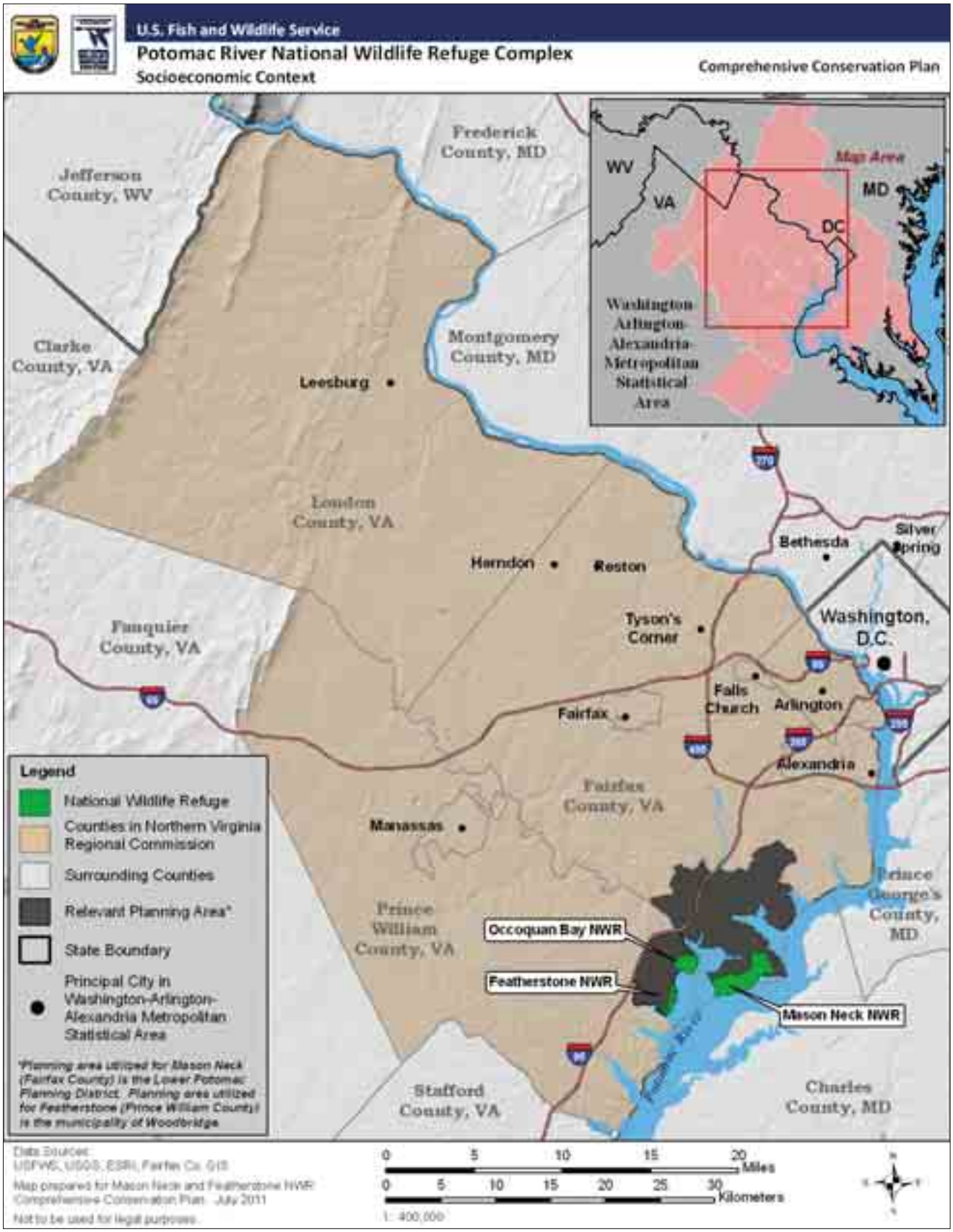
Map 1.4. Potomac River Refuge Complex and its Regional Location within the Chesapeake Bay Watershed



Map 1.5. Potomac River Refuge Complex and its Regional Location within the Tidal Potomac River Area



Map 1.6. Potomac River Refuge Complex and its Socioeconomic Context



The Service and Refuge System Policies and Mandates Guiding Planning

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

The Service is part of the Department of the Interior. Our mission is:

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

Congress entrusts to the Service the conservation, protection, and enhancement of the following national natural resources:

- Migratory birds and fish
- Federally listed endangered or threatened species
- Interjurisdictional fish
- Wetlands
- Certain marine mammals
- National wildlife refuges

Boundary marker on Featherstone refuge

USFWS

In addition to national wildlife refuges, the Service operates national fish hatcheries, fisheries assistance field offices, and ecological services field offices. It also enforces Federal wildlife laws and international treaties on importing and exporting wildlife, assists states with their fish and wildlife programs, and helps other countries develop conservation programs.

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

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

The National Wildlife Refuge System and its Mission and Policies

The Refuge System is the world's largest collection of lands and waters set aside specifically for the conservation of wildlife and the protection of ecosystems. More than 550 national wildlife refuges encompass more than 150 million acres of lands and waters in all 50 States and several island territories. Each year, more than 40 million visitors hunt, fish, observe, and photograph wildlife, or participate in environmental education and interpretation on refuges.

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

> *The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.*
>
> *—Refuge Improvement Act; Public Law 105-57*

This act states that the Refuge System must focus on wildlife conservation. It also states that the mission of the Refuge System, coupled with the purposes for which each refuge was established, will provide the principal management direction on that refuge. The Refuge Improvement Act also establishes a process for determining compatibility of public uses on refuges and requires us to prepare a CCP for each refuge.

The Refuge System Manual contains policy governing the operation and management of the Refuge System that the Service Manual does not cover, including technical information on implementing refuge polices and guidelines on enforcing laws. These are a few noteworthy policies instrumental in developing these CCPs.

Policy on the National Wildlife Refuge System Mission, Goals, and Purposes
This policy (601 FW 1; *http://www.fws.gov/policy/601fw1.html* [accessed August 2011]) sets forth the Refuge System mission noted above, how it relates to the Service mission, and explains the relationship of the Refuge System mission and goals, and the purpose(s) of each unit in the Refuge System. In addition, it identifies the following Refuge System goals:

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
- Conserve those ecosystems, plant communities, and wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts.
- Provide and enhance opportunities to participate in compatible, wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, plants, and their habitats.

This policy also establishes the following management priorities for the Refuge System:

- Conserve fish, wildlife, and plants, and their habitats.
- Facilitate compatible, wildlife-dependent recreational uses.
- Consider other appropriate and compatible uses.

Policy on Coordination and Cooperative Work with State Fish and Wildlife Agencies
This policy (601 FW 7; *http://www.fws.gov/policy/601fw7.html*; [accessed August 2011]) establishes procedures for coordinating and working cooperatively with state fish and wildlife agency representatives on the management of units within the Refuge System. The policy acknowledges that effective conservation of fish, wildlife, plants, and their habitats depends on the professional relationship between managers at the State and Federal level. The policy also affirms the unique expertise and role of State fish and wildlife agencies in the management of fish and wildlife.

Concerning the preparation of CCPs, the policy specifically mentions that the Service will consult with adjoining State landowners and State fish and wildlife agencies, and will coordinate with relevant State plans for fish and wildlife and their habitats, during development or revision of plans.

Policy on Refuge System Planning
This policy is detailed in three Service Manual chapters:

- 602 FW 1 (Refuge Planning Overview); *http://www.fws.gov/policy/602fw1.html* (accessed June 2011)
- 602 FW 2 (Land Acquisition Planning); chapter has not been published yet
- 602 FW 3 (Comprehensive Conservation Planning Process); *http://www.fws.gov/policy/602fw3.html* (accessed June 2011)

The policy establishes the requirements and guidance for Refuge System planning, including CCPs and step-down management plans. It states that we will manage all refuges in accordance with an approved CCP that, when implemented, will help

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

The details on preparing CCPs (602 FW 3) also provide guidance, systematic direction, and minimum requirements for developing all CCPs, and provide a decisionmaking process that fulfills those requirements. Among them, we are to review any existing special designation areas or the potential for such designations (e.g., Wilderness and Wild and Scenic Rivers) and incorporate a summary of those reviews into each CCP.

Policy on Maintaining Biological Integrity, Diversity, and Environmental Health
This policy (601 FW 3; *http://www.fws.gov/policy/601fw3.html*; [accessed June 2011]) provides guidance on maintaining or restoring the biological integrity, diversity, and environmental health of the Refuge System, including the protection of a broad spectrum of fish, wildlife, and habitat resources in refuge ecosystems. It provides refuge managers with a process for evaluating the best management direction to prevent the additional degradation of environmental conditions and restore lost or severely degraded environmental components. It also provides guidelines for dealing with external threats to the biological integrity, diversity, and environmental health of a refuge and its ecosystem.

Policy on Wildlife-Dependent Recreation
This policy (605 FW 1-7; *http://www.fws.gov/policy/605fw1.html*; [accessed June 2011]) defines Service policies, strategies, and requirements concerning the management of wildlife-dependent recreation programs within the Refuge System. The Refuge Improvement Act establishes that "compatible wildlife-

dependent recreation is a legitimate and appropriate general public use of the Refuge System." The overarching goal of this policy is to enhance wildlife-dependent recreation opportunities and access to quality visitor experiences on refuges while managing refuges to conserve fish, wildlife, plants, and their habitats. According to this policy, new and ongoing recreational uses should help visitors focus on wildlife and other natural resources. These uses should provide an opportunity to make visitors aware of resource issues, management plans, and how the refuge contributes to the Refuge System and Service missions. Thus, we only allow wildlife-dependent recreation on a refuge after we determine it is appropriate and compatible (see discussions below). Six wildlife-dependent uses were identified in the Refuge Improvement Act as being priority general public uses of the Refuge System and should receive enhanced consideration over non-priority uses. Those uses are: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. Chapters within this policy present guiding principles for each of these respective uses and provides guidance on how to plan for, establish, conduct, and evaluate each program.

Lee Karney/USFWS

Green heron

Policy on Appropriateness of Refuge Uses

Federal law and Service policy provide the direction and planning framework for protecting the Refuge System from inappropriate, incompatible, or harmful human activities and ensuring that visitors can enjoy its lands and waters. This policy (603 FW 1; *http://www.fws.gov/policy/603fw1.html*; [accessed June 2011]) provides a national framework for determining appropriate refuge uses in an effort to prevent or eliminate those uses that should not occur in the Refuge System. It describes the initial decision process the refuge manager follows when first considering whether or not to allow a proposed use on a refuge. A required form documents the decision. An appropriate use must meet at least one of the following four conditions:

1) The use is a wildlife-dependent recreational use as identified in the Refuge Improvement Act.

2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals and objectives described in a refuge management plan approved after October 9, 1997 (the date the Refuge Improvement Act was signed into law).

3) The use involves the take of fish and wildlife under state regulations.

4) The use has been found to be appropriate after concluding a specified findings process using 10 criteria.

Policy on Compatibility

This policy (603 FW 2; *http://www.fws.gov/policy/603fw2.html* [accessed June 2011]) relates to the appropriateness policy. The refuge manager must first find that a use is appropriate before undertaking a compatibility review of that use. If the proposed use is not found appropriate, the refuge manager will not allow the use and will not prepare a compatibility determination.

This policy and its regulations includes a detailed description of the process and requirements for conducting compatibility reviews. Our summary follows:

- The Refuge Improvement Act and its regulations require an affirmative finding by the refuge manager on the compatibility of a public use before it is allowed on a national wildlife refuge.

- A compatible use is one "that will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge."

- The act defines six wildlife-dependent uses that are to receive enhanced consideration on refuges: hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

- The refuge manager may authorize those priority uses on a refuge when they are compatible and consistent with public safety.

- When the refuge manager publishes a compatibility determination, it will specify the required maximum reevaluation dates, which is either 15 years for wildlife-dependent recreational uses or 10 years for other uses.

- However, the refuge manager may reevaluate the compatibility of any use at any time, for example, sooner than its mandatory date, or even before the CCP process is completed if new information reveals unacceptable impacts or incompatibility with refuge purposes (602 FW 2.11, 2.12).

- The refuge manager may allow or deny any use, even one that is compatible, based on other considerations such as public safety, policy, or available funding.

Other Mandates

Although Service and Refuge System policy, along with each refuge's purposes, provides the foundation for its management, there are other Federal laws, executive orders, treaties, interstate compacts, and regulations on conserving and protecting natural and cultural resources that also affect how we manage refuges. A centralized library of Servicewide policies, executive orders, director's orders, and the "Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service" can be viewed at: *http://www.fws.gov/laws/lawsdigest.html* (accessed June 2011).

Of particular note are Federal laws that require the Service to identify and preserve its important historic structures, archaeological sites, and artifacts. NEPA mandates our consideration of cultural resources in planning Federal actions. The Refuge Improvement Act requires that the CCP for each refuge identify its archaeological and cultural values. The following is a highlight of some cultural and historic resource protection laws which relate to the development of CCPs.

- The Archaeological Resources Protection Act (16 U.S.C. § 470aa–470ll; Public Law 96-95), approved October 31, 1979 (93 Stat. 721), referred to as ARPA, largely supplanted the resource protection provisions of the Antiquities Act of 1906 for archaeological items. ARPA established detailed requirements for issuance of permits for any excavation or removal of archaeological resources from Federal or Indian lands. It also establishes civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from Federal or Indian land in violation of any provision of Federal law; and for interstate and foreign commerce in such resources acquired, transported, or received in violation of any state or local law.

- The Archaeological and Historic Preservation Act (16 U.S.C. § 469-469c; Public Law 86-523), approved June 27, 1960 (74 Stat. 220), as amended by Public Law 93-291, approved May 24, 1974 (88 Stat. 174), carries out the policy established by the Historic Sites Act (see below). It directs Federal agencies to notify the Secretary of the Interior (Secretary) whenever they find a Federal or Federal-assisted, licensed, or permitted project may cause loss or destruction of significant scientific, prehistoric, or archaeological data. The act authorizes use of appropriated, donated, and/or transferred funds for the recovery, protection, and preservation of such data.

- The Historic Sites, Buildings, and Antiquities Act (16 U.S.C. § 461-462, 464-467; 49 Stat. 666) of August 21, 1935, popularly known as the Historic Sites Act, as amended by Public Law 89-249, approved October 9, 1965 (79 Stat. 971), declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provides procedures for designation, acquisition, administration, and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this act. More than 30 national wildlife refuges contain such sites.

- The National Historic Preservation Act of 1966 (16 U.S.C. § 470-470b, 470c-470n) Public Law 89-665, approved October 15, 1966 (80 Stat. 915), and repeatedly amended, provides for preservation of significant historical features (buildings, objects, and sites) through a grant-in-aid program to the states. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. § 468-468d). This act also established an Advisory Council on Historic Preservation, which was made a permanent independent agency in Public Law 94-422, approved September 28, 1976 (90 Stat. 1319), and created the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register. At least 90 historic sites on national wildlife refuges have been placed on the National Register.

The Service also owns and cares for museum properties. The most common are archaeological collections, art, zoological and botanical collections, historical photographs, and historic objects. Each refuge maintains an inventory of its museum property. Our museum property coordinator in Hadley, Massachusetts, guides the refuges in caring for that property and helps us comply with the Native American Grave Protection and Repatriation Act of 1990 and Federal regulations governing Federal archaeological collections. Our program ensures that Service collections will continue to be available to the public for education and research.

Two other Federal resource laws are also important to highlight as they are integral to developing a CCP. They can be viewed in their entirety at: *http://www.fws.gov/laws/lawsdigest/resourcelaws.html* (accessed June 2011).

- The Wilderness Act of 1964 (16 U.S.C. § 1131-1136; PL 88-577) established a National Wilderness Preservation System (NWPS) that is composed of Federal-owned areas designated by Congress as "Wilderness Areas." The act directs each agency administering designated wilderness to preserve the wilderness character of areas within the NWPS, and to administer the NWPS for the use and enjoyment of the American people in a way that will leave these areas unimpaired for future use and enjoyment as wilderness. The act also directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems for inclusion in the National Wilderness Preservation System. Service planning policy requires we evaluate the potential for wilderness on refuge lands, as appropriate, during the CCP planning process.

- The Wild and Scenic Rivers Act of 1968, as amended, selects certain U.S. rivers possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values and preserves them in a free-flowing condition and protects their local environments. Service planning policy requires we evaluate the potential for wild and scenic rivers designation on refuge lands, as appropriate, during the CCP planning process.

In the draft CCP/EA, Chapter 4 "Environmental Consequences," evaluated this plan's compliance with the acts noted above, as well as the Clean Water Act of 1977 as amended (33 U.S.C. § 1251 *et seq.;* PL 107-303), Clean Air Act of 1970 as amended (42 U.S.C. § 7401 *et seq.*), and the Endangered Species Act (ESA) of 1973 (16 U.S.C. § 1531-1544), as amended. The draft NEPA and the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508).

Our mandates also include orders directed by the President, the Secretary, and the Director of the Service. Several of the mandates of special importance to this CCP include the following:

- Presidential Executive Order 13443–Facilitation of Hunting Heritage and Wildlife Conservation was issued on August 16, 2007. The purpose of this order is to direct Federal agencies that have programs and activities affecting public land management, outdoor recreation, and wildlife management, including the Departments of Interior and Agriculture, to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat. Federal agencies are directed to pursue certain activities listed in the order, consistent with their missions. Those activities include managing wildlife and wildlife habitats on public lands in a manner that expands and enhances hunting opportunities, and working with state and Tribal governments to manage wildlife and habitats to foster healthy and productive populations and provide appropriate opportunities for the public to hunt those species.

- Presidential Executive Order 13508–Chesapeake Bay Protection and Restoration (signed May 12, 2009). This order furthers the purpose of the Clean Water Act of 1972, as amended (33 U.S.C. § 1251 *et seq.*), and other laws "…to protect and restore the health, heritage, natural resources, and social and economic value of the Nation's largest estuarine ecosystem and the natural sustainability of its watershed." It recognizes the Chesapeake Bay as "a national treasure constituting the largest estuary in the United States and one of the largest and most biologically productive estuaries in the world." The order also establishes the development of a strategy for coordinated implementation of existing programs and projects and development of an annual action plan and accomplishment reports. It also requires collaboration with state partners. The focus of the coordinated implementation plan will be to address

  1) water quality;
  2) sources of pollution from agricultural lands and Federal lands and facilities;
  3) protecting the bay's resources as the climate changes;
  4) expanding opportunities for public access;
  5) conserving landscapes and ecosystems; and
  6) the monitoring and accountability of activities.

- Presidential Memorandum–America's Great Outdoors (signed April 16, 2010). This memorandum established the America's Great Outdoors Initiative. The initiative is a grassroots approach to protecting America's lands and waters, and connecting all Americans to their natural and cultural heritage. Its major premise is that lasting conservation solutions should come from the American

people. The initiative empowers all Americans to share in the responsibility for conserving, restoring, and providing better access to the Nation's lands and waters. The goals of the initiative are the following:

1) Reconnect Americans, especially children, to America's rivers and waterways, landscapes of national significance, ranches, farms and forests, great parks, and coasts and beaches by exploring a variety of efforts, including

   - promoting community-based recreation and conservation, including local parks, greenways, beaches, and waterways;
   - advancing job and volunteer opportunities related to conservation and outdoor recreation; and
   - supporting existing programs and projects that educate and engage Americans in our history, culture, and natural bounty.

2) Build upon state, local, private, and Tribal priorities for the conservation of land, water, wildlife, historic, and cultural resources, creating corridors and connectivity across these outdoor spaces, and for enhancing neighborhood parks; and determine how the Federal Government can best advance those priorities through public and private partnerships and locally supported conservation strategies.

3) Use science-based management practices to restore and protect our lands and waters for future generations.

- Secretarial Order 3289–Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources (issued on September 14, 2009). This order establishes a Departmentwide, science-based approach to increasing our understanding of climate change and to coordinate an effective response to its impacts on Tribes and on the land, water, ocean, fish and wildlife, and cultural heritage resources that the Department manages. The order requires a "Climate Change Response Council" that will execute a coordinated Departmentwide strategy to increase scientific understanding and the development of adaptive management tools to address the impact of climate change on our natural and cultural resources. The Council will help coordinate activities within and among Federal agencies. Land management agencies are directed to pursue appropriate activities to reduce their carbon footprint, adapt water management strategies to address the possibility of a shrinking water supply, and protect and manage land in anticipation of sea level rise, shifting wildlife populations and habitats, increased wildland fire threats, and an increase in invasive and exotic species.

Steve Maslowski/USFWS

Bald eagle

Conservation Plans and Initiatives Guiding the Project

Birds of Conservation Concern 2008 Report (USFWS, 2008)

The Service developed the Birds of Conservation Concern (BCC) report (USFWS, 2008) as an update to their 2002 report in consultation with the leaders of ongoing bird conservation initiatives and such partnerships as Partners in Flight (PIF), the North American Waterfowl Management Plan (NAWMP) and its Joint Ventures, the North American Waterbird Conservation Plan (NAWCP), and the U.S. Shorebird Conservation Plan. It fulfills the mandate of the 1988 amendment to the Fish and Wildlife Conservation Act of 1980 (100 Pub. L. 100–653, Title VIII), requiring the Secretary to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973."

The overall goal of this report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities.

The geographic scope of this endeavor is the entire U.S., including U.S. island territories in the Pacific and Caribbean. The report encompasses three distinct geographic scales: 1) National; 2) North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs); and, 3) the eight Service Regions.

This report lists priority bird species of conservation concern at each scale which are primarily derived from assessment scores from several major bird conservation plans: 1) the Partners in Flight North American Landbird Conservation Plans; 2) the U.S. Shorebird Conservation Plan; and 3) the North American Waterbird Conservation Plan. Bird species included on lists in the report include nongame birds; gamebirds without hunting seasons; subsistence-hunted nongame birds in Alaska; and Federal Endangered Species Act candidate, proposed endangered or threatened, and recently delisted species. Population trends, threats, distribution, abundance, and relative density were all factors considered.

This report is intended to stimulate coordinated and collaborative proactive conservation actions among Federal, state, Tribal, and private partners. It is hoped that by focusing attention on these highest-priority species, this report will promote greater study and protection of the habitats and ecological communities upon which these species depend, thereby contributing to healthy avian populations and communities. You may access the report at: *http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf* (accessed June 2011). This is one of the plans we used in identifying species of concern in appendix A, and in developing management objectives and strategies under goals 1 and 2.

North American Waterfowl Management Plan (NAWMP; update 2004) and Joint Venture Plans

Originally written in 1986, the NAWMP describes a 15-year strategy for the U.S., Canada, and Mexico to restore and sustain waterfowl populations by protecting, restoring, and enhancing habitat. The plan's committee, including representatives from all three countries, has modified the 1986 plan twice to account for biological, sociological, and economic changes that influenced the status of waterfowl and to allow cooperative habitat conservation. The most recent modification in 2004 updates the latest needs, priorities, and strategies for the next 15 years, and guides partners in strengthening the biological foundation of North American waterfowl conservation and stakeholder confidence in the direction of the plan. You may access the report at: *http://www.fws.gov/birdhabitat/NAWMP/files/ImplementationFramework.pdf* (accessed June 2011).

Donna Dewhurst

Green-winged teal

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

The plans are implemented at the regional level in 14 habitat Joint Ventures and 3 species Joint Ventures (Arctic Goose, Black Duck, and Sea Duck). The Refuge Complex lies in the ACJV, which includes all the Atlantic Flyway States from Maine to Florida and Puerto Rico. The ACJV Waterfowl Implementation Plan was completed in June 2005. The Refuge Complex lies within the plan's "Lower Potomac River—Virginia Sub-focus Area" (map 1.5). You can view the plan online at: *http://www.acjv.org/planning.htm* (accessed June 2011).

The waterfowl goal for the ACJV is to "Protect and manage priority wetland habitats for migration, wintering, and production of waterfowl, with special consideration to black ducks, and to benefit other wildlife in the joint venture area." The Black Duck Joint Venture plan also relates to our CCP. American black ducks use the refuge during the winter and migration, but are less common during their breeding season as their primary breeding grounds are in Canada. The Black Duck Joint Venture Final Draft Strategic Plan (USFWS/CWS 1993) resides online at: *http://www.pwrc.usgs.gov/bdjv/* (accessed June 2011). We referred to both Joint Venture plans in developing the management objectives and strategies under goals 1 and 2.

Mid-Atlantic/Southern New England Bird Conservation Region (BCR 30) Implementation Plan (2007)

This plan covers the Mid-Atlantic/Southern New England BCR 30, which extends from southern Maine to coastal Virginia, including the Chesapeake Bay. This region provides important resources for migratory birds whose ranges span the western hemisphere. Habitats associated with coastal ecosystems provide the highest habitat values and provide critical staging areas for migratory waterfowl, waterbirds, shorebirds, and landbirds. Coastal beaches and wetlands, followed by forested upland communities, are considered the most important habitats in need of protection for migratory birds in this region.

The purpose of the plan is to develop common regional goals for bird conservation by integrating information from continental and regional bird conservation initiatives and State wildlife action plans, such the U.S. Shorebird Conservation Plan, the North American Waterbird Conservation Plan, and the NAWMP (see separate discussions of plans below). The specific goals are to

1) identify the highest priority bird species and their specific habitat needs and threats;

2) delineate and define geographic focus areas for priority species;

3) use conservation design methods and modeling approaches to refine identification of important geographic areas;

4) develop models to estimate population and habitat goals for priority species;

5) identify the highest priority monitoring and research needs for birds and habitats;

6) focus resources towards the highest priority birds and the habitats they depend upon; and

7) create a communication platform encouraging dialogue on bird conservation activities both within and between states and partners at the BCR scale.

To help achieve these goals, the plan lists 134 priority bird species for BCR 30 and identifies the region's coastal beaches, wetlands, and forested upland communities as the most important habitat types in need of protection. Throughout the region, the greatest threats to the conservation of these species and habitats are habitat degradation and loss, fragmentation, invasive species, and human disturbance. The plan also

- outlines activities and management actions thought to be most useful in addressing these needs and threats;
- highlights the most important geographic areas to focus conservation action on; and
- establishes a regional bird conservation initiative with partners across the BCR 30 to communicate and coordinate conservation planning and implementation.

For more information or to view the entire plan, please visit: *http://www.acjv.org/bcr30.htm* (accessed June 2011). We used this plan to help develop objectives and strategies for goals 1 and 2, and to create species of concern lists in appendix A.

North American Waterbird Conservation Plan (Version 1, 2002)

This plan (Kushlan et al., 2002) is an independent partnership among individuals and institutions interested in, or responsible for, conserving waterbirds 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 waterbirds 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 facilitates continentwide planning and monitoring, Federal, state, and provincial conservation, regional coordination, and local habitat protection and management. You can access the continental plan online at: *http://www.pwrc.usgs.gov/nacwcp/nawcp.html* (accessed June 2011). We referred to this plan as we developed management objectives and strategies under goals 1 and 2, and to create appendix A.

Mid-Atlantic/New England/ Maritimes (MANEM) Waterbird Conservation Plan (2008)

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

The MANEM region consists of Bird Conservation Regions 14 (Atlantic Northern Forest) and 30 (Mid-Atlantic/Southern New England), and Pelagic Bird Conservation Regions 78 (Northeast U.S. Continental Shelf) and 79 (Scotian Shelf). The MANEM Waterbird Conservation Plan is being implemented within the context and framework of the North American Waterbird Conservation Plan—a project of the Waterbird Conservation for the Americas Initiative. You can access the plan online at: *http://www.waterbirdconservation.org* (accessed June 2011).

Seventy-four waterbird species use habitats in MANEM for breeding, migrating, and wintering. Avian families include loons, grebes, shearwaters, storm-petrels, boobies, pelicans, cormorants, herons, ibises, rails, gulls, terns, skuas, jaegers, and alcids. Partners in 4 subregions of MANEM selected 43 focal species for immediate conservation action. In addition, 55 of MANEM's waterbirds are identified in state wildlife action plans as "Species of Greatest Conservation Need." You can access information on Mid-Atlantic/New England/Maritimes regional planning online at: *http://www.fws.gov/birds/waterbirds/MANEM/* (accessed June 2011). We referred to this plan as we developed management objectives and strategies under goals 1 and 2, and while compiling appendix A.

U.S. Shorebird (2001, 2nd edition) and North Atlantic Regional Shorebird (2000) Plans

Concerns about shorebirds led to the creation of the U.S. Shorebird Conservation Plan in 2000. Brown et al. published a second edition in May 2001. Developed under a partnership of individuals and organizations throughout the United States, the plan develops conservation goals for each U.S. region, identifies important habitat conservation and research needs, and proposes education and outreach programs to increase public awareness of shorebirds and of threats to them. You may read the U.S. Shorebird Plan online at: *http://www.fws.gov/shorebirdplan/USShorebird/downloads/USShorebirdPlan2Ed.pdf* (accessed June 2011).

In the Northeast, the North Atlantic Regional Shorebird Plan was also drafted to step down the goals of the continental plan to smaller scales to identify priority species, species goals, habitats, and prioritize implementation projects. The North Atlantic Regional Shorebird Plan appears online at: *http://www.fws.gov/shorebirdplan/RegionalShorebird/RegionalPlans.htm* (accessed June 2011). We used both plans in developing our objectives and strategies for goals 1 and 2, and while compiling appendix A.

National Bald Eagle Management Guidelines (2007)

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

The guidelines are intended to

1) publicize the provisions of the Eagle Act that protect bald eagles to reduce the possibility that people will violate the law;

2) advise landowners, land managers, and the general public of the potential for various human activities to disturb bald eagles; and

3) encourage additional nonbinding land management practices that benefit bald eagles.

The document is intended primarily as a tool for landowners and planners who seek information and recommendations regarding how to avoid disturbing bald eagles. You can view these management guidelines at: *http://www.fws.gov/migratorybirds/baldeagle.htm* (accessed June 2011). We referred to these guidelines as we developed management objectives and strategies for bald eagles under goal 1.

Partners-in-Flight Bird Conservation Plans

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

The goal of each PIF plan is to ensure the long-term maintenance of healthy populations of native birds, primarily nongame 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.

Physiographic Area 44—Mid-Atlantic Coastal Plain Bird Conservation Plan (April 1999)
Our project area lies in Physiographic Area 44, the Mid-Atlantic Coastal Plain. We referred to this plan as we developed our management objectives and strategies under goals 1 and 2. The plan can be accessed at: *http://www.blm.gov/wildlife/pl_44sum.htm* (accessed June 2011).

The plan includes objectives for the following habitat types and associated species of conservation concern on the refuge:

- Forested Wetland: cerulean warbler *(Dendroica cerulean)*, Swainson's warbler *(Limnothlypis swainsonii)*, Kentucky warbler *(Oporornis fromosus)*, Acadian flycatcher *(Empidonax virescens)*, yellow-throated vireo *(Vireo flavifrons)*, prothonotary warbler *(Protonotaria citrea)*, and Louisiana waterthrush *(Seiurus motacilla)*.

- Mixed Upland Forest: cerulean warbler, wood thrush *(Hylocichla mustelina)*, Kentucky warbler, Acadian flycatcher, worm-eating warbler *(Helmitheros vermivorum)*, eastern wood-pewee *(Contopus virens)*, and Louisiana waterthrush.

- Fresh/Brackish Emergent Wetland: American black duck *(Anas rubripes)* and king rail *(Rallus elegans)*.

- We used this plan to help develop objectives and strategies for goals 1 and 2, and to create appendix A.

A Management Plan for the Eastern Population of Tundra Swans (July 2007)

Responsibility for preparing migratory bird flyway management plans lies with Flyway Councils, which are administrative bodies who represent state and provincial wildlife agencies in North America. The Flyway Councils work cooperatively with the Service, the Canadian Wildlife Service, and the Mexican government's wildlife agency (SEMARNAT). The Eastern Population (EP) of tundra swans *(Cygnus columbianus)* has been managed under a joint, four-flyway management plan first developed and implemented in 1982, with additions and updates occurring in 1988 and 1998. Since 1998, a number of research projects have highlighted some of the uncertainties identified in the 1998 plan. This 2007 plan, prepared by the Ad Hoc Eastern Population Tundra Swan Committee of the four Flyway Councils, incorporates new information, particularly related to the use and accuracy of mid-winter counts, and updates its recommendations for the long-term conservation of these swans. It can be accessed online at: *http://www.mdwfa.org/flyway.html* (accessed June 2011).

The specific purpose of this plan is to identify population goals, establish guidelines and priorities for management actions, identify strategies and assign responsibilities, specify levels of public use, and emphasize research needs to improve the management of EP swans. The primary management goal is to maintain an EP tundra swan population of 80,000 in the Atlantic and Mississippi Flyways. The plan discusses how the protection of breeding, staging, and wintering habitat is critical to this goal and to the long-term maintenance of EP tundra swans and the habitats they rely upon.

The Refuge Complex's tidal marsh and the surrounding shallow water habitats contribute to this goal by providing staging and wintering habitat for tundra swans. We consulted this plan and its recommended management actions as we developed objectives and strategies under goal 2.

A Management Plan for the Atlantic Population of Canada Geese (March 2008)

The Atlantic Flyway Council's Canada Goose Committee provides this update to the Atlantic Flyway Canada Goose Management Plan developed in 1989. The 1989 plan established population objectives and emphasized status assessments using wintering ground survey information. In 1996, in response to dramatic declines in the Atlantic Population (AP) Canada goose *(Branta canadensis)* population and coupled with an increase in the resident Canada goose population, the Atlantic Flyway Council developed an action plan to address immediate survey and research needs that would help guide management to rebuild AP goose numbers. Management efforts since 1996 have been directed towards ensuring population growth, resulting in a significant turnaround. This 2008 plan provides management guidelines to promote continued growth of the AP goose population at sustained higher levels. It can be accessed online at: *http://www.mdwfa.org/flyway.html (*accessed June 2011*).*

The overall management goal in this plan is to maintain the AP Canada goose population and their habitats at a level that provides optimum opportunities for people to hunt, view, and otherwise enjoy geese on a sustainable basis. The population objective believed necessary to achieve this goal is to maintain an index of 250,000 breeding pairs of AP Canada geese in the Ungava region of Québec, Canada.

One of the long-term strategies for maintaining this population is the conservation of important breeding, staging, and wintering habitats. The Refuge Complex provides staging and wintering habitat. We referred to this plan as we developed management objectives and strategies under goal 2.

Atlantic Flyway Mute Swan Management Plan (July 2003)

The Atlantic Flyway Council's Snow Goose, Brant, and Swan Committee prepared this plan in response to the exponential growth of the invasive, exotic mute swan *(Cygnus olor)* population in the Flyway that was occurring between 1986 and 2002, especially in Maryland and Virginia where the populations were doubling every 12 years. Mute swans are a Eurasian species, not native to North America. They are highly invasive of wetland habitats, impact native species of fish and wildlife, damage commercial agricultural crops, and pose a threat to human health and safety. Because of their consumption of large quantities of submerged aquatic vegetation (SAV) and aggressive behavior, they compete directly with many other native waterbirds and fisheries for limited resources in critical habitats.

The goal of this management plan is to "reduce the mute swan populations in the Atlantic Flyway to levels that will minimize negative ecological impacts to wetland habitats and native migratory waterfowl and to prevent further range expansion into unoccupied areas." This plan lists five specific management objectives and numerous associated strategies to achieve this goal. It can be accessed online at: *http://www.mdwfa.org/flyway.html* (accessed June 2011).

We referred to this plan, as well as the Chesapeake Bay Program's mute swan plan (see below) as we developed management objectives and strategies for dealing with this invasive species under goals 1 and 2.

Mute Swan in the Chesapeake Bay: A Baywide Management Plan (June 2004)

This plan (USFWS, 2004) was prepared by the Chesapeake Bay Program's Mute Swan Working Group. We describe the successful partnership that is the foundation of the Chesapeake Bay Program below. Mute swans were identified as one of the highest concerns among the partners in the program when asked which species are causing, or have the highest potential to cause, adverse ecological effects in the bay's ecosystem. In response to this elevated concern, a working group of researchers, and Federal and state natural resource managers was formed to develop a baywide regional mute swan management plan.

The goal of the plan is to manage the Chesapeake Bay population of mute swans to a level that

- minimizes the impacts on native wildlife, important habitats, and local economies;
- minimizes conflict with humans;
- agrees with the Chesapeake Bay Program's Chesapeake 2000 Agreement goals for SAV and invasive species; and
- agrees with the Atlantic Flyway Mute Swan Management Plan.

The plan identifies management objectives and strategies that will work to meet this goal. It can be accessed online at: *http://www.mdwfa.org/flyway.html* (accessed June 2011).

We consulted this plan as we considered management actions to control mute swan. We describe those in Chapter 4 "Management Direction and Implementation."

Atlantic Flyway Resident Canada Goose Management Plan (July 1999)

This plan was cooperatively written by the state, provincial, and Federal agencies responsible for managing local-nesting or "resident" Canada geese in the Atlantic Flyway. It does not prescribe specific regulations or dictate management policies or programs, but identifies an overall management goal and five management objectives developed by all the cooperators. The concern with resident Canada geese is that their numbers began to escalate in the 1980s and biologists became concerned that their numbers might be masking a decline in the number of migratory AP Canada geese. This concern was coupled with the recognition that the resident geese were contributing significantly to sport harvests, and human/goose conflicts in urban and suburban areas. Banding studies have confirmed that these resident geese are a distinct population from the migratory AP Canada geese with very different management needs and opportunities.

We consulted this plan as we considered alternative management actions to benefit waterfowl under goal 1 objectives. Our intent is to continue working closely with VDGIF in managing this species. The plan can be accessed at: *http://www.mdwfa.org/flyway.html* (accessed June 2011).

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

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

John Mosesso, Jr., NBII

Eastern ribbon snake

national and regional herpetofaunal conservation challenges. Regional working groups allow for region-specific communication.

The National State Agency Herpetological Conservation Report (NHCR), a summary report sponsored by PARC, provides a general overview of each state wildlife agency's support for reptile and amphibian conservation and research through September 2004. Each state report was compiled in cooperation with its agency's lead biologist on herpetofaunal conservation. The purpose is to facilitate communication among state agencies and partner organizations throughout the PARC network to identify and address regional and national herpetological priorities.

PARC intends to expand the scope of the NHCR to include other states, provinces, and territories. It will also include other state agencies that are supporting herpetofaunal conservation and research, such as transportation departments, park departments, and forest agencies. The U.S. Geological Survey (USGS) is supporting the Northeastern Partners in Amphibian and Reptile Conservation Home Page as part of its contribution to PARC. It is being served by the Patuxent Wildlife Research Center, part of the USGS Eastern Region *(http://www.pwrc.usgs.gov/partners/;* accessed June 2011*).* The next NHCR will also integrate the list of species of conservation concern into each state's comprehensive wildlife conservation strategy (see below). We referred to the latest draft NHCR plan in developing management objectives and strategies for goals 1 and 2, and in developing appendix A.

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

The Service's Fisheries Program's primary mission is to work with others to maintain self-sustaining, healthy populations of coastal and anadromous fish, fish species that cross state or national boundaries, and endangered aquatic animals and their habitats. In the Northeast Region, 25 fishery management offices and national fish hatcheries work with states and other partners to restore and protect a variety of fish and other aquatic species. Examples include Atlantic salmon *(Salmo salar)*, striped bass *(Morone saxatilis),* American shad *(Alosa sapidissima)*, alewife *(Alosa pseudoharengus)*, blueback herring *(Alosa aestivalis),* Atlantic sturgeon *(Acipenser oxyrinchus oxyrinchus)*, horseshoe crab *(Limulus polyphemus),* American eel *(Anguilis rostrata),* and menhaden *(Brevoortia tyrannus).*

The Fisheries Program has played a vital role in conserving and managing fish and other aquatic resources since 1871. Today, the Fisheries Program is a critical partner with states, Tribes, other governments, other Service programs, private organizations, public institutions, and interested citizens in a larger effort to

Striped bass

Kraft, C.E., D.M. Carlson, and M. Carlson. 2006. *Inland Fishes of New York (Online),* Version 4.0. Department of Natural Resources, Cornell University, and the New York State Department of Environmental Conservation.

conserve these important resources. In 2002, working with its many partners in aquatic conservation through the Sport Fishing and Boating Partnership Council's Fisheries Steering Committee, the Service completed its Strategic Vision (Vision) document: "Conserving America's Fisheries, U.S. Fish and Wildlife Service Fisheries Program Vision for the Future." That vision document includes goals, objectives, and action items on a national programmatic scale.

The Fisheries Program is committed to working with partners to

1) protect the health of aquatic habitats;

2) restore fish and other aquatic resources; and

3) provide opportunities to enjoy the many benefits of healthy aquatic resources.

The Regional Fisheries Program Strategic Plan is an extension of the vision, describing more specifically the tactics to be implemented by the Northeast Region to fulfill the goals and objectives identified in the vision. The first plan covered years 2004 to 2008. The current plan can be viewed at: *http://www.fws.gov/northeast/fisheries/* (accessed June 2011).

This plan brings together changing national direction, institutional knowledge, analysis of spatial information, and the perspectives of our state and Tribal partners to develop a strategic plan that allows this regional program to prioritize its efforts during challenging times, while promoting positive change into the future. As the plan is implemented it will build on a strong foundation of active partnerships and past accomplishments, while recognizing that continued communication, cooperation, and expansion of partnerships is essential for successful implementation of this plan and fulfillment of the Program's resource responsibilities and obligations. This plan was built off the lessons learned from implementing the 2004–2008 strategic plan.

One step-down effort resulting from the plan is the identification and ranking of fish and other aquatic species as to their level of conservation concern by hydrologic unit. We used this ranking and have consulted with the Regional Fisheries Program staff in developing aquatic objectives and strategies under goal 2 and in creating appendix A "Species Known or Suspected on the Refuges and Their Conservation Status."

Virginia Department of Game and Inland Fisheries, Virginia's Comprehensive Wildlife Conservation Strategy (2005)

In 2002, Congress created the State Wildlife Grant Program (SWG) and appropriated $80 million in grants 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 the state's 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 needed to develop a statewide "Comprehensive Wildlife Conservation Strategy" and submit it to the National Advisory Acceptance Team by October 1, 2005. Each plan needed to address eight required elements, identify and focus on species of greatest conservation need, yet address the "full array of wildlife" and wildlife-related issues, and to "keep common species common."

The Virginia Comprehensive Wildlife Conservation Strategy (VDGIF, 2005), more commonly referred to as the Virginia "Wildlife Action Plan" (WAP), developed from that charge. The goal of this plan is to create a vision for conserving Virginia's wildlife and stimulate other states, Federal agencies, and conservation partners to think strategically about their individual and coordinated roles in prioritizing conservation.

In addressing the eight elements below, the Virginia WAP supplements and validates the information on species and habitat and their distribution in our analysis area, and helps us identify conservation threats and management strategies for species and habitats of conservation concern in the CCPs. The WAP was invaluable to us during our planning process because of the depth of expertise and amount of public and partnership involvement that went into its development. We used it in developing objectives and strategies for goals 1 and 2, and in developing appendix A. These are the eight elements required for state WAPs:

1) Information on the distribution and abundance of species of wildlife, including low and declining populations, as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the state's wildlife

2) Descriptions of locations and relative condition of key habitats and community types essential to the conservation of species identified in element 1

3) Descriptions of problems that may adversely affect species identified in element 1 or their habitats, and priority research and survey efforts needed to identify factors that may assist in restoration and improved conservation of these species and habitats

4) Descriptions of conservation actions necessary to conserve the identified species and habitats and priorities for implementing such actions

5) Plans proposed for monitoring species identified in element 1 and their habitats, for monitoring the effectiveness of the conservation actions proposed in element 4, and for adapting those conservation actions to respond appropriately to new information or changing conditions

6) Description of procedures to review the plan at intervals not to exceed 10 years

7) Plans for coordinating, to the extent feasible, the development, implementation, review, and revision of the plan strategy with Federal, state, and local agencies, and Native American Tribes that manage significant areas of land and water within the state, or administer programs that significantly affect the conservation of identified species and habitats

8) Plans for involving the public in the development and implementation of plan strategies

Other Regional Information Sources

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

A Guide to the Conservation of Forest Interior Dwelling Birds in the Chesapeake Bay Critical Area. Forest interior dwelling birds (FIDS) require large tracts of forest for nesting, breeding, and foraging habitat. FIDS are a diverse group of birds, including migratory songbirds, woodpeckers, hawks, and owls. Although many of the FIDS species are still relatively common, populations of some of these species are declining. The loss and fragmentation of forested habitats are major threats to all FIDS species. As the Chesapeake Bay region becomes increasingly more developed, the forests these species rely on are becoming further fragmented.

The Chesapeake Bay Critical Area Commission's, "A Guide to the Conservation of Forest Interior Dwelling Birds in the Chesapeake Bay Critical Area," contains a list of the 25 FIDS species that breed in the Chesapeake Bay area, information on how to identify the presence of FIDS habitat, and conservation guidelines on how to manage for these species. The conservation guidelines focus on regional

and local land use planning, site design guidelines for developers and landowners, and ways to mitigate impacts on FIDS. This guide is available online at: *http://www.dnr.state.md.us/education/envirothon/wildlife/criticalareareg_FIDS.pdf (Chesapeake Bay Critical Area Commission 2000;* accessed June 2011*).* We used this guide in identifying species of concern in appendix A.

Chesapeake Bay Program. The Chesapeake Bay Program (Bay Program) *(http://www.chesapeakebay.net/;* accessed June 2011*)* is a unique regional partnership directing and conducting the restoration of the bay since the signing of the historic 1983 Chesapeake Bay Agreement. The Bay Program partners include the States of Maryland, Pennsylvania, and Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the Environmental Protection Agency (EPA); and participating advisory groups. Since its inception, the Bay Program's highest priority has been the restoration of the bay's living resources, including finfish, shellfish, bay grasses, and other aquatic life and wildlife. Improvements include fisheries and habitat restoration, recovery of bay grasses, nutrient and toxic reductions, and significant advances in estuarine science. In April 2007, the Bay Program released its Chesapeake Bay 2006 Health and Restoration Assessment. The report gives watershed residents a clear and concise synopsis of bay health and on-the-ground restoration efforts taking place across its vast watershed *(http://www.chesapeakebay.net/publication.aspx?publicationid=15548;* accessed June 2011*)*. The report is divided into two parts: Ecosystem Health and Restoration Efforts. This format of reporting, first used to detail the condition of the bay in 2005, allows the Bay Program partnership to look at the effectiveness of cleanup actions across the entire watershed and allocate restoration efforts appropriately.

Potomac Conservancy. The mission of the Potomac Conservancy is to protect the health, beauty, and enjoyment of the Potomac River and its tributaries. The Potomac Conservancy's primary focus is protection of water quality through land protection and sound land use practices. Because clean water alone is not enough, the Potomac Conservancy also works to preserve and restore the Potomac's scenic landscapes, and to enhance river-based recreational opportunities *(http://www.potomac.org/site/about-us/;* accessed June 2011*)*.

Fairfax County Comprehensive Plan of 2007. This plan, required by State law, is a guide to decisionmaking about the built and natural environment by the county's Board of Supervisors and other agencies, such as the Planning Commission and the Board of Zoning Appeals. It is also a guide for county staff and the public to use in the planning process.

Prince William County Comprehensive Plan of 2003 with Amendments of 2006. This Comprehensive Plan creates a vision for the future of Prince William County. It is used as a guideline for evaluating and negotiating development applications. Generally, development applications that fail to match Comprehensive Plan goals and actions can be denied. The Comprehensive Plan includes a map that shows planned land uses on a parcel-to-parcel basis. It also lists specific goals and actions that are needed to make the vision a reality.

National Audubon Society's Important Bird Area Program. The National Audubon Society participates in a global IBA program which identifies areas that are most important for maintaining bird populations and focuses conservation efforts on protecting these sites. In the U.S., more than 1,200 IBAs in 40 states have been identified. The Virginia Audubon chapters have established the following goals for IBAs in the State:

- Identify, document, and publicly recognize Virginia's most important areas for birds.
- Engage people in citizen science and avian conservation cooperative projects with land managers to benefit birds and their habitats at IBAs.
- Partner with others to bring conservation tools and resources to IBAs in need of conservation.
- Base all action on the best available scientific criteria.

The refuge lies in the Lower Potomac River IBA (map 1.5). This 281,134 acre area includes the tidal fresh/brackish reach of the Potomac River extending from Mathias Point to just above Fort Belvoir. It supports a variety of habitats including emergent and forested wetlands, extensive tracts of upland hardwoods, and a diversity of other upland habitats.

The upper tidal reach of the Potomac River has been the focus of intensive ornithological observation for 200 years. Over this time period, the landscape and bird community have changed dramatically. Currently, the area supports a significant community of piscivorous (fish-eating) bird species, including one of the largest great blue heron *(Ardea herodias)* colonies within the Mid-Atlantic region, a dense breeding population of bald eagles, and both a summer and winter concentration area for migrant bald eagles. The rich hardwood forests are strategically important for local breeding populations of neotropical migrants, as well as stopover areas for northern populations moving through the region in the fall. The waterways support significant populations of waterfowl during migration and winter. This IBA also includes one of only two known breeding locations for the Bachman's warbler *(Vermivora bachmanii)* in Virginia.

To learn more visit the Northern Virginia Audubon Society Web site at: *http://www.audubonva.org/index.php/important-bird-areas-iba* (accessed June 2011).

Individual Species Plans

We also referred to the following species specific plans while developing management goals, objectives, and strategies for both refuges.

Sensitive Joint-Vetch Recovery Plan; available at: *http://ecos.fws.gov/docs/recovery_plans/1995/950929b.pdf* (accessed June 2011)

American Shad and River Herring Fisheries Management Plan (spawning/nurseries); available at: *http://www.asmfc.org/*(accessed June 2011)

Final Recovery Plan for the Shortnose Sturgeon; available at: *http://www.nmfs.noaa.gov/pr/pdfs/recovery/sturgeon_shortnose.pdf* (accessed June 2011)

Interstate Fishery Management Plan for Atlantic Sturgeon and its amendments and addendums; available at: *http://www.asmfc.org/speciesDocuments/sturgeon/fmps/fmps/sturgeonFMP.pdf* (accessed June 2011)

American Eel Fisheries Management Plan and addendum; available at: *http://www.asmfc.org/speciesDocuments/eel/fmps/eelFMP.pdf* (accessed June 2011)

Small Whorled Pogonia Recovery Plan; available at: *http://ecos.fws.gov/docs/recovery_plans/1992/921113b.pdf* (accessed June 2011)

Refuge Management Profiles

Establishing Authority and Purpose

Mason Neck Refuge was established in 1969 as the Nation's first refuge specifically established to protect a federally listed endangered or threatened species—the bald eagle, which was federally listed as threatened until 2007. The refuge was created under the authority of the Endangered Species Preservation Act of 1966, the precursor to the current-day Endangered Species Act of 1973. From the initial acquisition of 845 acres in 1969, Mason Neck Refuge has grown to 2,277 acres. This includes 789 acres leased in 1982 for 60 years from the Northern Virginia Regional Park Authority (NVRPA).

Bill Wallen

Eagle Point Shelter at Mason Neck NWR

Featherstone Refuge was established under Public Law 91-499, approved October 22, 1970 (84 Stat 1095). This law authorized the Secretary to acquire, by purchase or exchange, portions of a tract of land in Prince William County, Virginia (then being disposed of by the District of Columbia). As a prerequisite of the transaction, both the Secretary and the District of Columbia had to mutually agree that the lands were formally classified wetlands, or included adjacent lands necessary to protect the natural features of the wetlands, and were worthy of permanent protection. The purchase of the first 164 acres did not occur until 1979. This was followed by a 161-acre gift from Prince William County in 1992 resulting in the present 325-acre refuge.

Refuge Administration

In 1998, Mason Neck, Featherstone, and Occoquan Bay Refuges were organized into the Potomac River National Wildlife Refuge Complex. The decision to jointly administer the refuges was based on the proximity of the refuges and the management complexity of Mason Neck and Occoquan Bay Refuges. This change necessitated sharing staff and resources to address the management requirements of all three refuges.

The refuges' shared staff are based at Refuge Complex headquarters in Woodbridge, Virginia. Mason Neck Refuge has its own maintenance compound onsite. Featherstone Refuge has no onsite facilities and is maintained with equipment located at Occoquan Bay Refuge. The Refuge Complex has six full-

time permanent staff members: the refuge manager, assistant refuge manager, outdoor recreation planner, law enforcement officer, administrative assistant, and maintenance worker. These positions have responsibilities throughout the Refuge Complex. Additional permanent staff are recommended in this plan as depicted in appendix E. The Refuge Complex also may employ seasonal, part-time, or term appointments.

Occoquan Bay Refuge was established in 1998, combining land previously acquired as Marumsco Refuge in 1972 and, later, military surplus lands. Its 642 acres include extensive grasslands interspersed with marshes and early successional shrub and forest areas that support neotropical migratory birds and grassland-dependent species. A separate CCP for Occoquan Bay National Wildlife Refuge was completed in 1997 (USFWS, 1997). For further details on this refuge and its management, please contact refuge headquarters staff or visit the refuge Web site at: *http://www.fws.gov/occoquanbay/index.html* (accessed June 2011).

Refuge Operational Plans ("Step-down" Plans)

Refuge planning policy (602 FW 3) lists more than 25 step-down management plans that may be applicable on any given refuge. Those plans outline specific strategies and implementation schedules for achieving refuge goals and objectives. Some plans require annual revisions; others require revision every 5 to 10 years. Some also require additional NEPA analysis, public involvement, and compatibility determinations before we can implement them.

The status of step-down plans on the refuges follows. This CCP document incorporates, by reference, those plans that are up-to-date.

Step-down plans and annual updates completed for the Refuge Complex:

- Chronic Wasting Disease (2006)
- Avian Influenza (2006)
- Safety (annually updated)
- Emergency Action (annually updated)
- Continuity of Operations (annually updated)
- Hazard Communications (annually updated)
- Hurricane (annually updated)

The following plan is completed for both Mason Neck and Featherstone Refuges:

- Fire Management (2004; anticipate update in 2011)

The following plans will be completed:

- Law Enforcement (in preparation for the Refuge Complex; anticipate completion in 2011)
- Habitat Management (HMP; will be done for each refuge)
- Visitor Services (VSP; will be done for each refuge)
- Integrated Pest Management (IPM; will be done for each refuge)
- Inventory and Monitoring (IMP; will be done for each refuge)
- Sign (will be done for each refuge)

In Chapter 4, "Management Direction and Implementation," we prioritize the development of the plans not yet completed. Additional plans may be required in response to new information once implementation of the CCP is underway.

Vision Statements

Very early in the planning process, our team developed the following vision statements to establish a desired condition for the entire Refuge Complex, as well as to provide a guiding management philosophy and convey Mason Neck and Featherstone Refuges' unique contribution to that overall vision.

Potomac River Refuge Complex Vision

The Potomac River National Wildlife Refuge Complex provides exceptional forest, grassland, and wetland habitats for wildlife in a dynamic, highly urbanized region of Northern Virginia. We will maintain and enhance those quality habitats along the middle tidal Potomac River for native wildlife, particularly bald eagles and other species of conservation concern.

The proximity of the Refuge Complex to our Nation's capital provides unparalleled opportunities to demonstrate the importance of the natural world in enhancing the quality of human life and raise public awareness about the value of the National Wildlife Refuge System. Through outreach, education, and partnerships, we will foster stewardship of the living resources of the tidal Potomac River and the Chesapeake Bay watershed. Visitors will have diverse opportunities for quality, compatible, wildlife-dependent recreation.

Mason Neck Refuge Vision

Elizabeth Hartwell Mason Neck National Wildlife Refuge is dedicated to the protection of the bald eagle and exemplifies the significant efforts, contributions, and successes of conservationists in Virginia. The refuge will continue to protect and enhance regionally important habitat for the bald eagle, migratory birds, and native wildlife and plant species along the tidal Potomac River. We will provide quality wildlife-dependent recreational and educational opportunities, in particular, wildlife viewing and photography. In cooperation with the other agencies in the Mason Neck Management area, we will work to resolve resource issues on the Mason Neck Peninsula.

Featherstone Refuge Vision

Featherstone National Wildlife Refuge provides valuable acres of 'wild woods and wetland' which are rapidly disappearing within this region of Virginia. The refuge will continue to protect wetlands, bottomland hardwoods, and associated native wildlife and plants in an otherwise highly urbanized setting along the tidal Potomac River. Assuming access issues are resolved, the refuge will provide limited, quality, wildlife-dependent recreational opportunities, in particular, wildlife viewing and fishing.

Refuge Goals

In our discussion on the "purpose of, and need for, the proposed action" earlier in this chapter, we presented the goals we developed for each refuge. Those goals are based on our vision for each refuge, their respective establishment purposes, the missions of the Service and the Refuge System, and the mandates, plans, and conservation initiatives above. The goals are intentionally broad, descriptive statements of purpose. They highlight elements of our vision for the refuge's that we will emphasize in future management. The biological goals take precedence; but otherwise, we do not present them in any particular order. In chapter 4 we outline the process by which these goals will be achieved.

Chapter 2

Tim Williams

Black-crowned night heron

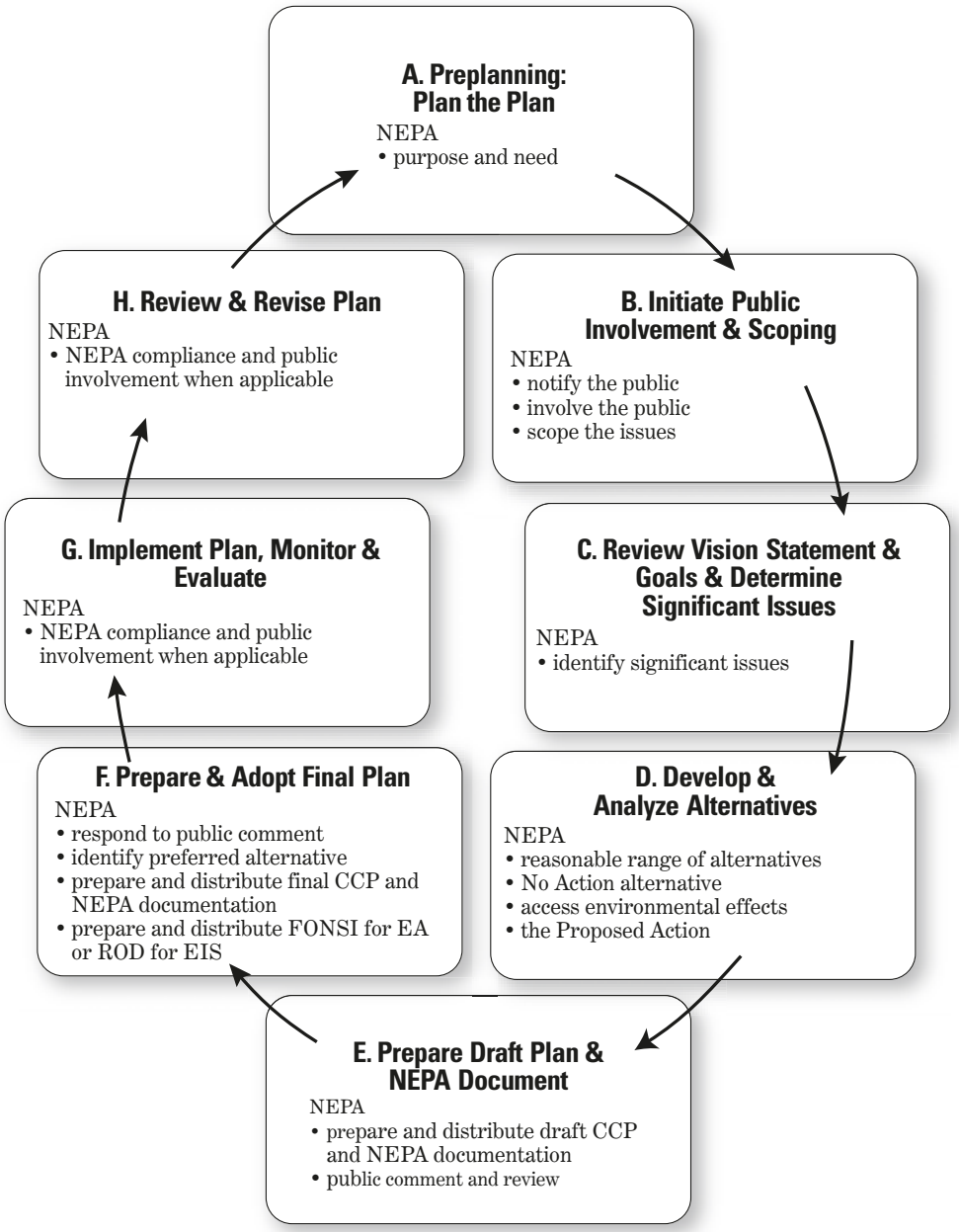
The Planning Process

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

The Comprehensive Conservation Planning Process

Service planning policy (602 FW 3) establishes an eight-step planning process that also facilitates our compliance with NEPA (figure 2.1). Our planning policy and CCP training course materials describe those steps in detail. We followed this process in developing the draft CCP/EA document and this final CCP. Although the steps are described sequentially, the CCP planning and NEPA processes are iterative. It is normal to cycle through some steps more than once or to have several steps occurring simultaneously. For more information on the CCP planning process, visit the Web site: *http://policy.fws.gov/602fw3.html* (accessed June 2011).

Figure 2.1. The Comprehensive Conservation Planning Process



In 2006, we began developing a CCP for Mason Neck and Featherstone Refuges by collecting information on both the refuges' resources and initiating scoping efforts to identify issues, concerns, and opportunities to address in the CCP. We took the following actions to complete CCP planning steps A-F:

- Held first CCP core team meeting in September 2006; drafted a vision statement and identified preliminary issues.
- Distributed separate planning newsletters for Mason Neck and Featherstone Refuges in March 2007 to announce the kick-off of the CCP, notify the public about the public scoping open house meetings, and share draft vision and goals statements.
- Held an open house on March 27, 2007 primarily focused on Featherstone Refuge at the Potomac Community Library in Woodbridge, Virginia.
- Held an open house on March 28, 2007 primarily focused on Mason Neck Refuge at Gunston Elementary School in Lorton, Virginia.
- Held a CCP core team meeting on March 29, 2007 to discuss the comments made at the scoping meetings, to further define key issues, and to develop a draft CCP schedule.
- Hosted an interagency Visitor Services Program Review that included Service experts and representatives from Mason Neck State Park, Virginia State Parks, and VDGIF on May 15, 2007.
- Hosted an interagency Biological Program Station Evaluation that included Service experts and representatives from Mason Neck State Park, Virginia State Parks, and VDGIF on May 16, 2007.
- Published a Notice of Intent (NOI) in the *Federal Register* on May 18, 2007 (72 FR 28066).
- Held a series of CCP core team meetings to develop alternatives from March–October 2007.
- Distributed a planning newsletter in November 2007 summarizing public scoping comments and describing the Visitor Services Program Review and Biological Program Station Evaluation.
- Evaluated Service fee-owned lands on the refuges for their possible inclusion into the National Wilderness Preservation System. We completed that evaluation in January 2008 with the recommendation that no lands on either refuge qualified and that we not proceed with a wilderness study. Appendix D in the draft CCP/EA shows the results of this evaluation.
- Evaluated Service fee-owned waters on the refuges for their potential for Federal Wild and Scenic River status. We completed that evaluation in January 2008. Although the Potomac River borders Mason Neck Refuge, it is not included within the refuge boundary. Mason Neck Refuge also borders Belmont and Occoquan Bays whose waters are under the jurisdiction of the Commonwealth of Virginia. Featherstone Refuge borders Occoquan Bay and Neabsco Creek. No other river or river segments lie within the refuges.

  Eligibility criteria for use by Federal agencies to evaluate rivers' potential for Wild and Scenic designation are recommended by the National Park Service (NPS) and include consideration of outstanding remarkable values for scenery, recreation, geology, or history. We consulted the National Rivers

Inventory database maintained by the National Park Service which documents rivers and river segments that have been evaluated (*http://www.nps.gov/ncrc/programs/rtca/nri/*; [accessed June 2011]). Several segments of the Potomac River are identified as potentially eligible. The closest is the 24-mile segment from Nice Memorial Bridge in Charles County, Maryland to Sandy Point in Prince Georges County, Maryland. None of this segment occurs on refuge lands. While we would consider being a part of a more detailed evaluation of the Potomac River in proximity to the Refuge Complex, undertaking its full evaluation is outside the scope of our planning process and we have determined there was no need to initiate further analysis.

- Analyzed management alternatives and wrote a draft CCP/EA from January 2008–September 2010.
- Published a Notice of Availability (NOA) in the *Federal Register* on January 5, 2011 (76 FR 582). That notice announced the release of the draft CCP/EA document for a 49-day public review and comment from January 5, 2011 to February 22, 2011.
- Distributed the draft CCP/EA to all interested parties, contacted the media, and posted it on our Web site during the January–February 2011 comment period.
- Hosted three public meetings in January 2011 in Woodbridge and Lorton, Virginia.
- Reviewed and summarized all comments received and wrote responses during March-May 2011. Our response to public comments is in appendix G.
- Submitted the final plan to our Regional Director for review in August 2011. The Acting Regional Director determined a FONSI was warranted (see appendix H), and that our analysis was sufficient to simultaneously issue a decision adopting this CCP for the refuges.
- We will announce the final decision by publishing a Notice of Availability in the *Federal Register,* where we will also notify people of the availability of the final CCP. We will also distribute a newsletter announcing his decision to all contacts on our project list, as well as post that newsletter on our Web site. These actions will complete "Step F: Prepare and Adopt a Final Plan."

We can then begin "Step G: Implement Plan, Monitor and Evaluate." We will modify the CCP as warranted following the procedures in Service policy (602 FW 1, 3, and 4) and NEPA requirements as part of "Step H: Review and Revise Plan." Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3C) will require only an environmental action memorandum. As the Refuge Improvement Act and Service policy stipulate, we will review and revise CCPs at least every 15 years.

Issues, Concerns, and Opportunities

We define issues and concerns as "any unsettled matter requiring a management decision." Issues need not be negative, and can also include opportunities. According to Service policy (602 FWS 1.6), an issue can be an

- initiative;
- opportunity;
- resource management problem;
- threat to a resources;
- conflict in use; or
- a public concern.

Issues, concerns, and opportunities arise from many sources, including our staff, other Service programs, State agencies, other Federal agencies, our partners, neighbors, user groups, or Congress. One of the distinctions among the proposed management alternatives is how each addresses those issues, concerns, and opportunities. The following summary provides a context for the issues that arose during the scoping process.

Mason Neck Refuge Issues, Concerns, and Opportunities

Based on core team discussions, Federal and State agency scoping, and public scoping, we compiled the following set of issues, concerns, and opportunities to address under our various management objectives in chapter 4.

Maintaining a Biological Program
Establishing a quality biological program is core to the mission of the Refuge System. The Refuge Improvement Act emphasizes that "wildlife come first" on refuges. Unfortunately, due to budget and staffing changes, the Refuge Complex has been without a wildlife biologist for several years. This has hampered the current staff's ability to develop a strategic plan for its biological program.

- *Staff Biologist*—If we are to have a viable biological program in the long term, should hiring a wildlife biologist be a high priority for the Refuge Complex?

- *Management Assistance*—How can we best cooperate with VDGIF, other State agencies, conservation partners, and volunteers for assistance with biological inventory, monitoring, and management, and/or other aspects of the biological program?

Bald Eagle Management
With a reduction in pollution, greater awareness, and better national and regional protection for populations and their habitat, the bald eagle has made a recovery. In 2007, the bald eagle was officially de-listed under the Federal Endangered Species Act. However, the bald eagle remains one of our priority management concerns because the refuge was originally established for bald eagle conservation and the species remains State-listed as threatened in Virginia.

- *Eagle Nest Tree Protection*—Although the bald eagle nest trees currently benefit from the breakwater project (see shoreline erosion below), how can we ensure continued long-term protection?

- *Preventing Disturbance to Nesting Eagles*—Trail restrictions should continue to be posted to protect active nest trees each year. Should those restrictions change in any way?

- *Future Roost and Nest Trees*—What, if any, site improvements can we make for eagles to ensure there is a sustainable and adequate stock of trees suitable for nesting and roosting? Should this be a major focus of our forest management?

Forest Management
Forest habitat accounts for most of the acres on the refuge. Protecting the diversity, integrity, and health of those forests is fundamental to our mission. We are concerned about many existing and potential threats to this habitat, including deer overbrowsing, pests and pathogens, invasive plants, and climate change. In 2009, the Virginia Department of Forestry (VDF) conducted a Forest Health and Condition Inventory and Assessment for Mason Neck Refuge. Overall, they found that the forest as a whole was not healthy (VDF, 2009). The forest was determined to be overstocked, lacking significant tree regeneration, and missing a shrub and herbaceous layer. The major concerns with these conditions are:

stressed trees are less able to fend off disease and pests, the lack of regeneration would mean the forest cannot replace itself once trees die, and the lack of shrub and herbaceous understory means degraded habitat conditions for many forest dwelling species.

- *Forest Health*—How can we effectively implement the VDF's recommendations, as presented in their Forest Health and Condition Inventory and Assessment, to help meet our forest health objectives? Which ones should be a priority?

- *Deer Impacts on Forest*—The forest habitat on the refuge appears to be recovering from its previously overbrowsed condition due to reductions in the deer herd from managed hunts. How can we ensure overbrowsing does not occur again?

- *Deer Management Coordination*—White-tailed deer *(Odocoileus virginianus)* are a problem across the Mason Neck Peninsula, and it will take a coordinated effort among agencies to make any more significant improvement in habitats. How can we best continue to play a principal role in that collaborative effort?

- *Deer Exclosures*—Currently there are about 20 deer exclosures on the refuge, each showing differences in vegetation growth and forest floor diversity. These exclosures have not been monitored in the last several years, but many are in disrepair. What should be done with the deer exclosures?

  - Is the Bureau Land Management (BLM) still interested in using some at the Meadowood Recreation Area?

  - Is there an interpretation message about deer overbrowsing that could be facilitated at one of the exclosures visible location alongside a trail? The exclosure beside the Great Marsh Trail is in good condition and a possibility. Is this a good use of refuge staff and resources?

- *Vernal Pools*—What can we do to further protect and promote vernal pools on the refuge?

Heron Rookery

The great blue heron rookery on Mason Neck Refuge was once one of the largest in the Mid-Atlantic region with over 1,600 nests at its peak. It now supports approximately 800 nests. The reasons for this reduction are not entirely clear.

- What are the threats to the rookery on Mason Neck Refuge? What steps could we take to address the threats?

- Can the rookery be maintained on the refuge, or on other protected lands in the area?

Wetlands–Little Marsh Impoundment

Little Marsh Impoundment (50 acres) is a heavily used foraging area for bald eagles and herons. It is partially drained in June and July so that fledgling herons and eagles have better access to food. We need to determine how best to address a number of management issues here.

- The Little Marsh wetland is shallow and becoming increasingly filled in with sediment, allowing emergent woody vegetation to encroach. How can we create a greater diversity of emergent marsh vegetation to better support wetland wildlife species?

- In the past, large storms have overtopped the dike threatening to damage or wash it out. How can we address the integrity of the dike?

- The water control structure continues to be damaged and disrupted by beavers *(Castor canadensis)*. How can we address the integrity of the water control structure?

Green heron

Tim Williams

Wetlands–Great Marsh

Great Marsh (207 acres) is one of the largest freshwater marshes in northern Virginia. It is a significant habitat on the refuge, and we consider its protection a priority. The marsh contains extensive stands of wild rice and provides habitat for a variety of species including waterfowl and waterbirds.

- How do we best determine what steps are needed to maintain its integrity and be proactive about certain issues, such as the following:
  - Is water quality adversely affecting the marsh?
  - How do we continue to deal with tide and storm-deposited trash?
  - How do we best prevent invasive plants from taking hold in the marsh?

Other Wetlands

- What management practices are best for waters currently impounded on refuge streams, such as the Little Marsh Road impoundment (approximately 4 acres)?

- Can waterfowl or waterbirds benefit from these smaller impoundments?

Climate Change

Climate change is an issue of increasing concern because of its potential effects on land, water, and biological resources. In addition to warming temperatures, other predicted climate-related changes include changing patterns of precipitation, significant acceleration of sea level rise, changes in season lengths, decreasing range of nighttime versus daytime temperatures, increasing water temperatures, and increasing frequency and intensity of severe weather events (TWS, 2004). Each of these changes would affect wildlife and habitats, but the level of impact would vary depending on the species.

Virginia's WAP identifies more than 900 species that are being impacted by the loss or degradation of their habitats. Many of these species could become extinct or extirpated from Virginia if steps are not taken to reverse these trends. In coming decades, climate change would exacerbate and intensify many of the existing threats and would likely result in new sets of impacts and stressors. In 2009, VDGIF and the Virginia Conservation Network (VCN) produced Virginia's "Strategy for Safeguarding Species of Greatest Conservation Need from the Effects of Climate Change" to provide initial guidance on actions Virginia's conservation community can implement immediately to enhance the conservation of wildlife and habitats in the face of climate change while more comprehensive adaptation strategies are developed (VGDIF et al., 2009).

Conservation strategies include specific actions for conserving species and habitats, developing new data and climate modeling resources, and implementing new outreach efforts related to climate change (VDGIF et al., 2009; *http://bewildvirginia.org/climate-change/;* [accessed June 2011]).

- How can we use adaptive management on the refuge to address the predicted climate change impacts? Are there specific actions we can take to reduce environmental stressors on wildlife and habitats? Are there particular species or ecological communities that should be a priority to address?

- Is there additional research, impacts modeling, monitoring and inventories we should initiate to serve as a baseline for measuring change and/or predicting impacts?

Shoreline Protection
Shoreline erosion is an existing problem that would be exacerbated with predicted climate change impacts. Erosion is occurring along the entire refuge shoreline, but is most visible along the bluffs. Maintaining a stable shoreline is critical to sustaining the integrity of the refuge and its resources. However, shoreline stabilization can be very complex and expensive and would include coordination with several partners.

- How can we best accomplish additional shoreline protection? Breakwaters have been successful in stopping and reversing erosion trends along the southwest bluffs near the heron rookery. Should this technique be used in other locations?

- Is using fill another feasible and practicable way to stabilize the shoreline? Could we use dredge spoil as a source of material for fill?

- Are there other shoreline stabilization measures we should explore, such as "living shoreline" options?

- Are there partners with expertise willing to assist us in the design, implementation, and monitoring of stabilization projects?

- What are potential funding sources for these projects?

Invasive Plants
Japanese stiltgrass *(Microstegium vimineum)* is the most problematic invasive plant on Mason Neck Refuge. However, there are several other invasive plants that may pose problems in the future. Other invasive species present on the refuge include mile-a-minute *(Polygonum perfoliatum),* tree of heaven *(Ailanthus altissima)*, Japanese honeysuckle *(Lonicera japonica),* Japanese barberry *(Berberis thunbergii)* and beefsteak plant *(Perilla frutescens).*

- How can we best control the increasing invasive species problem?

- How do we prioritize treatment?

Invasive Animals/Insects
Emerald ash borer *(Agrilus planipennis)* and gypsy moth *(Lymantria dispar)* are pests recorded on the refuge, and while not currently a problem, they could become one without vigilant monitoring and control where warranted.

- How can we ensure we are prepared to deal with animal and insect pests in the future?

National Historic Preservation Sites and their Protection
Recent studies identified archaeological sites along the shoreline that are jeopardized by erosion. We need to verify whether or not these sites are eligible for the National Register of Historic Places. We are also concerned about the protection of historical sites. Although we are uncertain of the presence of any important sites, the Mason family was settled on the peninsula for several generations.

- How can we protect the integrity of any sites known or eligible for the National Register of Historic Places?

- Are there issues with public access to these sites? Can we expand refuge uses and still effectively protect these resources?

Public Use and Demands
Mason Neck Refuge is located within driving distance of approximately 10 million residents of Virginia, Maryland, and Washington, D.C. The current estimate of 19,100 refuge visitors annually is likely to increase over the next 15 years. Such an increase is especially likely if refuge facilities are expanded or improved, and/or promoting recreational opportunities across Mason Neck Peninsula increases. On the Mason Neck Peninsula alone, public agencies manage lands that include the refuge, the Meadowoods, Mason Neck State Park, Gunston Hall Plantation, and Pohick Bay Regional Park.

Together, in an informal association referred to as "Mason Neck Managers Group," representatives of these Federal, State, and regional government land management agencies share resources and attempt to minimize duplication of effort by coordinating recreational activities. This allows each agency to focus on its strengths, such as general recreation, outdoor or wildlife dependent recreation, resource protection, or historical interpretation. Collectively, the coordination among public land managers on Mason Neck ensures that the public has the opportunity to enjoy a variety of activities without diminishing the purposes for which each area was created. One priority of the association is to collaboratively and jointly manage in anticipation of a predicted increase in area visitation.

The refuge presently accommodates five out of the six priority public uses. Wildlife observation, nature photography, environmental education, interpretation, and hunting, all occur at some level on the refuge, although demand may not always be met. The only priority public use not allowed on the refuge is recreational fishing. This is an issue that has been raised by the public. It is not allowed because no opportunities are present in areas open to public access. For example, virtually all of the refuge shoreline (and thus, potential fishing sites) are closed to public access due to concerns with wildlife disturbance or impacts to sensitive habitat areas. In this CCP, the fishing closure is maintained and we continue to direct people to the adjacent State Park for fishing.

The major issues we need to address concerning public uses at Mason Neck Refuge include the following:

- How can we accommodate increased public demand for additional access on the refuge, primarily more walking trails, while not jeopardizing sensitive wildlife and habitat areas?

- How do we effectively explain the decision to allow certain activities on the multi-use High Point Trail, where it runs through the refuge, while not allowing some of those same activities on refuge trails?

- How can we best coordinate with Mason Neck State Park, which has well established set of trails that should factor into decisions about an overall trail system?

- How can we best provide trail connections, taking into account distances and parking areas?

- How do we accommodate the public desire for more and better access, yet not complicate law enforcement? We have had several instances where vehicles are locked-in behind the gate after hours. Is there a better system? Should we change the gate type to one which opens from the inside after hours, so no one can get locked in? Is the best location on State Park lands? What is the level of coordination that will be required with State Park enforcement of trailheads and parking lots?

- Is there a potential to develop a new trail along a current refuge road (e.g. Sycamore Road), which leads to a viewpoint on the Potomac River? How do we avoid impacting the private residences along that road?

- Could we link the trail to the road and avoid the residential backyards issue by using the first loop of the Woodmarsh Trail as a connector to a Sycamore Road trail?

- Would this impact any archaeological/historical sites?

- The bottom two loops of Woodmarsh Trail are closed December to July to protect nesting eagles so we do not want to open up those areas to public use. How do we integrate that closure into an expanded trails plan?

- Could we create a trail to provide access to Little Marsh? A new Little Marsh trail would access a different habitat type than current refuge and State Park trails because Little Marsh is nontidal freshwater; the water control structure does not allow tidal influence. Access must be through a controlled road.

- Other issues on trails and trail creation include the following:

  - Can we use existing road surfacing for road-to-trail conversions?

  - The State Park is conceptualizing (no final plans yet) a trail from the primitive campground, out towards Sandy Point, up to High Point Road. How can we best integrate any new or expanded refuge trails with the newly planned trails in the State Park?

Environmental Education
A limited environmental education program occurs on the refuge. Although the refuge has a small established environmental education site, it has not been used in recent years. There is high public demand to increase environmental education opportunities on this refuge, but we have been unable to, given our current level of funding and staffing. Instead we have concentrated our environmental education efforts on Occoquan Bay Refuge.

- Can we improve the quality of our environmental education program given our limited resources?

- Could we effectively expand those educational opportunities through partnerships with other educators?

- Would allowing public access to the environmental education site via the proposed Sycamore Road trail affect the quality of our educational programs?

Northern Virginia Regional Park Authority Lands
A large portion of the refuge, including the Little Marsh area, is land leased from the NVRPA.

- Should the Service pursue full fee-title ownership of the land?
- Are there opportunities for a land exchange?

Volunteers and Friends
There were a number of individuals, groups, and the Friends of Potomac River Refuges interested in projects to support all three refuges.

- How do we best coordinate efforts among individuals and organizations?
- How do we prioritize our staff and funding resources to develop and support meaningful projects that meet expectations and are consistent with refuge purpose, goals, and objectives?

Featherstone Refuge Issues, Concerns, and Opportunities

Based on core team discussions, agency scoping and public scoping, we developed the following set of issues, concerns, and opportunities which we address under our various management objectives in chapter 4.

Refuge Administration and Management
Management emphasis on this refuge has been limited due to higher priorities for refuge staff and available funding and other resources on Occoquan Bay and Mason Neck Refuges.

- Is the level of management attention on this refuge commensurate with its resource and public use values?
- Are there alternative ways (e.g. partnerships) to increase the effectiveness of management on this refuge?

Maintaining or Restoring Biological Resources
- How can we ensure Featherstone Refuge continues its supporting role in a significant eagle conservation area in the Chesapeake Bay watershed? Eagles have nested on the refuge in the past. What steps can we take to attract eagles to nest here again?
- Featherstone Refuge has low migratory and resident waterfowl counts in comparison to other areas along the Potomac River.
  - How can we most effectively determine why these numbers are low?
  - Do we need to collect baseline data?
  - How can we most effectively partner with State, local, and conservation groups on this type of project?
- How can we best manage the refuge as a neo-tropical migratory bird breeding and migrating location?
- We know very little about the resources on this refuge. Is there other Federal trust or State species of conservation concern we should be managing for on the refuge?

Protecting Wetlands and Water Quality
Featherstone Refuge was established, in part, to protect its wetlands. The refuge's wetlands are at risk from spills from the adjacent commercial industrial park and from shore water runoff from upland drainages. There is a need to establish soil and water baseline conditions onsite and offsite, and monitor effects from pollutants, to address the following concerns:

- Is the refuge receiving contaminants from the industrial park adjacent to the refuge?
- Are there impacts from former landfill activities?
- Are there impacts from storm water runoff, for example, Farm Creek discoloration, fish kills, other hazards to wildlife from runoff and other pollutants?
- How can we most effectively establish baseline conditions?
- Is storm water runoff and siltation onto the refuge a serious problem?
- Can we establish partnerships with other organizations to conduct monitoring (e.g. Ecological Services Division)?
- Based on baseline results, can we establish partners to help in correcting and mitigating negative results?
- How can we best work with Prince William County to address runoff and drainage issues?

Climate Change and Shoreline Protection
Similar to our discussion for Mason Neck Refuge, Featherstone Refuge is at risk from predicted impacts related to climate change and shoreline erosion. Featherstone Refuge, due to its comparatively lower elevation, is more likely to be affected by rising water levels in the tidal Potomac River. The issues questions identified for climate change on Featherstone Refuge are similar to those for Mason Neck Refuge.

Shoreline erosion is an existing problem that will be exacerbated with predicted climate change impacts. However, unlike the bluffs and steep banks on Mason Neck Refuge, the shoreline of Featherstone Refuge has a more gradual slope and is backed by wetlands rather than upland forest. Rising waters would inundate lower areas and create a mix of new wetland habitats while losing some current shoreline areas. While maintaining a stable shoreline is important to sustaining the integrity of the refuge, protecting the existing shoreline would be a daunting challenge. The issues identified for climate change include:

- Is protection of the current shoreline necessary to protect refuge resources?
- At what level of climate change impact/sea level rise would protection of the shoreline become critical?
- What, if any, areas of the shoreline should be protected?

Public Access
Public access is the overarching issue at Featherstone Refuge. Currently, there is no public access for several reasons. In order to access the refuge, visitors would have to park on private lands and walk across privately owned land, including an active railroad right-of-way, a gas pipeline right-of-way, and/or a subdivision. Public safety is a major concern with access. We need to address that problem before allowing any public uses in the future.

- Should we look into weekend use of parking facilities near the Virginia Railway Express (VRE) station as part of a plan to allow access?
- Can we establish partnerships with adjacent landowners for the public to gain access to the refuge?

- The southwest corner of the refuge presents different opportunities for access; can we find a way to work with neighbors in nearby townhouses for the public to gain refuge access?

- Should we consider the possibility of access by water trails for canoeists, kayakers, and power boaters?

Trails and Trail System Integration
Featherstone Refuge is considered a great location in the local area for bird watching and other wildlife viewing, and many residents encourage resolution for finding safe, public access. Continued public involvement in resolving the access issue, and helping to determine trail needs, could bring increased awareness about these and other issues which impact the refuge.

- Would it be a good area to build a birding trail—using natural materials, observation blinds, and boardwalks over wet areas?

- Can we make use of the old railroad grade that runs through the refuge as a location for a walking trail?

- Could Featherstone Refuge be managed to include a segment of the Potomac Heritage National Scenic Trail (PHNST)? Could we make the portions of the trail through the refuge accessible for pedestrians only or for pedestrians and bicyclists? Can we partner with the Prince William County to establish a trailhead and to identify a suitable location for trail facilities on the refuge that contributes to a continuous trail network?

Marsh mallow at Mason Neck Refuge

Bill Wallen

- Can the refuge be integrated with the Virginia Birding and Wildlife Trail?
- Should we consider the possibility of a trail at the southern end of the refuge (under railroad trestle)?

Trespass, Vandalism, Law Enforcement

Trespass and vandalism have been recurring problems on the refuge, although incidents have dramatically decreased with the presence of law enforcement personnel on the Refuge Complex. Trespass by anglers looking for fishing access to the Potomac River and shelters being built by homeless and displaced people are examples of trespass problems in the recent past. Dumping of household and commercial debris and waste are examples of vandalism that has been a problem.

- Can allowing public access and building trails help with this situation? Will a greater public presence on the refuge reduce incidences of trespass and vandalism?
- Are we distributing our law enforcement effort among the three refuges in the Refuge Complex most effectively to deal with the level of violations and resource impacts?

Chapter 3

Bill Wallen

Northern flicker

Existing Environment

- Introduction
- Regional Setting
- Socioeconomic Setting
- Special Regional Conservation Areas and Activities
- Potomac River Refuge Complex Administration
- Mason Neck Refuge Environment
- Featherstone Refuge Environment

Introduction

This chapter describes the physical, biological, and social environments of Mason Neck and Featherstone Refuges. The environment of the third refuge in the Potomac River Refuge Complex—Occoquan Bay Refuge—is described in a separate CCP for that refuge (USFWS, 1997). Specifically included in this chapter are descriptions of the regional and refuge settings, current refuge administration, and refuge resources and programs. In particular, we describe components of the biological diversity, integrity, and environmental health of these refuges because these details are crucial in planning for their future management under the provisions of the Refuge System Administration Act (16 U.S.C. § 668dd-668ee) and other laws. Appendix F provides an informative overview of the cultural resources on both refuges.

Regional Setting

Tidal Potomac River Basin

The Potomac River begins in West Virginia and is fed by tributaries from Pennsylvania, Maryland, and Virginia. It flows over 380 miles from its headwaters, expanding to more than 11 miles wide as it flows into the Chesapeake Bay. The Potomac River Basin (see map 1.4) includes 14,670 square miles in four states including Virginia (5,723 square miles), Maryland (3,818 square miles), West Virginia (3,490 square miles), Pennsylvania (1,570 square miles), and the District of Columbia (69 square miles) (Interstate Commission on the Potomac River Basin ICPRB, 2006).

The tidal Potomac River includes that portion of the river influenced by tides and extends for 117 miles from its head-of-tide, located approximately ½-mile upstream of Chain Bridge in the District of Columbia, to its mouth at Point Lookout in Maryland and Smith Point in Virginia. The surface area of all tidal waters, including Potomac River embayments and tidally influenced tributary rivers, streams, and creeks, is about 434 square miles. The land area of the tidal river is 2,537 square miles, or approximately ⅙ of the entire Potomac River Basin area (Lippson et al., 1979).

Many people rely on and enjoy the abundant resources of the tidal Potomac River. It supplies almost four million area residents with clean drinking water, provides a wide variety of natural resources such as critical wildlife habitat, and supports historical and cultural resources of national significance (DWSPP, 2007). The tidal river is recognized as regionally significant habitat for many fish and birds. More than 200 species of birds, including the bald eagle, breed there. The river also provides important habitat for 70 species of fish (TPL, 2006).

Potomac River Refuge Complex Units

The Refuge Complex is located in northern Virginia, approximately 25 miles south of Washington, D.C. It is situated on a roughly 8-mile section of the Potomac River's Virginia shoreline between Pohick Bay and Neabsco Creek (see map 1.1). This portion of Virginia is in the Mid-Atlantic Coastal Plain Physiographic Area of broad rolling hills and moderate slopes (BLM, 2004).

The Climate

The climate of the Refuge Complex area is variable. The area is influenced by the Chesapeake Bay, as well as the Atlantic Ocean to the east and the Appalachian Mountains to the west. The weather in the refuge area is characterized by cold, dry, continental-polar winds from the west ("westerlies") and northwest during the winter, and warm, humid, maritime-tropical winds from the south and southwest during the spring and summer. Precipitation averages 39 inches per year, and is evenly distributed throughout the year. January, February, and April are the driest months, with less than three inches of precipitation. Snowfall averages less than 10 inches per year. The maximum recorded snowfall of

25 inches fell in February 2010. The annual mean daily temperature for the area is 57°F. The growing season, based on average first and last killing frosts, is from April 15 to October 15. The mean number of cloudy days per month ranges from 11 in June to 16 days in December and January (USFWS, 2005a).

Regional Climate Change Projections

Under our discussion of issues in chapter 2, we note that climate change is of increasing concern because of its potential effects on land, water, and biological resources. Also of major concern are effects on human health and effects to human built infrastructure. Generally, the concerns center on the impacts from warming air and water temperatures, changing patterns of precipitation, significant acceleration of sea level rise, changes in season lengths, the decreasing range of nighttime versus daytime temperatures, and increasing frequency and intensity of severe weather events (TWS, 2004).

While there is currently little information specific to Mason Neck or Featherstone Refuges, there is a building body of information about the climate change implications for the State and the Chesapeake Bay region. For our discussion below, we refer to two reports: the State of Virginia's "Climate Change Action Plan" and "Virginia's Strategy for Safeguarding Species of Greatest Conservation Need from the Effects of Climate Change." We encourage you to read the reports in their entirety for a better understanding of the current knowledge and projected impacts of climate change in the region surrounding the refuges.

Governor's Climate Change Action Plan
In 2007, Virginia's Governor Timothy M. Kaine issued Executive Order 59 (E.O. 59; 2007), establishing the "Governor's Commission on Climate Change." The Commission was comprised of a wide range of experts who were "philosophically diverse." Its panel consisted of more than 40 citizens from Virginia, including scientists, economists, environmental advocates, and representatives from the energy, transportation, building, and manufacturing sectors. The Commission also included local government representatives and State lawmakers. He charged this Commission to create a "Climate Change Action Plan" (GCCC 2008) that would do the following:

1) Inventory the amount of and contributors to Virginia's greenhouse gas emissions and projections through 2025. (Note: According to the report, "Most of the observed increase in globally averaged temperature since the mid-20th century is very likely due to increase in anthropogenic [green house gas] concentrations. Currently, the three largest sources of greenhouse gas emissions in Virginia are electricity generation, transportation, and non-utility uses of fuel in industrial, commercial, and residential facilities.")

2) Evaluate expected impacts of climate change on Virginia's natural resources, the health of its citizens, and the economy, including the industries of agriculture, forestry, tourism, and insurance.

3) Identify what Virginia needs to do to prepare for the likely consequences of climate change.

4) Identify actions that needed to achieve the goal of a 30 percent reduction in greenhouse gas emissions.

5) Identify climate change approaches being pursued by other states, regions, and the Federal government.

The plan explains the Commission's findings about the projected effects of climate change in Virginia on the built environment, natural systems, and human health. To read the entire plan, visit: *http://www.deq.virginia.gov/export/sites/default/info/documents/climate/CCC_Final_Report-Final_12152008.pdf* (accessed August 2011). For natural systems, they had the following findings:

- Sea level rise is a major concern for coastal Virginia. The Chesapeake Bay Program's Scientific and Technical Advisory Committee projects that sea levels in the Chesapeake Bay region will be 2–5 feet higher by 2100. Specific impacts will vary by location, depending on changes in land elevation.

- Climate change will have a significant impact on Virginia's ecosystems. At varying rates, vegetation ranges are moving from current locations to higher altitudes and latitudes. The effect of this will be that suitable habitat for some species will decline, other species will become extirpated, and others species will become extinct. Climate change also will exacerbate threats already faced by Virginia ecosystems, such as invasive species, pathogens, and pollution.

- The effects of climate change on many of Virginia's ecosystems and species will be better understood as more research becomes available. Research and conservation efforts will need to be increasingly focused on managing resources to maintain healthy, connected, and genetically diverse ecosystems, and plant, wildlife, and fisheries populations.

- Some of the Chesapeake Bay's "foundation species," such as blue crabs, eelgrass, and oysters, could decline or disappear as salinity and temperatures continue to increase and weather patterns continue to fluctuate widely from year to year. Because foundation species support many other species, these impacts would be felt throughout the ecosystem.

- Oxygen levels in the Chesapeake Bay are expected to decrease due to increasing temperatures and increasing storm runoff, which will have a negative impact on species like striped bass, blue crabs, and oysters. Acidification of the bay and Atlantic Ocean is also a concern as waters absorb more carbon dioxide.

- Coastal wetlands, a critical habitat for many of the Chesapeake Bay's plants and animals, are being lost as sea levels rise, and freshwater coastal wetlands are similarly threatened by saltwater intrusion.

- Virginia's agriculture and forestry industries, as well as commercial and sport fishing industries and park land, will be impacted by climate change. More research to determine specific effects is needed. The lack of specific information on the impacts hinders Virginia's ability to adapt and prepare for these changes.

- Virginia's forestlands sequester approximately 23 million metric tons of carbon dioxide per year. Unless current land conversion trends are reversed, however, this number will decline every year, as Virginia loses on average 27,000 acres of forestland annually to development. The loss of agricultural lands, which also can sequester carbon dioxide, depending on the management practices applied, is an additional concern. In 2003, Virginia had 15.8 million acres of forestland, which represents a decline of 180,600 acres since 1992.

Appendix B of the action plan summarizes climate change information presented to the Commission from notable sources. Examples of presentations included:

Author and Affiliation	Subject
Benjamin DeAngelo – EPA	A summary of work from the Intergovernmental Panel on Climate Change (IPCC)
Bill Stanley – The Nature Conservancy	Nature's role in capturing and storing carbon emissions
Tom Ballou – VDEQ	Greenhouse gas emissions and energy consumption in Virginia and projected emissions in the future through 2025
H.H. Shugart, Ph.D. – University of Virginia – Department of Environmental Sciences	Effects of a warming climate on Virginia's terrestrial ecosystems and the role of Virginia's terrestrial ecosystems in context of the global carbon cycle
Doug Inkley, Ph.D. – National Wildlife Federation	Impacts of warming climate on fisheries and wildlife resources in the United States and Virginia
James E. Bauer, Ph.D. – Virginia Institute of Marine Science	Climate Change impacts to the Chesapeake Bay region
Emmett Duffy, Ph.D. – Virginia Institute of Marine Science	Impacts on the Chesapeake Bay and its living resources
Kristie L. Ebi, Ph.D., M.P.H	Climate change impacts on human health
Chris Munson – ICF/U.S. Department of Transportation	Potential impacts of global sea level rise on transportation infrastructure
Nan Humphrey – Transportation Research Board, National Academy of Sciences	Potential impacts of climate change on U.S. Transportation
Patrick Hogan – Pew Center on Global Climate Change	A summary of State and regional actions to address climate change

Virginia's Strategy for Safeguarding Species of Greatest Conservation Need from the Effects of Climate Change

In 2009, the VDGIF, Virginia Conservation Network, and the National Wildlife Federation released "Virginia's Strategy for Safeguarding Species of Greatest Conservation Need from the Effects of Climate Change" (VDGIF et al, 2009). This document provides important information on the status and implications of climate change on wildlife and habitats in Virginia. It was created "…to provide initial guidance on actions Virginia's conservation community can implement immediately to enhance the conservation of wildlife and habitats in the face of climate change while more comprehensive adaptation strategies are developed." To view the entire document, visit: *http://bewildvirginia.org/climate-change/virginias-strategy-for-safeguarding-species-of-greatest-conservation-need-from-the-effects-of-climate-change.pdf* (accessed August 2011).

The strategies in this document build off of the analysis and recommendations made in the Virginia WAP for conserving wildlife and habitat (VDGIF 2005). For example, the Virginia WAP describes more than 900 species that are being impacted by the loss or degradation of their habitats. In coming decades, climate change will exacerbate and intensify many of the existing threats and will likely result in new sets of impacts and stressors. The document's strategies for addressing climate change impacts include specific actions for conserving species and habitats, developing new data and climate modeling resources, and implementing new outreach efforts related to climate change. The plan also includes a list of concerns identified by the conservation community, actions that can be implemented to make wildlife and habitats more resilient to climate change, research projects needed to inform future planning and management efforts, and outreach efforts required to build the social and political support that will be needed to implement climate adaptation efforts.

During development of this strategic plan, public and partner workshops were held. Participants were asked to identify the most significant challenges currently impacting Virginia's major rivers and specific wetland types. For the Potomac River, the significant challenges identified were the following:

- Introduction of herbicides, fungicides, and insecticides
- Sediment loading, alterations, and increased turbidity (erosion)
- Channel and shoreline alteration
- Increased nutrient inputs
- Decreased surface permeability within the watershed

In summary, addressing the implications of climate change necessarily requires engagement at all levels, from national, regional, state, and local. Chapter 4 of this CCP identifies objectives and strategies we developed to monitor, address, and adapt to climate change at the refuge-scale.

Regional Air Quality

The air quality in the Washington D.C. metropolitan and surrounding area is experiencing gradual improvement, although excessive ozone and some particulates remain a problem. During the summer, there are occasional air pollution episodes when high-pressure systems stagnate over the area. Ozone and particle pollution have been linked to short-term health concerns, particularly among children, asthmatics, people with heart or lung disease, and older adults. The Virginia Department of Environmental Quality (VDEQ) monitors levels of ozone and particle pollution from several stations in Virginia. For more information, visit *www.deq.state.va.us/air/homepage.html.*

Ozone may affect the recreational potential of this stretch of river, as sensitive groups may be advised to limit their outdoor activities due to high ozone levels (MWCG, 2006). Ozone levels over the past 10 years have exceeded healthy levels between zero and 21 days per year (VDEQ, 2006). There is not a discernable trend, increasing or decreasing, in unhealthy ozone days over time. The primary factors contributing to unhealthy ozone levels are emissions and the warm and sunny regional climate (AIR Now, 2006). A significant improvement in air quality is unlikely to occur in the near future, as the metropolitan Washington, D.C. area continues to grow and the climate will remain relatively warm and sunny.

Particles found in soot, dust, smoke, and fumes create air pollution in the area. The burning of coal, oil, diesel, and other fuels produces these particles. Vehicles in northern Virginia are a major source of particulate matter (particles and liquid droplets suspended in the air). Motor vehicles emit direct particulate matter from their tailpipes, as well as from normal brake and tire wear. In addition, vehicles cause dust from paved and unpaved roads to be re-entrained, or re-suspended, in the atmosphere. Also, highway and transit construction projects may cause dust. The particles are small enough to enter deep into the lungs and cause health problems.

Scarlet tanager

Les Brooks

Air Quality Index

The Air Quality Index (AQI) is an index for reporting daily air quality. It describes the cleanliness of the air in a particular location and the associated health concerns with increasing pollutant levels (table 3.1). The AQI focuses on health effects a person may experience within a few hours or days after breathing polluted air. The EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone (O_3), particle pollution (also known as particulate matter; $PM_{2.5}$ or PM_{10}), carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2). For each of these pollutants, EPA has established national air quality standards to protect public health.

An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level EPA has set to protect public health. AQI values below 100 are generally thought of as satisfactory. When AQI values are above 100, air quality is considered to be unhealthy for certain sensitive groups of people. As AQI values increase above 150, everyone in the affected area may

experience health effects. The AQI is divided into six categories as shown in table 3.1.

Table 3.1. Air Quality Index (AQI) Values and Related Health Concerns

AQI Range	Air quality condition: (Level of Health Concern)
0 to 50	Good: (air pollution poses little to no risk)
51 to 100	Moderate: (acceptable; some moderate health concerns for a few people)
101 to 150	Unhealthy for Sensitive Groups: (may cause a health effect for certain groups)
151 to 200	Unhealthy: (may pose health effect for everyone)
201 to 300	Very Unhealthy: (poses a health alert; everyone may experience health effect)
301 to 500	Hazardous: (triggers health warnings of emergency conditions)

County AQI Statistics

In 2007, AQI statistics were calculated for 212 days for Prince William County. On 5 out of these 212 days, the air quality was unhealthy for sensitive groups (table 3.2). On all 212 days, ozone was the major problem pollutant.

In 2007, AQI statistics were calculated for all 365 days for Farifax County. On 27 out of these 365 days, the air quality was unhealthy for sensitive groups (table 3.2). Ozone and PM2.5 were the major problem pollutants in Farifax County.

According to the VDEQ Air Division, the refuges are located in an ozone nonattainment and emission control area for nitrogen oxides and volatile organic compounds.

Table 3.2. Air Quality Index Statistics for Prince William and Fairfax Counties for 2007

2007		Number of Days when Air Quality Met Categories			
County	Number of Days AQI Statitics were calculated	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy
Prince William	212	151	56	5	0
Fairfax	365	232	106	27	0

**Note: CO–Carbon monoxide; NO_2–Nitrogen dioxide; O_3–Ozone; SO_2–Sulfur dioxide; $PM_{2.5}$–Particulate matter smaller than 2.5 micrometers; PM_{10}–Particulate matter smaller than 10 micrometers*

Regional Water Quality

Virginia's Water Quality Standards

The goals of Virginia's water quality assessment program are to determine whether water quality standards are met and to design and implement a plan to restore waters with impaired quality.

The VDEQ released the Final 2010 305(b)/ 303(d) Water Quality Assessment Integrated Report (Integrated Report) on February 9, 2011. The Report is a summary of the water quality conditions in Virginia from January 1, 2001, to December 31, 2006. The VDEQ develops and submits this report to the EPA every even-numbered year. The report satisfies the requirements of the U.S. Clean Water Act sections 305(b) and 303(d) and the Virginia Water Quality Monitoring, Information, and Restoration Act.

Water quality standards designate uses for waters. There are six designated uses for surface waters:

1) Aquatic life
2) Fish consumption
3) Shellfish consumption
4) Swimming
5) Public water supplies (where applicable)
6) Wildlife

Additionally, several new subcategories of aquatic life use have been adopted for estuarine waters of the Chesapeake Bay and its tidal tributaries. The standards define the water quality needed to support each of these uses. If a water body contains more contamination than allowed by water quality standards, it will not support one or more of its designated uses. Such waters have "impaired" water quality. In most cases, a cleanup plan (called a "Total Maximum Daily Load" (TMDL)) must be developed and implemented to restore impaired waters.

Impairments in Waters Affecting the Potomac River Refuges
Table 3.3 lists the impairments in tidal waters adjacent to Mason Neck and Featherstone Refuges for which TMDL studies are required to reduce pollutant levels to allow the designated uses. Of particular note are the impairments to aquatic life that may affect aquatic species on both refuges, and the fish consumption advisories that may affect users of Featherstone Refuge if public access is allowed in the future.

Table 3.3. Virginia 2010 303(d) Impaired Waters (Category 5) Needing Total Maximum Daily Load (TMDL) Study

TMDL Watershed Name					
Cause Group ID	**Uses Affected**	**Type of Impairment**	**Estuary (Square Miles)**	**Initial List Date**	**TMDL Dev. Date**
Occoquan River					
A25E-04-EBEN	Aquatic Life	Estuarine Bioassessments	0.29	2006	2018
A25E-03-BAC	Recreation	Fecal Coliform	0.08	2004	2016
Neabsco Creek					
A25E-02-BAC	Recreation	E. coli	0.54	2002	2010

Maryland's Water Quality Standards
The purpose of Maryland's water quality standards is to protect, maintain, and improve the quality of the State's surface waters. Maryland's water quality standards have three main components: designated uses, water quality criteria to protect designated uses, and an anti-degradation policy (MDE 2010).

Designated uses are goals for water quality and are usually an appropriate intended use by humans and/or aquatic life. Each waterbody (stream segment, lake, bay, etc.) is assigned one or more designated uses, such as human recreation, shell-fishing, human water supply, or aquatic life habitat. Although these designated use goals may not be currently meet, each must be attainable for that water body (MDE 2010). For more information on Maryland's designated uses, visit: *http://www.mde.state.md.us/programs/Water/TMDL/Water%20Quality%20Standards/Pages/programs/waterprograms/tmdl/wqstandards/index.aspx/* (accessed June 2011).

Water quality criteria are generally a numeric criteria that set the minimum water quality standards necessary to meet the designed uses. Maryland publishes criteria for protection of human health, protection of aquatic life and habitat, toxins such as lead, dissolved oxygen levels, turbidity, bacteria, and temperature (MDE 2007). Maryland's water quality criteria are updated every 3 years and published in the Code of Maryland Regulations (COMAR). They are available online at: *http://www.dsd.state.md.us/comar/comarhtml/26/26.08.02.03-3.htm* (accessed June 2011).

The antidegradation policy is the last component of the Maryland water quality standards (MDE 2007). This policy assures that water quality continues to support designated uses.

Impairments in Waters Affecting the Potomac River Refuges

Table 3.4 lists the impairments for the portions of the Potomac River that occur in Maryland for which TMDL studies are required to reduce pollutant levels to allow the designated uses. Of particular note are the impairments to aquatic life that may affect aquatic species on both refuges.

Table 3.4. Maryland 2008 303(d) Impaired Waters (Category 5) Needing Total Maximum Daily Load (TMDL) Study

Designated Use(s)	Cause of Listing	Source of Pollutant	Priority
Potomac River Lower Tidal			
Aquatic Life and Wildlife	Combination Benthic/Fishes Bioassessements	Unknown	Low
Lower Potomac River Mesohaline			
Open Water–Fish and Shellfish	Nitrogen (total)	Agriculture	High
Season Deep–Channel Refuge Use	Nitrogen (total)	Agriculture	High
Season Deep–Channel Refuge Use	Phosphorus (total)	Agriculture	High
Open Water–Fish and Shellfish	Phosphorus (total)	Agriculture	High
Seasonal Deep Water–Fish and Shellfish	Nitrogen (total)	Agriculture	High
Aquatic Life and Wildlife	Estuarine Bioassessements	Unknown	Low
Lower Potomac River Oligohaline			
Open Water–Fish and Shellfish	Nitrogen (total)	Agriculture	High
Open Water–Fish and Shellfish	Phosphorous (total)	Agriculture	High
Seasonal Shallow Water–Submerged Aquatic Vegetation	Total Suspended Solids	Unknown	Low
Upper Potomac River Tidal Fresh			
Seasonal Shallow Water–Submerged Aquatic Vegetation	Total Suspended Solids	Unknown	Low
Open Water–Fish and Shellfish	Nitrogen (total)	Unknown	High
Open Water–Fish and Shellfish	Phosphorus	Unknown	High

Source: MDE 2008

Socioeconomic Setting

Regional Overview

The population of the Washington, D.C. metropolitan region is approximately 5.35 million residents (2000 Census), and has increased by almost 9 percent over the past decade. Northern Virginia is a sub-area of both Virginia and the Washington, D.C. metropolitan area (map 1.6). Northern Virginia is home to over 2 million residents. Local governments comprising northern Virginia include four counties: Arlington, Fairfax, Loudoun, and Prince William; five independent cities: Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park; and 14 incorporated towns: Clifton, Dumfries, Hamilton, Haymarket, Herndon, Hillsboro, Leesburg, Lovettsville Middleburg, Occoquan, Purcellville, Quantico, Round Hill, and Vienna (NVRC, 2002). Because Mason Neck and Featherstone Refuges are located in the adjacent counties of Fairfax and Prince William respectively, those counties are the most relevant contexts for our discussion in the larger Washington, D.C. metropolitan area.

Northern Virginia's population is expected to increase by about one-third during the next 22 years, with an estimate of more than 3 million by the year 2030 (table 3.5).

Fairfax County

Fairfax County, which includes the Mason Neck Peninsula and Mason Neck Refuge, is the largest county in the Washington, D.C. metropolitan area and has the highest population of any county or city in Virginia. It accounts for about 13 percent of the State's population (USCB American Factfinder, 2007). Fairfax County's population was projected to be 1,077,000 persons as of January 2006, an increase of 31.6 percent over the 1990 census count. This population is expected to continue to increase as indicated in table 3.5.

In terms of both population size and density, Fairfax County ranks among the top two percent of all counties in the nation (FC, 2006a). The county consists of approximately 252,828 acres of land spread across an area of 395 square miles. Residents are primarily employed by private businesses and the Federal government (FC, 2006b). As of the census of 2000, the population density was 2,455 people per square mile. There were 359,411 housing units at an average density of 910 per square mile. The racial makeup of the county is depicted in table 3.6. The average household size was 2.74 and the average family size was 3.20 (USCB American Factfinder, 2007).

Based on U.S. Census Bureau (USCB) figures for 2006 for household median income, Fairfax County was the richest county in the country. The median income in the county was $100,318 in 2006. This overtook the previous richest county, neighboring Loudoun County, which ranked second with a median income of $99,371 in 2006. Incomes in Fairfax and Loudoun Counties are both more than double national median income of $48,451. In addition, poverty levels in each of the area's four counties were well below the national average of 12.3 percent (Francis & Levitz, 2007).

Prince William County

Prince William County, in which Featherstone Refuge is located, is one of the fastest growing counties in Virginia and includes Manassas, Manassas Park, and Manassas City (USCB, 2006). It consists of 222,305 acres of land and 5,120 acres of water, and comprises single-family residential, multi-family residential, agriculture, parks and open space, and government, commercial, and industrial facilities. Employment is high, predominantly in government and government associated services or activities (USCB, 2006).

Prince William County has the third highest population of all Virginia's counties and cities but still has only about a third the population of neighboring Fairfax County—an estimated 360, 411 persons in July 2007 (USCB American Factfinder, 2007). This population is also expected to increase as indicated in table 3.5.

As of the census of 2000, there were 280,813 people, 94,570 households, and 72,724 families residing in the county. The population density was 831 people per square mile. There were 98,052 housing units at an average density of 290 per square mile. The racial makeup of the county is depicted in table 3.6. The fastest growing population since 2005 is of Hispanic and Latino origin.

USFWS

Bald eagle on a snag

Of the 94,570 households, 44.20 percent had children under the age of 18 living with them, 61.30 percent were married couples living together, 11.20 percent had a female householder with no husband present, and 23.10 percent were non-families. Of all households, 17.10 percent were made up of individuals, and 3.00 percent had someone living alone who was 65 years of age or older. The average household size was 2.94, and the average family size was 3.32.

In the county, the population distribution included 30.40 percent under the age of 18, 8.80 percent from 18 to 24, 35.20 percent from 25 to 44, 20.80 percent from 45 to 64, and 4.80 percent 65 or older. The median age was 32 years. For every 100 females there were 99.50 males. For every 100 females age 18 and over, there were 97.40 males.

The median income for a household in the county was $65,960, and the median income for a family was $71,622. Males had a median income of $45,595, compared to $34,286 for females. The per capita income for the county was $25,641. About 3.30 percent of families and 4.40 percent of the population were below the poverty line, including 5.60 percent of those under age 18 and 4.70 percent of those aged 65 or over (USCB American Factfinder, 2007).

Table 3.5. Regional Population Forecasts

Jurisdiction	2010	2015	2020	2025	2030
Fairfax County	1,132,500	1,211,500	1,276,000	1,303,700	1,330,900
Prince William County	416,000	463,400	489,900	524,900	556,300
Northern Virginia	2,434,700	2,658,500	2,823,800	2,957,700	3,082,200

Source: (Metropolitan Washington Council of Governments, 2006)

Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low Income Populations," requires Federal agencies to identify and address potential disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations (EO 12898, 2/11/1994; *http://www.archives.gov/federal-register/executive-orders/pdf/12898.pdf,* [accessed June 2011]). The Presidential Memorandum accompanying this Executive Order further directs Federal agencies to improve opportunities for community input and the accessibility of meetings, documents, and notices (Presidential Memorandum, 2/11/1994; *http://govinfo.library.unt.edu/npr/library/direct/memos/21a6.html* [accessed June 2011]).

In creating table 3.6 below, we used the definitions provided by the USCB for race, ethnicity, income and poverty.

Table 3.6. Regional Environmental Justice Detailed Characteristics

	Fairfax County, Virginia	Prince William County, Virginia
Race and Ethnicity (from year 2009)		
White persons	73.8%	68.3%
Black Persons	7.1%	20.8%
American Indian and Alaska Native persons	0.4%	0.5%
Asian persons	16.2%	7.4%
Native Hawaiian and Other Pacific Islander	0.1%	0.2%
Persons reporting two or more races	2.4%	2.8%
Persons of Hispanic and Latino origin	14.2%	18.7%
White persons not Hispanic	61.0%	51.6%
Income and Poverty (from year 2000)		
Median household income	$67,642	$87,973
Per capita income	$31,427	$25,641
Persons below poverty level (from year 2008)	5.6 %	5.3%

Source: United States Census Bureau, 2010

In creating table 3.7 below, we used the following definitions:

- Minority population includes persons who are members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.
- **Low-income population** includes persons living below the poverty line.

Table 3.7. Regional Environmental Justice Summary Characteristics

	Fairfax County, Virginia	Prince William County, Virginia
Minority Population (as percent of total population)	38.0	64.3
Low-income Population (as percent of total population)	5.6	5.3

Source: United States Census Bureau, 2010

Local Socioeconomic Setting of Mason Neck and Featherstone Refuges

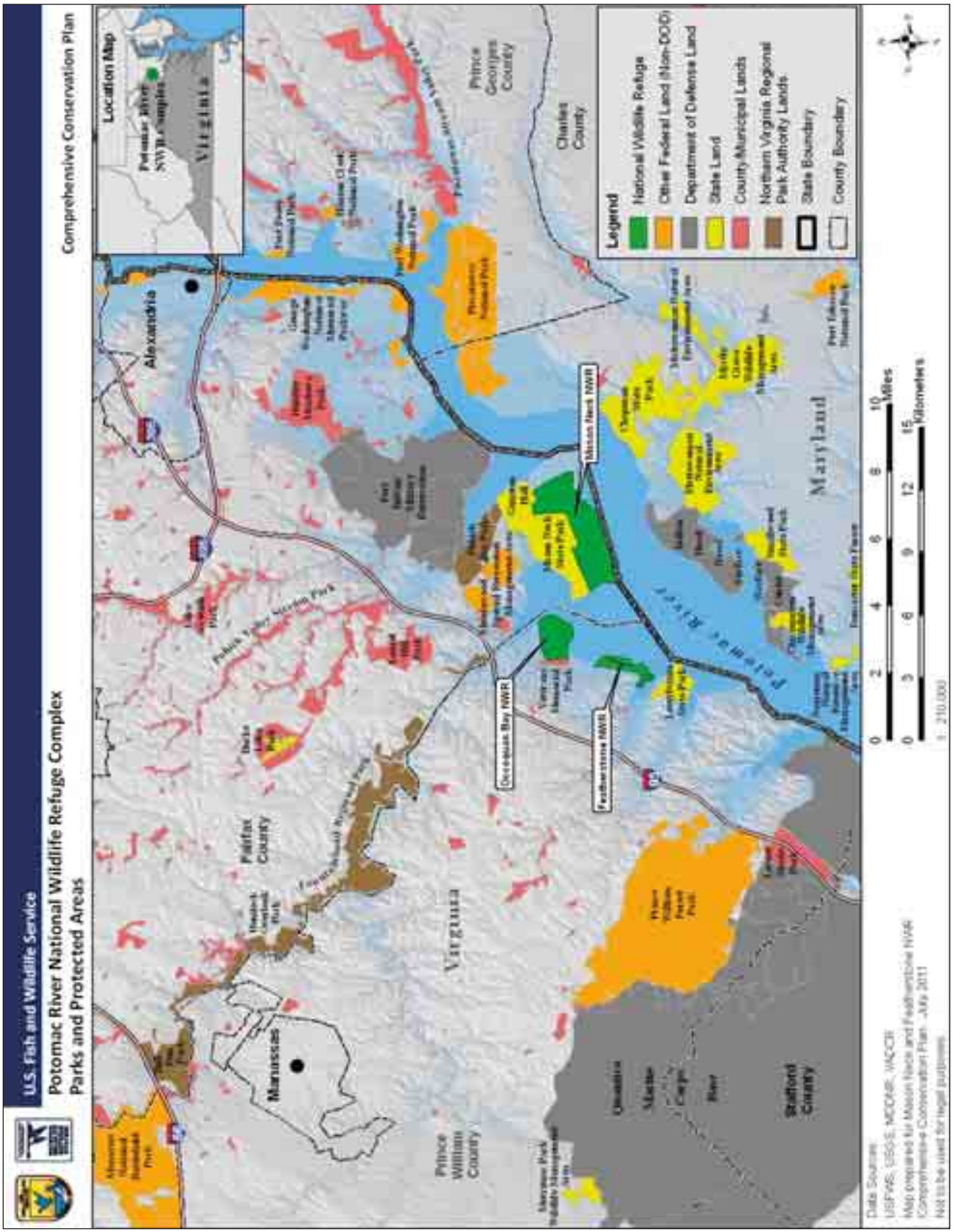
The same factors of burgeoning population and development, and resulting recreation and "green space" demand, influence decisionmaking across the Potomac River Refuge Complex. However, the local socioeconomic settings of Mason Neck Refuge on the Mason Neck Peninsula, and Featherstone Refuge in the Woodbridge section of Prince William County, differ sufficiently to be treated separately in the respective refuge profiles that follow in this chapter.

Regional Parks and Protected Lands

Map 3.1 shows parks and protected areas in the vicinity of the Refuge Complex. The total land area of the map is approximately 576,000 acres. About one-quarter of the area falls under parks and protected lands comprised as follows:

- Federal Agencies, not including Department of Defense—approximately 27,000 acres

Map 3.1. Parks and Protected Areas



- Department of Defense—approximately 73,500 acres
- State Agencies—approximately 13,500 acres
- Northern Virginia Regional Park Authority Land—approximately 6,400 acres
- County/Local Park Land—approximately acres 21,000 acres

The data are from the Virginia Department of Conservation and Recreation (VDCR) at: *http://www.dcr.virginia.gov/land_conservation/tools02a.shtml* (accessed June 2011) and the Maryland Department of Natural Resources (MDNR) at: *http://dnrweb.dnr.state.md.us/gis/data/* (accessed June 2011).

VDCR is the lead agency in developing the Statewide Conservation Lands Database to include State, Federal, private, and locally managed lands and conservation easements. VDCR is also responsible for tracking Virginia's progress towards the Chesapeake Bay 2000 Agreement land conservation goal of protecting 20 percent of the Chesapeake Bay watershed.

Special Regional Conservation Areas and Activities

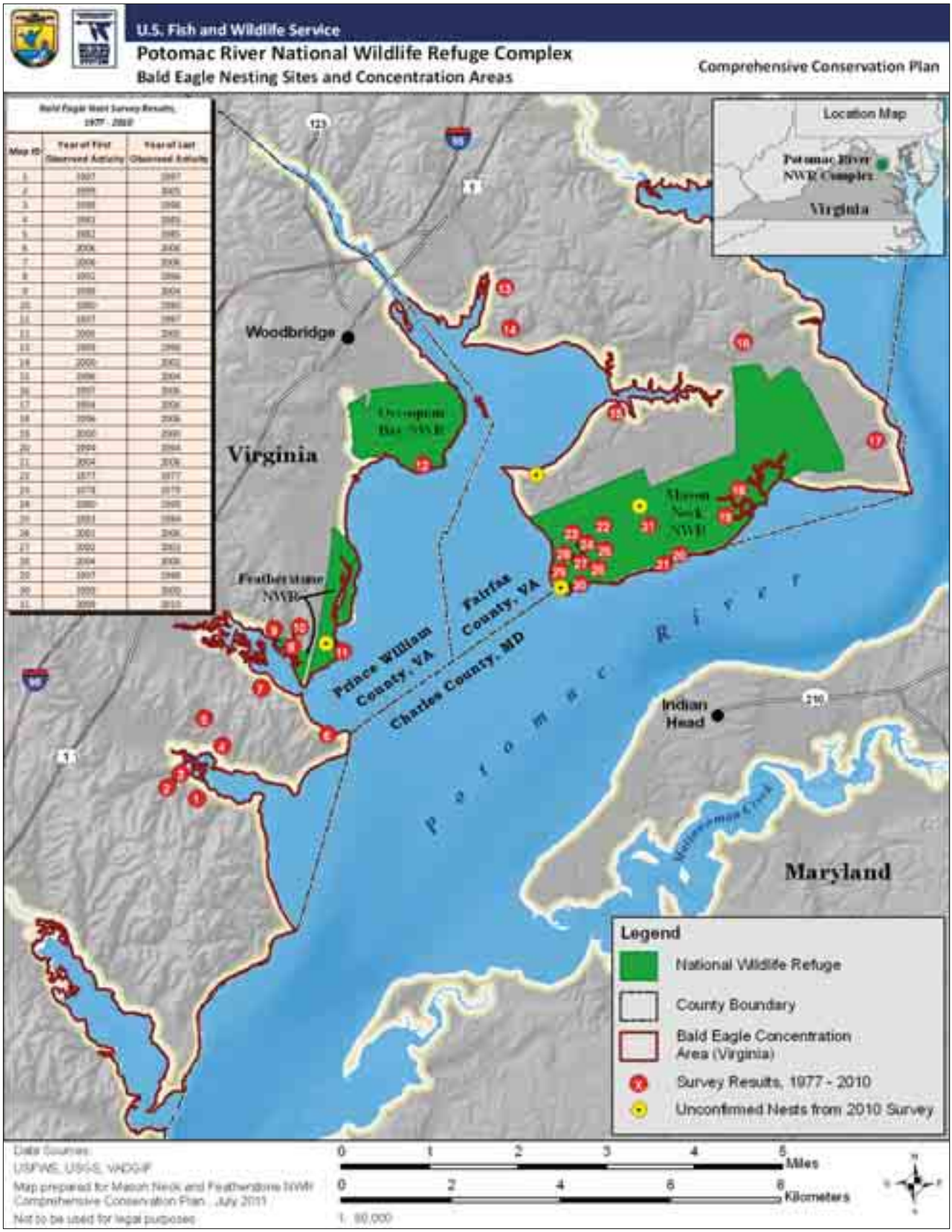
Atlantic Coast Joint Venture—Potomac River Focus Area

The Refuge Complex is located in the Atlantic Flyway along a major tributary of the Chesapeake Bay in the ACJV's Lower Potomac River Focus Area (map 1.5). The Potomac River Focus Area is located in northern Virginia encompassing 416,551 acres. The area as a whole is considerably developed, as would be expected in northern Virginia. The brackish and freshwater tidal wetlands are relatively undeveloped and provide a wide diversity of habitat for many waterfowl species. The Potomac River proper is under the jurisdiction of Maryland and is not included in the focus area. The adjacent marshes are located in Virginia and are included. These marshes are composed of highly brackish *Spartina* spp. marshes near the mouth of the Potomac River to freshwater *Peltandra* spp., *Lotus* spp., and wild rice marshes inland. Historically, hardwood forests dominated areas beyond the river. These forests have given way to row crop agriculture, commercial and industrial farms, horse/hobby farms, loblolly pine *(Pinus taeda)* plantations, and residential and industrial development. In recent historical times, the shallow water areas of the Potomac River have a history of high-density SAV beds which are important habitat for waterfowl, fish, and other aquatic species.

Priority Waterfowl
Fourteen priority waterfowl species use the refuge for wintering and migration habitat: American black duck, mallard *(Anas platyrhynchos)*, northern pintail *(Anas acuta)*, greater and lesser scaup (*Aythya* spp.), wood duck *(Aix sponsa)*, American wigeon *(Anas americana)*, canvasback *(Aythya valisineria)*, common goldeneye *(Bucephala clangula)*, redhead *(Aythya americana)*, bufflehead *(Bucephala albeola)*, gadwall *(Anas strepera)*, ring-necked duck *(Aythya collaris)*, and ruddy duck *(Oxyura jamaicensis)*. The dabbling duck species use flooded marshes and the adjacent rivers and lakes for food in the form of invertebrates, plant material, and seeds. Scaup use the adjacent open-water marshes to feed on SAV, and other invertebrates. Several other priority species heavily utilize these same areas for foraging and loafing. Wood ducks abound in the emergent wetlands for brood rearing and staging in the early fall. Table 3.8 outlines waterfowl usage of the Potomac River focus area.

Other Priority Bird Species
This focus area supports nearly 25 percent of the coastal population of bald eagle in Virginia (map 3.2). Waterfront development and increased urbanization is the

Map 3.2. Bald Eagle Nesting Sites and Concentration Areas



most important limiting factor on the distribution and future population trends of bald eagle and many other species in this area. Small, narrow fragments of bottomland and swamp forest border Potomac River tributaries but represent a relatively minor component of this area compared to other focus areas in coastal Virginia. However, these forested wetlands provide habitat for migratory birds of conservation concern such as Acadian flycatcher, yellow-throated vireo, northern parula *(Parula americana)*, and prothonotary warbler. Small, isolated populations of Swainson's warbler and worm-eating warbler may be found in forested wetlands with dense understory vegetation. Tidal marshes are irregularly distributed along the shores of the Potomac River but are extensive along some of the associated creeks and tributaries. These habitats are important for Virginia rail *(Rallus limicola)*, sora *(Porzana carolina)*, American bittern *(Botaurus lentiginosus)*, and least bittern *(Ixobrychus exilis)*. Marshes in the lower salinity zones and upper reaches of the Potomac River also support king rail. Historical records indicate that the coastal plain swamp sparrow *(Melospiza georgiana nigrescens)* inhabited these areas as well. However, their complete distribution among the marshes in this focus area is unknown.

Table 3.8. Waterfowl Species using the Potomac River Focus Area

Species	Breeding	Migration	Wintering
Mallard	X	X	X
Black Duck	X	X	X
Wood Duck	X	X	
Hooded Merganser	X	X	
Greater Scaup		X	X
Lesser Scaup		X	X
Redhead		X	X
Canvasback		X	X
American Wigeon		X	X
Green-winged Teal		X	X
Blue-winged Teal		X	
Ring-necked Duck		X	X
Tundra Swan		X	X
AP Canada Goose		X	X
Gadwall		X	X
Ruddy Duck		X	X
Bufflehead		X	X
Red-breasted Merganser		X	X

Migratory Bird Conservation Concerns and Needs

The ACJV has identified many threats to migratory birds. Additional development of riparian and forested areas remains a major concern for forest-dependent migratory birds. Increasing stormwater runoff, increased siltation, and chemicals associated with urbanization continue to degrade water quality. Increasing boat traffic may affect habitat quality for waterfowl by creating disturbances in resting, foraging, and nesting areas, and may push them into less favorable sites.

Continued acquisition and protection of land in a series of conservation corridors will help this area retain its importance for migratory birds. Previously converted crop fields and farmed wetland pasture that are restored to wetland habitat provide excellent waterfowl habitat and receive high use in these areas. Continued restoration of these sites will help wintering and staging waterfowl populations. The preservation of bottomland hardwood forest for nesting wood duck and other forest-dependent cavity nesting migratory birds is also important.

Regional Bald Eagle Monitoring

The Service formed the Chesapeake Bay Bald Eagle Recovery Team in 1977 (Abbott, 1977). This team was tasked with developing a plan for the recovery of the bay population. As part of this process, state wildlife agencies assumed the responsibility for population monitoring. As the State agency responsible for wildlife management, VDGIF is responsible for bald eagle monitoring and management in Virginia.

The primary focus area for the Virginia bald eagle breeding survey includes the tidal reaches of bay tributaries and the lower Delmarva Peninsula (map 3.2). All bay tributaries in Virginia are systematically surveyed to determine the extent of tidal influence on each of them. These drainages encompass nearly all historic records of breeding eagles in Virginia and continue to support the vast majority of the population. Map 3.2 also depicts nest survey results through 2010. Several nests from the 2010 survey are still unconfirmed but will be verified in 2011.

The Virginia bald eagle survey measures breeding activity and productivity via a standard two-flight approach (Fraser et al., 1983). All bald eagle nests detected are plotted on 7.5 minute topographic maps and given a unique alpha-numeric code. Each nest is examined to determine its condition and activity status. A breeding territory is considered to be "occupied" if a pair of birds is observed in association with the nest and there is evidence of recent nest maintenance (e.g. well-formed cup, fresh lining, and structural maintenance). Nests are considered to be "active" if a bird is observed in an incubating posture or if eggs or young are detected in the nest (Postupalsky, 1974). The second survey flight is conducted from late April through mid-May to check active nests for productivity.

Lower Potomac River—Important Bird Area

Description

The Lower Potomac River IBA is located in Fairfax, Stafford, King George, and Prince William Counties (map 1.5). The IBA area covers 281,024 acres, at elevations ranging from 0 to 282 feet above sea level. We mention in chapter 1 that we referenced Audubon's IBA program goals in developing this CCP. We also describe in chapter 1 the Lower Potomac River IBA's significance to birds.

USFWS

Wood duck

The tidal fresh/oligohaline reach of the Potomac River included in the IBA extends from Mathias Point to just above Fort Belvoir. The river is wide along this stretch with several large tributaries. Tributaries contain considerable emergent and forested wetlands. Surrounding uplands support extensive tracts of hardwoods that are increasingly giving way to residential development. The area lies within the extreme inner coastal plain and has a great deal of topographic relief that has led to the development of a diversity of upland habitats. Due to its close proximity to the Nation's capital, the area includes many historic properties and landmarks.

Protection
Due to its size, history, and proximity to Washington, D.C., the tidal fresh reach of the Potomac River in this IBA contains many tracts of land dedicated to conservation, education, military training, and recreation. Both the Service and the U.S. Department of Defense hold lands that are strategically important for conservation. Virginia also maintains several tracts of land that are State parks or natural area preserves. The NVRPA and individual counties own other lands for recreational access.

Conservation and Threats
Audubon's IBA program identifies the dominant threat to the avifauna within this area as habitat loss from urban expansion extending down the river from Washington, D.C. Jurisdictions within the area are experiencing some of the fastest human growth rates in the nation. This growth is causing the rapid loss of habitat for many species. All of the upland habitats are in immediate danger from development. The increase in the human population has lead to an increase in the demand for access to the waterway for recreational boating. Increase in boating activity and associated disturbance is the greatest threat to the bald eagle concentration area. In recent years, increases in disturbance along important shorelines appear to be limiting bald eagle use of the area during peak times of the year. In the future, rapid development of private lands will elevate the importance of government and conservation lands for the management of sensitive species. Maintaining continuity in the mission of these lands as it pertains to population protection will be important (Audubon VA, 2006).

Virginia Natural Heritage Program Conservation Sites

The VDCR's Natural Heritage Program (VNHP) maintains a Biotics Data System of occurrences natural heritage resources throughout Virginia. Areas where important natural heritage resources occur are called "conservation sites." These conservation sites represent areas for possible conservation action due to the presence of natural heritage resources, such as rare plants, animals, or natural communities. Conservation sites are also ranked by biodiversity significance based on the rarity, quality, and amount of natural heritage

Mason Neck Refuge Conservation Sites
Mason Neck Refuge is located in the Mason Neck—Sycamore Point Conservation Site (moderate biodiversity significance ranking). This site supports two important natural heritage resources: bald eagles and tidal freshwater marsh. Two other conservation sites are in the vicinity of the refuge. The Mason Neck State Park—Kane Creek Headquarters Conservation site (moderate biodiversity significance ranking) and the High Point NE Conservation Site (general biodiversity significance ranking) both support the following natural heritage resources: bald eagles and colonial wading bird colonies.

Featherstone Refuge Conservation Sites
Featherstone Refuge is located within the Neabsco Creek Conservation Site (general biodiversity significance ranking) that supports bald eagles. The refuge is also in the vicinity of the Powell Creek Conservation site (high biodiversity significance ranking), which supports both bald eagles and tidal freshwater marsh.

Potomac River Refuge Complex Administration

Refuge Complex Staff

The Refuge Complex staff manages and carries out duties related to Mason Neck, Featherstone, and Occoquan Bay Refuges. The full-time staff currently consists of a refuge manager, an assistant refuge manager, an administrative assistant, a visitor services specialist, a maintenance worker, and a law enforcement officer.

Refuge Complex Budget

Neither Mason Neck nor Featherstone Refuge receives specific funding—all funding is at the Refuge Complex level to support staff and projects on all three refuges. Federal budgets are complex, with funding sources which often have restrictions on where and how the funding can be used. The basic budget consists of funding for operations and maintenance which are defined in more detail below. A station may also receive a variety of additional funds for specific purposes. This funding can be for replacement of equipment, construction projects, major repairs to facilities, support of a specific activity such as burning, or to fund or support a specific project. While this type of funding can represent a significant portion of a station's overall budget, it is a one-time, project-specific allocation. As such, a station budget appears to have huge differences from year to year, which can be difficult to interpret without explanation. Table 3.9 shows the annual operations and maintenance budget of the Potomac River Refuge Complex from 2002 to 2009. Some of the additional project funds are also listed for reference.

Operations

This funding covers all operational costs including salaries, utilities, fuel, supplies, rent, training, travel, etc. The amount of funding left after all of the above operational costs are covered is the amount of money a station has to spend at its discretion. This "discretionary" money is used to accomplish projects, cover unanticipated expenses such as fuel increases, major repairs to equipment, clean up and repairs after major storms, employee overtime, etc. If a station does not have enough funding to cover the unanticipated cost or complete a project, it must be deferred until the next fiscal year. Over the past 3 years the "discretionary" funds in the budget has averaged $18,500. Only basic operations funds are included in table 3.9.

Maintenance

This funding is provided for a station to cover annual maintenance of buildings and equipment, and to cover minor repairs. In addition to annual maintenance funds, a station may receive funds targeted for replacement of equipment, major repairs to a facility, or for the rental of specialized equipment that the refuge would need to complete a project such as a forklift. These funds can be a significant part of the maintenance budget but are one time funding that varies from year to year. Only annual maintenance funds are included in table 3.9.

Table 3.9. Potomac River Refuge Complex Annual Budget from 2002-2009

Year	Operations	Maintenance	Additional Targeted Funds
2002	$415,100	$16,900	$97,000 Great Marsh Trail improvements
2003	$409,900	$16,900	$147,000 Visitor enhancement projects
2004	$466,500	$15,500	$93,000 Radio system replacement
2005	$483,500	$15,200	$15,000 Equipment rental funds
2006	$560,800	$15,500	$16,000 Equipment rental funds
2007	$556,614	$15,500	$61,655 Roof replacement, equipment
2008	$689,525	$15,500	$211,982 Dump truck, equipment rental
2009	$715,348	$15,500	$11,673 Equipment rental, challenge cost share, environmental compliance

Administrative Facilities

Headquarters Office

The office for the Refuge Complex is located in Woodbridge, Virginia, about 9 miles from Mason Neck Refuge, and 1 mile from Occoquan Bay and Featherstone Refuges. The office is in a small rental space in a strip mall (USFWS, 2005a). The

Service is planning to build a new visitor contact station/headquarters facility at a site on Occoquan Bay Refuge. That project was addressed in separate NEPA documentation and approved in 2009. Contact refuge headquarters for additional information.

Maintenance Facility
The primary maintenance facility for the Refuge Complex is located on Mason Neck Refuge. This facility consists of several small buildings and storage sheds within a fenced compound. The compound is also used for vehicle and equipment storage.

The Friends of Potomac River Refuges

The Friends of Potomac River Refuges (Friends Group) is an organization which supports the Refuge Complex goals. The purpose of this non-profit group is to promote conservation, awareness, and appreciation of the wildlife and habitats of the Refuge Complex, and to provide assistance to refuge programs. The group hosts special events and programs related to the Refuge Complex. For more information regarding the Friends Group, you can visit their Web site at: *http://www.foprr.org/* (accessed June 2011).

Activities of the Friends Group include the following:

- Designing and constructing interpretive signs for self-guided nature trails
- Developing a draft interpretive plan for Occoquan Bay Refuge
- Funding, designing, and erecting eight interpretive panels through a grant from Gateways
- Purchasing nets and storage shed for bird banding station, which has banded more than 3,000 birds
- Advocating for Federal funds for facilities, staff, and programs
- Demolishing and removing 60 feet of unsafe bridge at Mason Neck Refuge
- Conducting dozens of interpretive programs highlighting the flora and fauna of the refuges
- Surveying plants, insects, birds, and mammals on the refuges
- Co-sponsoring a forum on the Virginia Wildlife Action Plan
- Partnering with Virginia Dominion Power to construct public use facilities at Occoquan Bay Refuge.
- Participating in local and international events:
  - Elizabeth Hartwell Environmental Education Eagle Festival at Mason Neck State Park
  - Exxon Mobil shoreline cleanup
  - Youth fishing event
  - Photo contest
  - International Migratory Bird Day
- Partnering with refuge staff to present an annual Fall Wildlife Festival

Mason Neck Refuge Environment

Refuge Establishment and History

Refuge Size and Location

The 2,277-acre Mason Neck Refuge is located on the Mason Neck Peninsula in Lorton, Virginia. It is on the western shore of the Potomac River and approximately 18 miles south of Washington, D.C. The refuge is bounded by the Potomac River to the south and west, Mason Neck State Park and Gunston Hall Plantation (a State-owned historic site) to the north, and private housing developments to the east (Friends, 2009).

The Mason Neck Peninsula is surrounded by Gunston and Pohick Coves on the north, the Potomac River on the east, and Occoquan and Belmont Bays on the south. Mason Neck forms the southernmost section of Fairfax County in northern Virginia, and comprises an area of approximately 9,000 acres, two-thirds of which is preserved as parkland by regional, State, and Federal authorities (MNCA, 2004). Mason Neck is named for colonial patriot and founding father George Mason, whose estate, *Gunston Hall*, is preserved near the base of the peninsula (WAMU, 2008).

Establishing Authority and Purpose

When a major development was proposed for the Mason Neck Peninsula in the 1960s, local residents, working with The Nature Conservancy to protect the area and the bald eagles that frequented there, brought their concerns to the attention of local, State, and Federal agencies. In response to these concerns, the Service purchased 845 acres of land from The Nature Conservancy and officially established Mason Neck Refuge on February 1, 1969 (MNCA, 2004). Additional lands were subsequently acquired by the Service, and another 789 acres were incorporated into the refuge in 1982 under a 60-year lease from the NVRPA (map 3.3).

Establishing Purposes and Authorities

Mason Neck Refuge has several official purposes:

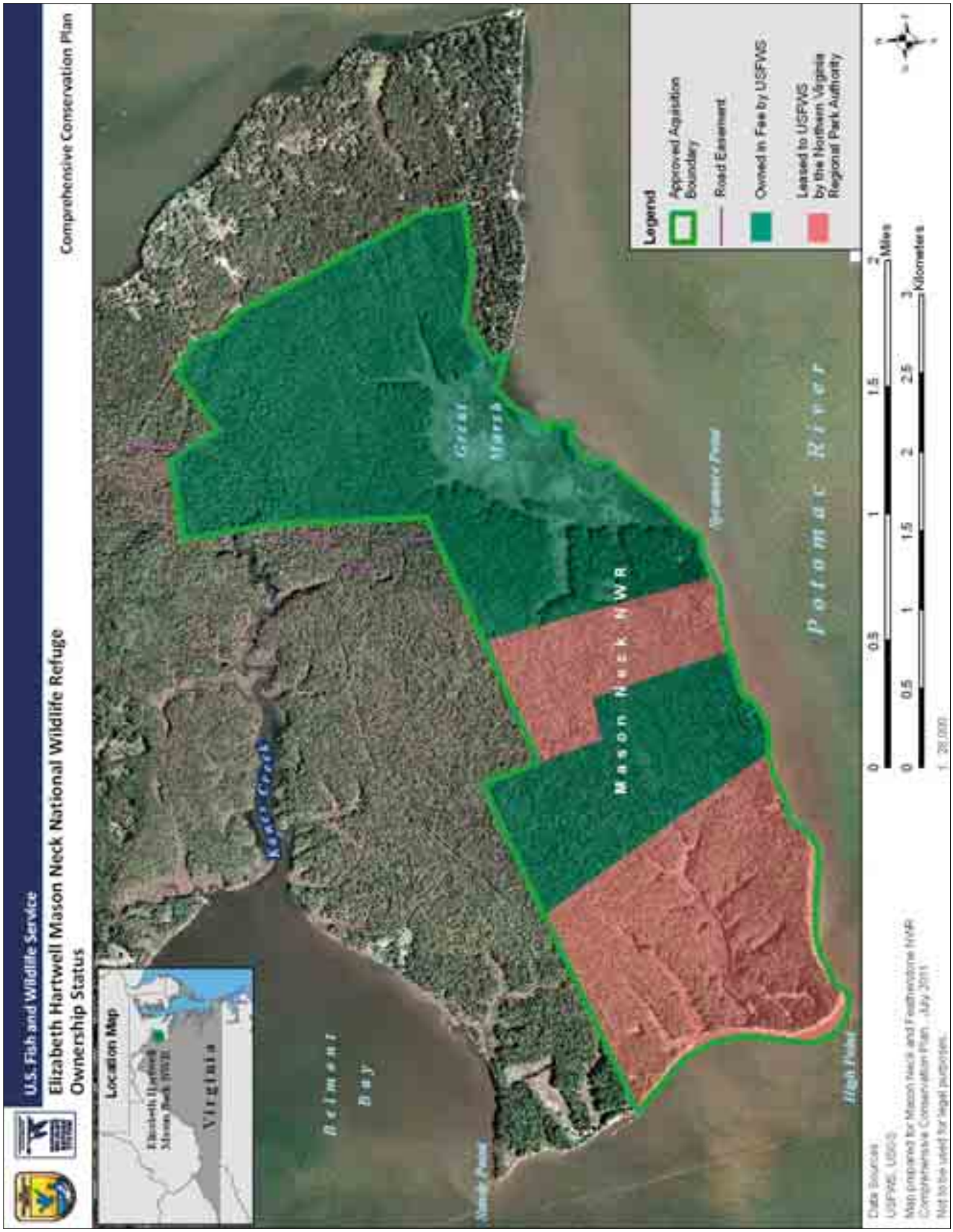
- Lands acquired under the Endangered Species Act were "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species …. Or (B) plants …" (16 U.S.C. § 1534).
- Lands acquired under the Refuge Recreation Act were found to be "… suitable for—(1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 U.S.C. § 460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" (16 U.S.C. § 460[k]–460[k] [4]).
- Lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b).
- Lands acquired under the Migratory Bird Conservation Act were "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d).

Administrative Changes since Refuge Establishment

Creating a Refuge Complex

Until 1974, Mason Neck Refuge was a subunit of Blackwater Refuge, located in Cambridge, Maryland. In 1974, it became an independent unit with a manager

Map 3.3. Mason Neck Refuge Ownership Status



and two nearby subunits of its own—Marumsco Refuge (which later became Occoquan Bay Refuge) and Featherstone Refuge (USFWS, 2005a). With the establishment of Occoquan Bay Refuge in 1998, which combined land previously acquired as Marumsco Refuge with newly acquired military surplus lands, Mason Neck, Featherstone, and Occoquan Bay Refuges were administratively reorganized into the current Potomac River Refuge Complex. Their proximity to each other and their growing management complexity warranted this new administrative status.

Refuge Name Change to "Elizabeth Hartwell Mason Neck" Refuge
In 2005, the name of the refuge was officially changed to Elizabeth Hartwell Mason Neck National Wildlife Refuge in honor of Elizabeth Hartwell, a long-time conservationist with significant contributions to protecting the natural landscape on the Mason Neck Peninsula and elsewhere in the region. Ms. Hartwell, a resident of Mason Neck, spearheaded the movement to protect habitat on the peninsula. Through her efforts, The Nature Conservancy ultimately purchased much of the land on the peninsula for later resale to local, State, and Federal governments. Ms. Hartwell also petitioned Congress for the initial $3 million appropriation to purchase land for the refuge. While part of the broader regional preservation movement, she is often referred to as the single most important person responsible for creation of the refuge and the Mason Neck State Park.

Public Access
Access to Mason Neck Refuge for five out of the six priority wildlife-dependent public uses (wildlife observation, photography, environmental education, interpretation, and hunting) currently occurs via foot access. Two trails, the Joseph V. Gartland, Jr. Great Marsh Trail (Great Marsh Trail) and the Woodmarsh Trail, provide access to forest habitat and viewpoints along Great Marsh. The High Point Trail is used solely to provide safe access for pedestrians through the refuge to Mason Neck State Park. The High Point Trail is the only trail on the refuge that allows bicycles, rollerblades, and other modes of recreational non-motorized pedestrian travel. High Point Trail and Great Marsh Trail are accessible and allow mobility-impaired visitors access to the natural beauty of the refuge. Parking to access the refuge can be found at the trailheads of Great Marsh and Woodmarsh Trails. See the section on "Visitor Services" for more details on the refuge's priority public use programs.

Some areas of the refuge are closed to public access, or to certain activities, because of concerns with disturbing wildlife or impacting sensitive habitat. For example, a significant area of the refuge is closed to migratory bird hunting by Director's Order. In 1969, the Director of the Bureau of Sport Fisheries and Wildlife, which was what the Service was called at that time, closed Great Marsh to migratory bird hunting to protect bald eagles (34 FR 15627; Oct 9, 1969). This concern with disturbance to wildlife and sensitive habitats, coupled with concerns about accelerating shoreline erosion, are the reasons we also do not allow fishing on the refuge. The most current information on refuge closures can be obtained at Refuge Complex headquarters.

Community Demographics and Planning

Mason Neck Peninsula Demographics
Because of its location, recent history of land management decisionmaking, and aggressive opposition to development, the Mason Neck Peninsula community contrasts sharply with Fairfax County overall. While the county population density is 2,455 per square mile, Mason Neck population density is 93 per square mile. The peninsula also has a median household income $8,600 higher than the county median and housing values $60,000 higher than the county average based on 2000 census figures (USCB, 2007).

Other Public Lands of the Mason Neck Peninsula
Since 1949, the Virginia Division of Historic Resources (VDHR) has protected the Gunston Hall Plantation site. Around the time of refuge establishment, the VDCR purchased the land to establish Mason Neck State Park adjacent to the refuge and the NVRPA bought the Pohick Bay Regional Park. NVRPA also purchased the Potomac Shoreline regional parks, which they subsequently leased to the Service. Together the Service, BLM, and these other agencies have acquired more than 6,400 acres on the peninsula (USFWS, 2004).

A series of events threatened Mason Neck peninsula in the late 1960s and early 1970s. After plans for a proposed beltway through the area were dropped in 1967, an airport, a natural gas pipeline, a landfill, and a sewer line were proposed for the area. These proposals met strong opposition from groups such as the Mason Neck Conservation Committee. Plans for the projects were dropped because of the potential negative impact each had on Mason Neck Refuge and Mason Neck State Park. Mason Neck State Park opened to the public in April 1985 (VDCR, 2006a).

The refuge, along with Mason Neck State Park, the Pohick Bay Regional Park, the Gunston Hall Plantation, and the BLM, cooperate in the management of their combined lands on the Mason Neck Peninsula with each agency focusing on their strengths of natural resource management, recreation, interpretation, and preservation. This cooperation provides a wide variety of recreational activities while protecting natural resources and avoiding duplication of facilities and programs (USFWS, 2004).


Tim Williams
Eastern bluebird

Mason Neck State Park
Mason Neck State Park (1,804 acres) is directly adjacent to Mason Neck Refuge along the refuge's northern boundary. The park attracts migrating and non-migrating species of birds, including tundra swans and a variety of waterfowl. Like Mason Neck Refuge, bald eagles also inhabit the park. The park also features several hundred acres of hardwood forests consisting of oaks, holly, hickory, and other species. Several wetland areas important to area wildlife are also found within the park.

Hiking, biking, and self-guided trails wind through the park. Elevated walkways allow visitors to explore some of the marsh areas in the park. Fresh and brackish water fishing are available from car-top boat launch facilities. The park rents kayaks and canoes to explore Belmont Bay or Kane's Creek. Deer hunting is conducted in coordination with Mason Neck Refuge. The Elizabeth Hartwell Environmental Education Center in the park features exhibits on the plant and animal life of the area, area history and the agencies of the Mason Neck Cooperative Management Area, hands-on activities, a resource library, volunteer exhibit, and roving interpretive displays. This center also provides an opportunity for teachers to conduct environmental studies in natural settings. The facility has a variety of research materials, a mobile wet lab, and a variety of sampling equipment.

The park supports many activities: pond study, birdwatching, canoe trips, fishing clinics, an active volunteer program, night hikes, teacher workshops, hands-on experiential educational opportunities, evening programs, and butterfly gardens. (VDCR, 2006a).

Gunston Hall Plantation
Gunston Hall Plantation is a 550-acre National Historic Landmark located about a mile northeast of Mason Neck Refuge. Gunston Hall is the plantation estate of George Mason, who was the first author of the Virginia Declaration of Rights

and instrumental in the framing of the U.S. Government. The site includes the main house (completed in 1759), gardens, a variety of outbuildings, as well as a graveyard. The outbuildings include a kitchen, dairy, smokehouse, and laundry. Guided tours of the main house, as well as self-guided tours of the outbuildings and grounds, give a glimpse into how the Mason family and their servants and slaves lived during the mid to late 18th century. Several archaeological studies are currently ongoing, with a strong focus on the historical gardens.

The onsite Gunston Hall Library and Archives serves as a resource to scholars interested in George Mason and the plantation. Gunston Hall occasionally hosts lectures, festivals, and other special events. Additionally, student and teacher programs aim to expose schoolchildren to the history of the plantation. For more information on the site visit: *http://www.gunstonhall.org* (Gunston Hall, 2006; [accessed June 2011]).

Bureau of Land Management–Meadowood Special Recreation Management Area

The 800-acre Meadowood Special Recreation Management Area (SRMA), administered by the BLM, is located along Gunston Road in Lorton, Virginia, northwest of Mason Neck Refuge. Meadowood SRMA consists of wooded acreage, open pastures, and support buildings. Support buildings on the property include a stable, indoor riding arena, and blacksmith shed. There are also three former residences on the property which have recently been converted into office space, temporary quarters, and an environmental education and interpretive center. The farm roads that traverse the property are planned to be used as recreational trails. The Meadowood Farm was privately owned until the BLM acquired it on October 18, 2001, under the authority of the 2001 Washington, D.C. Appropriations Act. Section 165 of this act authorized a complex set of land transactions facilitated by Fairfax County. These resulted in the acquisition of Meadowood Farm by BLM in exchange for federally owned land in the former Lorton Correctional Complex (BLM, 2004).

Management of the Meadowood SRMA focuses on three core programs: recreation, environmental education, and wild horses and burros. The goals and objectives of these programs and activities are balanced with the goals and objectives of the natural and cultural resource management programs. Boarding of private horses is allowed, as well as horse-related programs that the BLM determines are appropriate. Wildlife, vegetation, and riparian/wetland management focuses on species diversity, quality, protection, and enhancement in balance with visitor-use activities (BLM, 2004).

Pohick Bay Regional Park

Pohick Bay Regional Park is a 1,002-acre scenic shoreline park managed by the NVRPA. The park, located in the upper area of the Mason Neck Peninsula, features a large campground (160 acres), 18-hole golf course (460 acres), and a recreational facilities area (382 acres) featuring a large swimming pool, miniature and disk golf courses, 4 miles of equestrian trails, nature trails, and picnic shelters. The park also provides visitors with rental paddle boats, jon boats, sailboats, canoes, and kayaks (NVRPA, 1999).

Refuge Administration

Refuge Revenue Sharing Payments

The Refuge Revenue Sharing Act of 1935 (16 U.S.C 715s), as amended, authorizes revenues and direct appropriations to be deposited into a special fund, the National Wildlife Refuge Fund (NWRF). This fund is used for payments to counties in which lands are acquired in fee title ownership or reserved from the public domain (reserved land) and managed by the Service. These revenues are derived from the sale, transfer, or exchange of

1) products (e.g., timber and gravel);

2) other privileges (e.g., right-of-way and grazing permits); and/or

3) leases for public accommodations or facilities (e.g., oil and gas exploration and development) incidental to, and not in conflict with, refuge purposes.

The act authorizes payments for Service-managed fee lands based on a formula contained in the act that reflects, among other things, the amount of refuge land and its appraised value. Congress ultimately determines each year whether full payment, or a percentage of that full payment, will be made.

Mason Neck Refuge's revenue-sharing payments to Fairfax County from 2003 to 2009 are listed in table 3.10. Revenue-sharing checks are sent by the Service electronically to Fairfax County on an annual basis.

Table 3.10. Refuge Revenue Sharing Payments to Fairfax County, Virginia from 2003-2009

Fiscal Year	Revenue-Sharing Payments
2009	$51,147
2008	$65,923
2007	$68,175
2006	$73,661
2005	$65,224
2004	$73,741
2003	$61,814

Other Current Refuge Plans

In 1989, we prepared an EA to evaluate strategies to control the overpopulation of white-tailed deer that damage refuge habitat. High deer densities in the eastern deciduous forest cause heavy browsing that impacts forest communities, particularly the understory, ground cover, and recruitment of seedlings. Sensitive woody species subjected to heavy browsing will disappear as deer density increases and become replaced by plant species less palatable to deer. This process eventually alters the plant diversity and physical structure of the habitat, which in turn affects the populations and diversity of other species of wildlife. White-tailed deer management can not only improve the health of the deer population itself by eliminating overcrowding and competition for scarcer food resources, but will also improve the health and diversity of the plant and animal community as a whole (USFWS, 2005b). The EA resulted in the development of a refuge hunt plan and the refuge began a managed deer hunt in 1989. In 1993, Mason Neck State Park joined with the refuge to form a single hunting management unit.

In the years since the initiation of the hunt, species such as American holly *(Ilex opaca)*, American beech *(Fagus grandifolia)*, paw-paw (*Asimina* spp.), rhododendron (*Rhododendron* spp.), and eastern red cedar *(Juniperus virginiana)* have rebounded. These species have formed a noticeable mid- and understory layer on some parts of the refuge. However, white-tailed deer overpopulation continues to impact refuge habitats, as evidenced by lack of understory and tree regeneration, even though past hunts have reduced the refuge's deer population. We will continue to manage and monitor the deer

population and their impacts to protect refuge habitats from further damage (USFWS, 2005b).

Special Use Permits
The refuge issues special use permits for various activities such as research, wildlife surveys and censuses, and environmental education. Each request is considered on a case-by-case basis and decisions are based on the following criteria: type, purpose, and appropriateness of activity; whether the activity supports refuge goals; and what kind of impact the activity will have on other users. Prior to issuing a special use permit, the refuge manager evaluates the use's appropriateness and compatibility with the refuge purposes.

Partners
Since the 1960s, the conservation community has learned the importance of building strong partnerships between public agencies and private groups. As noted earlier, Mason Neck Refuge is part of the Mason Neck Cooperative Management Area, which includes BLM-Meadowood, Pohick Bay Regional Park, Mason Neck State Park, and Gunston Hall. The refuge coordinates with those agencies to address and resolve common management issues. VDGIF is also a key partner with the refuge and the other land managers when there are issues or opportunities affecting wildlife or habitat.

Other partnerships encompass a wide array of community organizations and individuals, including but not limited to the following:

- Friends of the Potomac River Refuges
- Audubon Society of Northern Virginia
- Boy Scouts of America
- Girl Scouts of America
- Chesapeake Bay Gateways Network
- The Hartwell Foundation

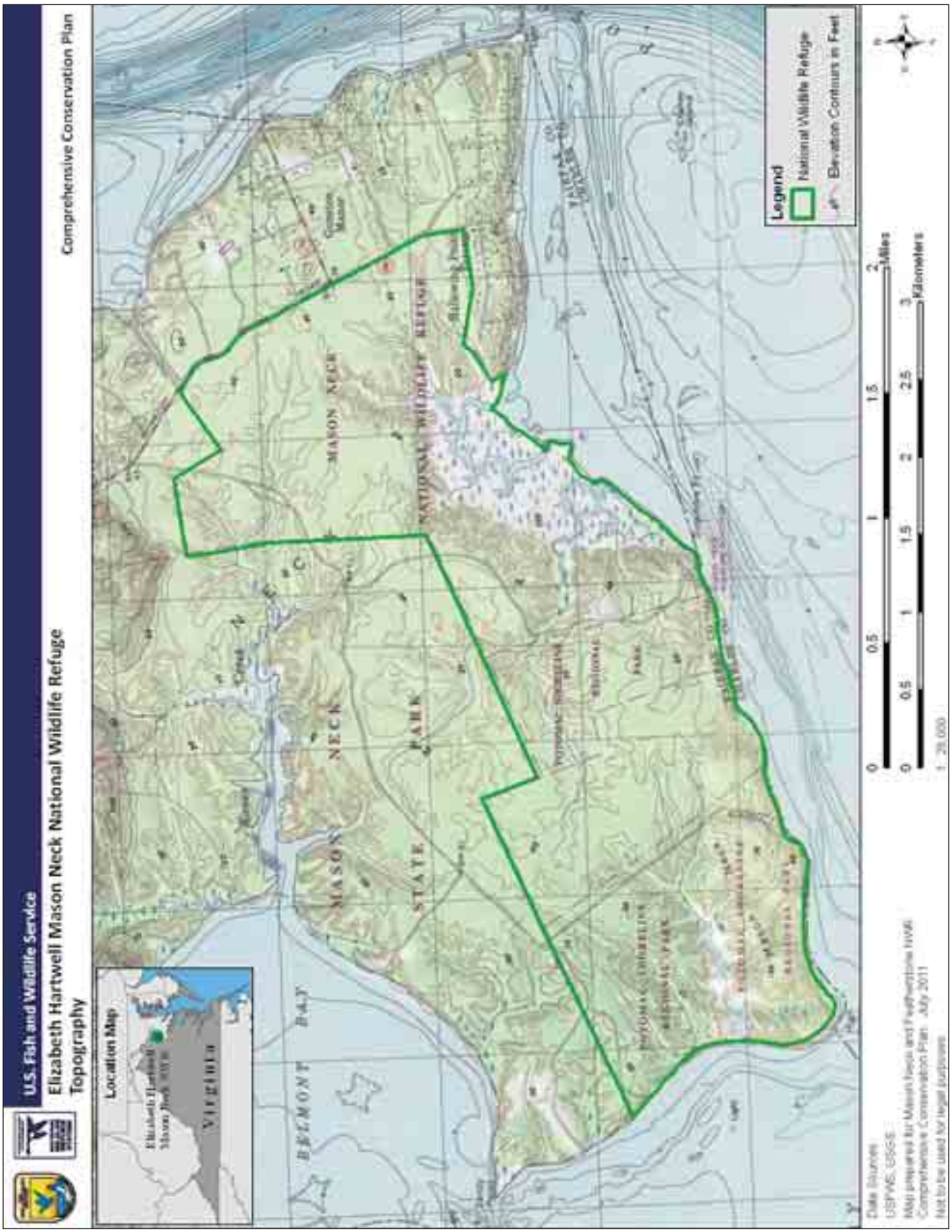
Volunteer Program
Since its establishment in 1969, refuge staff have continuously provided opportunities for volunteers to be involved in research, maintenance, and education. Volunteers contribute hundreds of hours of service each year to provide critical assistance in the maintenance of roads and trails, management of white-tailed deer, and monitoring of populations of bald eagles and great blue heron. In addition, volunteers have completed a variety of projects such as cleaning and painting kiosks, inventory of museum property, mounting of plants for the herbarium collection, and updating databases. The Refuge Complex's visitor services specialist is responsible for the oversight of all volunteer training and activities.

Refuge Terrain and Habitats

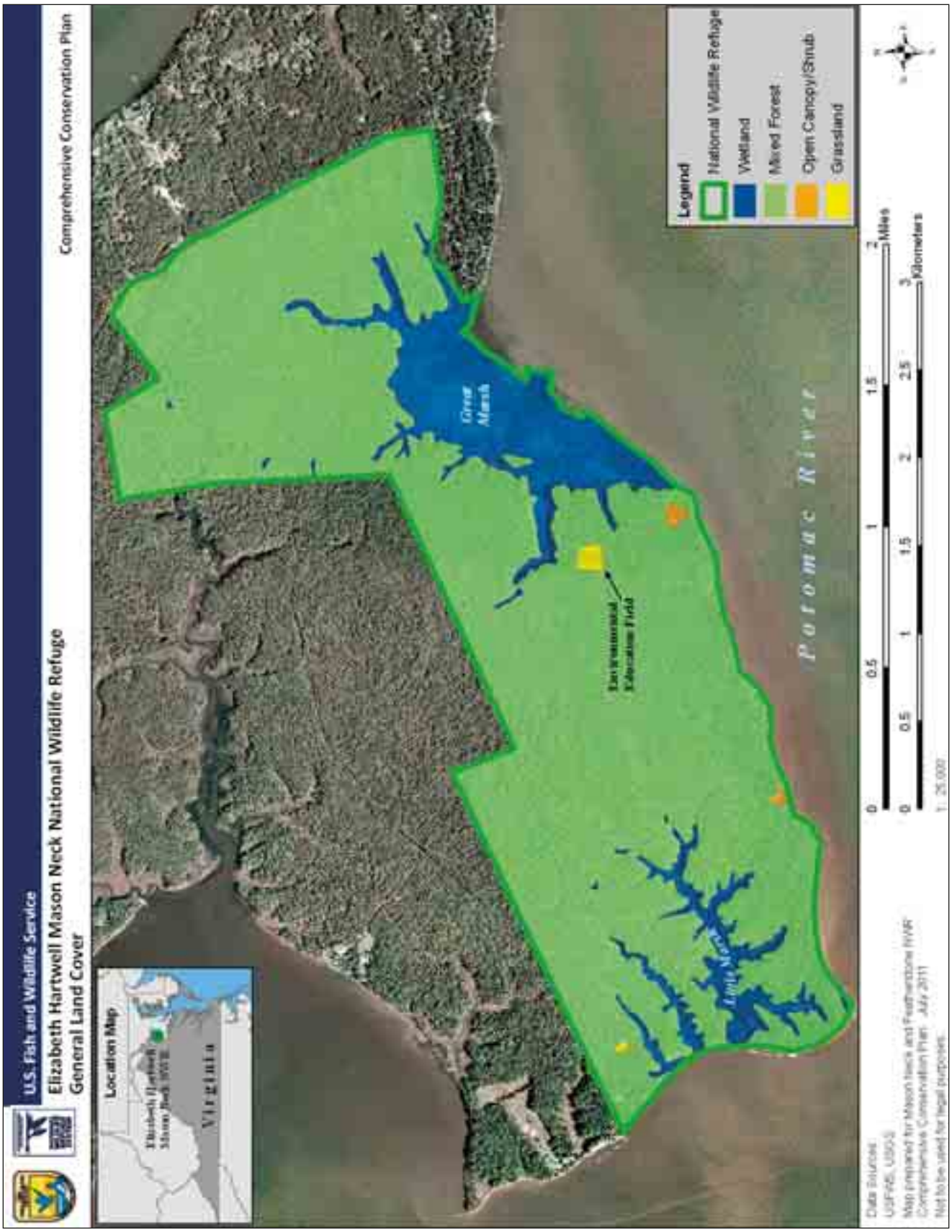
Topography
Inspection of the USGS topographic map (map 3.4) shows that the largest portion of Mason Neck Refuge is upland with relatively gentle relief between 30 and 40 feet above sea level. The shoreline terrain on the banks of the Potomac River consists of narrow beaches just above tidal level. Immediately inland of the beach are 20 to 40 feet high bluffs. At the major drainage outlets of the Great Marsh and Little Marsh, the land shows the dendritic pattern of deeply eroding notches of streams and marsh-vegetated low tidal flats.

Land Cover
Geographic Information System (GIS)-based land cover information from the Service and the USGS is shown on map 3.5. As illustrated on the map, the predominant land cover types on the refuge are mixed forest and wetlands, with

Map 3.4. Mason Neck Refuge Topography



Map 3.5. Mason Neck Refuge General Land Cover



very minor amounts of grasslands and open canopy/shrub cover. The refuge is comprised of 1,883 acres of mixed deciduous upland forest, 364 acres of palustrine and riverine wetlands, 15 acres of grasslands, 10 acres of brush, and 5 acres of administrative buildings, parking and roads (USFWS, 2005a).

Soils and Shoreline

The predominant soil association on the refuge is the Matapeake-Mattapex-Woodstown. It consists of sandy silt loams with more erodible soils along the cliffs (TPL, 2006). Specific soil series at Mason Neck Refuge are depicted on map 3.6 and their characteristics described in table 3.11 based on profiles from the Fairfax County Soil and Water Conservation District below (FC, 2009; USDA-NRCS, 2008).

Between High Point (the southwest point of refuge land at the junction of the Potomac River and Occoquan Bay) and Sandy Point (where Occoquan and Belmont Bays meet) is a 2-mile stretch of west-facing shoreline experiencing erosion. Four minor drainage systems enter Occoquan Bay along this stretch, with Little Marsh the southern-most and Short Marsh the northern-most. Both High and Sandy Points can be seen from the site, as well as Occoquan Bay Refuge across the bay. This exposed stretch of bluffs and creek mouths is what is most subject to heavy erosion. Miller (1983) studied erosion processes, rates, and sedimentation of the tidal Potomac River. One of his study locations occurred across High Point Creek on the bluff opposite Little Marsh Creek. At this location, Miller found that the mean recession rate was approximately 14 inches per year (Miller, 1983). This translates into over 115 feet of shoreline lost in the last 100 years; with even a greater proportional loss at the Little Marsh Creek site.

Lelaina Marin/USFWS

Breakwater structures off Mason Neck Refuge's shoreline

In 2001, the Federal Highway Administration (FHWA) and Virginia Department of Transportation (VDOT) requested and received authorization for construction mitigation activities associated with the Woodrow Wilson Bridge Replacement Project, including constructing three, 250-foot breakwaters near Mason Neck Refuge. These are spaced 50 feet apart which filled in to create 22,500 square feet of State jurisdiction bottomland adjacent to the refuge, and another two, 300-foot breakwaters, spaced 50 feet apart which filled in to create 18,000 square feet of State bottomlands adjacent to Mason Neck State Park (VAMRC, 2000).

The breakwaters were completed in October 2002 and have stemmed major erosion along the refuge's western shoreline. The substrate is accreting behind the breakwaters and the shoreline is actually expanding there. Erosion by wind and runoff is still occurring along the top of the bluff where numbers of mature trees are undermined and lost. In 2002, limited SAV monitoring at these sites occurred. However, since 2002, a steady increase in abundance of SAV has been noticed. The species composition varies but consists of mostly brittle waternymph *(Najas minor)* and *Hydrilla* spp. with a good percentage of *Vallisneria* spp. and *Myriophyllum* spp. mixed in.

Map 3.6. Mason Neck Refuge Soils

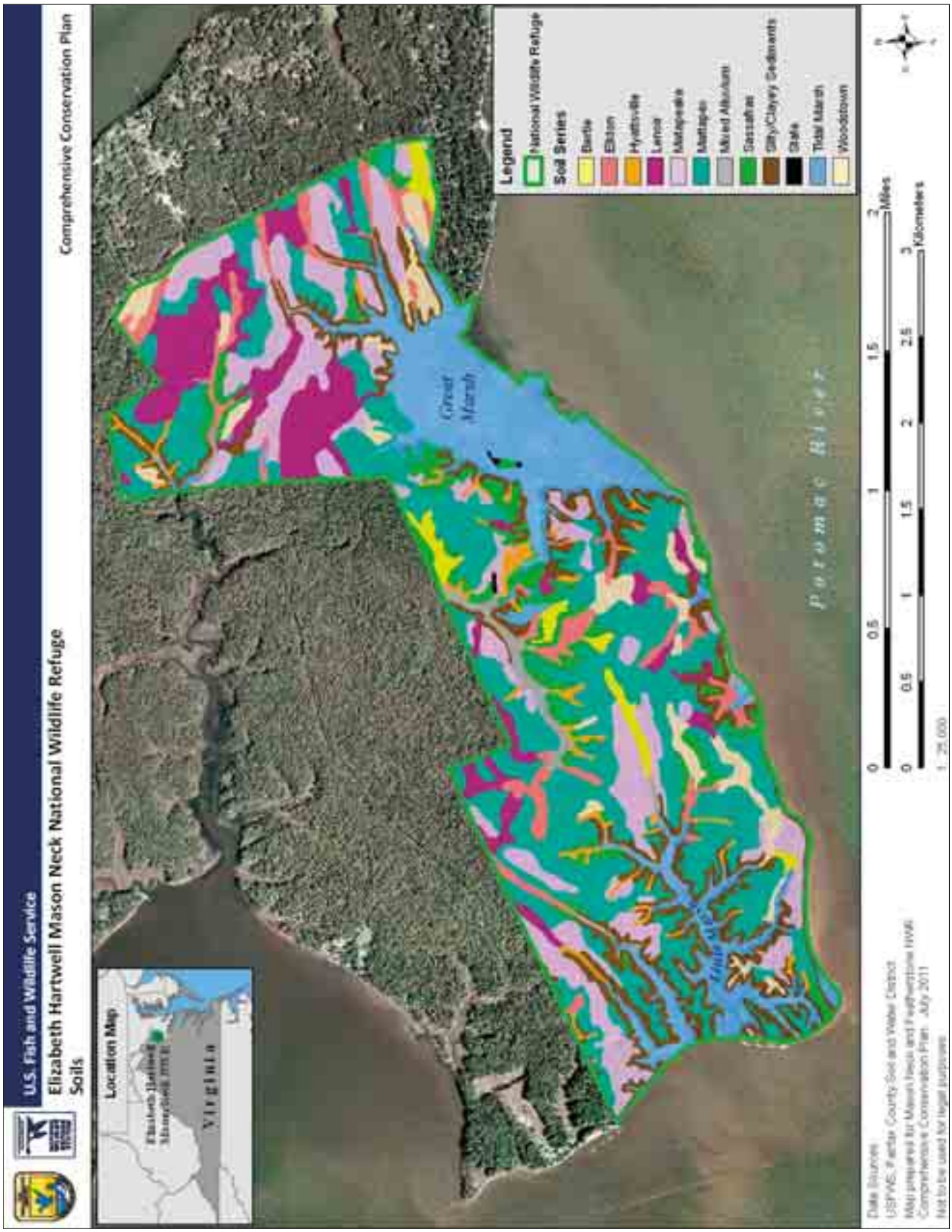


Table 3.11. Characteristics of the Soils of Mason Neck Refuge (Source: FC, 2009; USDA-NRCS, 2008)

Soil Type	Characteristics
Bertie	Predominantly fine, sandy loam sediments on relatively flat landscapes in the Coastal Plain. Very strongly acidic to moderately acidic. The seasonal high water table is 1.5 to 2.5 feet below the surface. Depth to hard bedrock is greater than 50 feet. Somewhat poorly drained with slow surface runoff and moderate permeability. Moderate erosion potential. Mostly used for agriculture, but where wooded, supports loblolly pine, sweetgum, yellow poplar, water oak, southern red oak, red maple. Understory plants typically include American holly, flowering dogwood, sassafras, greenbriar, giant cane, and inkberry.
Elkton	This wet soil occurs on nearly level landscapes in the lower Coastal Plain. Low areas of this soil, near larger streams, are within the floodplain. Fine-silty surface overlies silty and clayey subsoils. Organic strata may be encountered in some areas. Extremely to strongly acidic. Poorly drained with slow to ponded surface runoff. Erosion potential is low. The seasonal high water table is near to the surface. Depth to bedrock is greater than 200 feet. Mostly wooded with native vegetation including red maple, sweetgum, willow oak, blackgum, and loblolly pine. Understory plants typically include greenbriar, American holly, waxmyrtle, and sweet bay.
Hyattsville	This soil occurs in drainageways and toe slopes, derived from Coastal Plain sediments eroded from upper slopes. Soil materials include clay, silt, sand, and gravel. The seasonal high water table is 1 to 2 feet below the surface. Depth to bedrock ranges from 10 to 200 feet or more. Low erosion potential.
Matapeake	This soil occurs on uplands in sand, silt, and clay sediments of the lower Coastal Plain. Sandy clay loam, clay loam, and silty clay loam soils are typical. A dense silty clay loam layer may be present two to three feet below the surface in some areas. Extremely to strongly acidic. Well-drained with medium surface runoff and moderate to moderately slow permeability. Erosion potential is moderate. Depth to bedrock is typically greater than 200 feet. Almost exclusively used for agriculture, native vegetation dominated by oaks, some cutover areas have loblolly, Virginia, or shortleaf pine.
Mattapex	This soil occurs on uplands in sand, silt, and clay sediments of the lower Coastal Plain. Sandy clay loam, clay loam, and silty clay loam soils are typical. A dense layer occurs 2.5 to 3 feet below the surface. A "perched" seasonal high water table is found above the dense layer, one to two feet below the surface. Extremely to strongly acidic. Moderately well-drained with moderate to moderately slow permeability. Erosion potential is moderate. Depth to hard bedrock is typically greater than 200 feet. Where wooded dominate vegetation is white oak, scarlet oak, loblolly pine, red maple, yellow poplar, sweet gum with understory of sassafras, dogwood, greenbriar, and American holly.
Mixed Alluvial	This channel-dissected soil complex occurs in floodplains and drainageways, and is susceptible to flooding1. Soil materials range from soft organic silts and clays to dense gravel-sand-silt-clay alluvium. The seasonal high water table varies from 0 to 2.5 feet below the surface. Depth to hard bedrock ranges from 3 to 30 feet. Stream bank erosion within these soils may result in undercutting of embankments. Erosion potential is low.
Sassafras	This soil occurs on hilltops and sideslopes in sandy and clayey Coastal Plain sediments. The upper 5 feet consists of predominantly sandy and sandy clay loam materials. Well drained with slow to medium surface runoff and moderate to moderately slow permeability. Erosion potential is moderate. Depth to hard bedrock is greater than 200 feet. Mainly used for agriculture, where forested native vegetation is mixed upland hardwoods with some shortleaf and Virginia pine.
Silty/ Clayey Sediments	Occurs primarily along steep hillsides and adjacent to drainageways in the Coastal Plain. It consists predominantly of silty and clayey strata. Soil properties are variable within this unit and low bearing strata and perched seasonal high water tables may be present. This unit may contain deposits of marine clay. Erosion potential is high.
Tidal Marsh	Tidal marsh areas occur along the Potomac River and are periodically inundated by flood waters under tidal influence. The soils consist of organic-rich, highly stratified sandy, silty, and clayey sediments. Underlying soil is usually soft. Floodwaters from tidal inundation are typically shallow. Erosion potential is low.
Woodstown	This soil occurs in sandy sediments on nearly level landscapes in the lower Coastal Plain. Soil materials are primarily sandy loams to sandy clay loams, with a dense subsurface. The seasonal high water table is 1.5 to 2.5 feet below the surface. Extremely to strongly acidic. Moderately well drained with slow to medium surface runoff and moderate permeability. Erosion potential is low. Depth to hard bedrock ranges from 50 to more than 300 feet. Mostly used for agriculture; where wooded native vegetation is oak and hardwoods with some Virginia and loblolly pine.

Soil Type	Characteristics
State	This sandy to silty soil occurs on high stream terraces in the Coastal Plain. Flooding may occur following storm events. The seasonal high water table is four to six feet below the surface. Extremely to strongly acidic. Well drained with negligible to moderate surface runoff and moderate permeability. Shrink-swell potential is low. Erosion potential is high. Depth to hard bedrock is 8 to 20 feet. Mostly used for agriculture, where wooded dominate vegetation is white oak, red oak, American beech, elm, sycamore, American holly, sweetgum, yellow poplar, and loblolly, Virginia, and shortleaf pine.
Lenoir	This soil occurs in loamy and clayey sediments on nearly level landscapes in the lower Coastal Plain. A silty surface overlies a slowly permeable clayey subsoil which has a moderate shrink-swell potential. The seasonal high water table is 0.5 to 1.5 feet below the surface. Somewhat poorly drained with slow surface runoff and slow permeability. Erosion potential is moderate. Depth to bedrock is typically greater than 200 feet. Where wooded, dominant vegetation is loblolly pine, longleaf pine, blackgum, and yellow poplar. Understory typically includes inkberry, sourwood, honeysuckle, flowering dogwood, American holly, wax myrtle, blueberry, poison ivy, redbay, and greenbriar.

Wetland Habitats

Tidal Wetlands

Mason Neck Refuge's freshwater tidal wetlands include the 207-acre Great Marsh and the 50-acre Little Marsh. Little Marsh is formed by the impoundment of High Point Creek. Map 3.7 depicts the National Wetlands Inventory wetland types.

Great Marsh has several meandering creek mouths and is dominated by wild rice, spatterdock, and other open marsh species favored by a constant freshwater tidal exchange (USFWS, 2005a).

High Point Creek is narrow and protected by forested promontories, except at the narrow impounded (large dike) mouth with little exchange of water beyond storm surges and runoff. Little Marsh impoundment is drawn down to the greatest extent possible in early summer to provide better foraging opportunities for young eagles and great blue heron (USFWS, 2005a).

Nontidal Waters

Streams such as Raccoon Creek provide excellent wetland habitat for species such as painted turtles *(Chrysemys picta)*, red-bellied turtles *(Pseudemys rubriventria)*, beaver, and mink *(Mustela vison)* (USFWS, 2004).

Upland Habitats

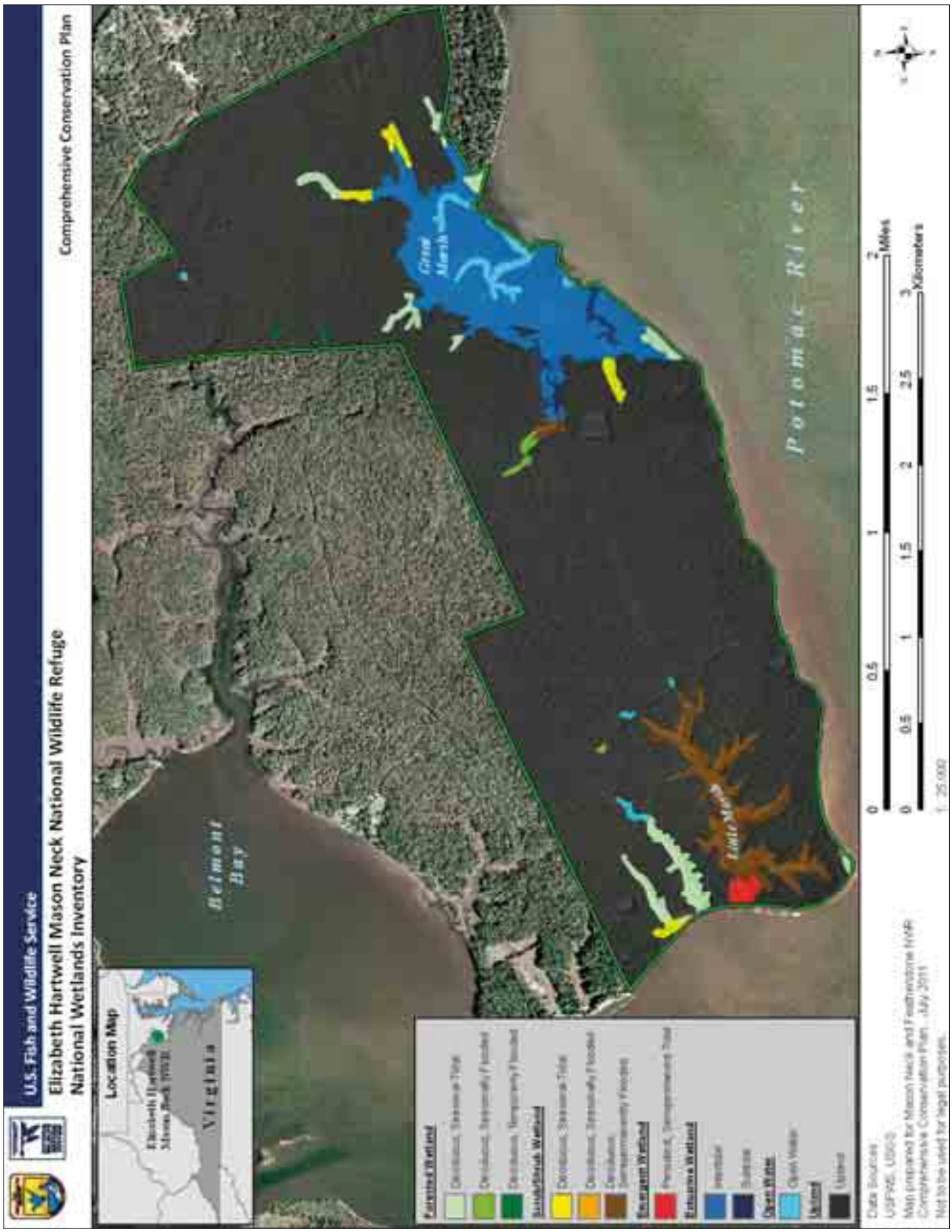
A survey in 1986 of Mason Neck Refuge identified a wide variety of plants throughout the diverse habitats of the refuge. Table A.5 in appendix A lists the plant species found during the survey.

Forest

Upland hardwood forest (1,883 acres) is the predominant vegetation type on the refuge and peninsula. Thirty-six species of trees have been recorded on the refuge. The dominant deciduous species in the upland forest are oak (*Quercus* spp.)—primarily chestnut oak *(Quercus prinus)*, white oak *(Quercus alba)*, and red oak *(Quercus rubra)* (USFWS 2004). Other overstory species include mockernut hickory *(Carya alba)*, shagbark hickory *(Carya ovata)*, yellow poplar *(Liriodendron tulipifera)*, sycamore *(Platanus occidentalis)*, American beech, and red maple *(Acer rubrum)*. The dominant understory species include American holly, flowering dogwood *(Cornus florida)*, and sweetgum *(Liquidambar styraciflua)* (USFWS, 1993).

Virginia pine *(Pinus virginiana)* is the most common coniferous species and is widely scattered throughout the deciduous upland forest where it sometimes

Map 3.7. Mason Neck Refuge National Wetlands Inventory



occurs in small patches and is usually found along the wetland edges. Other conifers include loblolly pine, eastern red cedar, and shortleaf pine *(Pinus echinata)*.

In 2009, VDF completed a Forest Health and Condition Inventory and Assessment of Mason Neck Refuge. Overall, they determined that the refuge's hardwood forest was unhealthy, suffering from a lack of regeneration, missing an understory of shrubs and herbaceous plants, and was considerably "overstocked." They attributed the lack of hardwood regeneration, shrub layer, and herbaceous plants to overbrowsing from high deer populations. The VDF report included recommendations for improving forest health and habitat quality for bald eagles and forest interior dependent birds. The report is available from refuge headquarters.

Grassland

Only about 15 acres of grasslands or open field remain on the refuge and they are not a priority for management. During colonial times and up to the early 1900s, numerous acres were used for agriculture (crops and dairy) and logging. Natural succession has converted the grasslands into hardwood forests leaving a monotypic habitat of mixed hardwoods with small patches of conifers. Most of the refuge has not been logged in the last 40 to 50 years and some areas on the refuge have stands of 100-year and older trees (USFWS, 2005a). We mow approximately 10 acres of the grassland fields on a rotational basis for wildlife viewing opportunities and to manage invasive plants and weeds. In addition, approximately 2 acres of the field associated with the environmental education site are mowed annually as part of a 3-year rotational strip mowing program designed for educational interpretation and habitat diversity (USFWS, 2005a).

Threatened or Endangered Plants

The small whorled pogonia *(Isotria medeoloides)* is a federally listed threatened plant species. Although it has been found south and north of the refuge, it has not yet been found on the refuge. Habitat for this plant may be present on the refuge, but the deer population is likely having an impact on any suitable areas (USFWS, 1993). To date, the recovery team has not recommended special efforts to locate this plant on the refuge.

Sensitive joint-vetch *(Aeschynomene virginica)*, a federally listed and State-listed threatened plant, has the potential to occur in freshwater tidal marshes on or in the vicinity of the refuge. Although it has not been identified on the refuge, sensitive joint-vetch can occur in freshwater to brackish wetlands, primarily marshes in the intertidal zone of large rivers (VDCR, 2010).

Two other State rare plant species may occur in the vicinity of the refuge, but have also not been identified on the refuge. Parker's pipewort *(Eriocaulon pakeri)* occurs in intertidal zones and river bulrush *(Schoenoplectus fluviatilis)* inhabits fresh tidal marshes (VDCR, 2010).

Invasive Plants

Executive Order 13122–Invasive Species (issued February 3, 1999) authorizes and directs the Service to protect native wildlife and their habitats on national wildlife refuges from damage from invasive and injurious species. In 2004, the refuge surveyed for invasive plants along 24 transects across the refuge. Table A.5 in appendix A lists the plant species found. The refuge currently has two invasive plants of primary concern: Japanese stiltgrass and mile-a-minute. Their descriptions are below. Other invasive plants of concern on the refuge are tree-of-heaven, Japanese honeysuckle, Japanese barberry, and beefsteak plant.

Japanese stiltgrass
Japanese stiltgrass is an annual plant that has a sprawling habit and grows slowly through the summer months, ultimately reaching heights of 2 to 3.5 feet. It threatens native plants and natural habitats in open to shady, and moist to dry locations. Stiltgrass spreads to form extensive patches, displacing native species that are not able to compete with it. Where white-tail deer are abundant, as they are on Mason Neck Refuge, they may facilitate stiltgrass invasion by feeding on native plant species and avoiding stiltgrass (NPS, 2008). Japanese stiltgrass can spread rapidly following a disturbance such as flooding or mowing. Within 3 to 5 years it can form dense monotypic stands which crowd out native herbaceous vegetation. Although Japanese stiltgrass does not produce prolific amounts of seed (a single produces 100 to 1000 seeds), the seeds remain viable in the soil for 3 to 5 years. It is also well adapted to low light levels and is able to grow and produce seeds in five percent of full sunlight.

Mile-a-minute
Mile-a-minute weed is an herbaceous, annual, trailing vine that is widely distributed on the refuge and is a high priority for management. Mile-a-minute weed generally colonizes open and disturbed areas along the edges of woods, wetlands, stream banks, roadsides, and uncultivated open fields. It will tolerate shade for a part of the day, but needs a high percentage (63-100 percent) of available light. Mile-a-minute attaches to other plants with recurved barbs and climbs over other plants to reach areas of high light intensity. This invasive species spreads rapidly and is difficult to manage once established. It is a rapidly growing vine which allows it to overtake native vegetation by smothering seedlings and outcompeting adult plants for space, nutrients, and sunlight. This is particularly a concern in the refuge's wet meadows which may support rare wetland plants (VDCR, 2003).

Refuge Wildlife

The mature upland hardwoods, freshwater marshes, and small grassland areas which comprise the refuge habitat host over 211 species of birds, 31 species of mammals, and over 40 species of reptiles and amphibians (USFWS, 2005a). One of the State's largest colonies of great blue heron in the Mid-Atlantic region is located in the Little Marsh impoundment area (USFWS, 2004). Lists of the wildlife species on the refuge are provided in appendix A. This section discusses species of greatest conservation need found at the refuge that we consider as focal species for refuge management.

Threatened or Endangered Animals

There are no known occurrences of any federally listed animal species on the refuge. However, should one become known, we would make it a priority to protect and aid in its recovery. Two State threatened birds, the peregrine falcon *(Falco peregrinus)* and loggerhead shrike *(Lanius ludovicianus)*, are known on the refuge but are rare sightings. The tables in appendix A highlight sensitive species including State rare and endangered species, as well as other species of concern.

Birds

Of the 211 species of birds that occur on Mason Neck Refuge (USFWS, 1995; also see appendix A), 114 species are listed as species of conservation concern by one or more of the following authorities in various plans:

- Service's Region 5 Birds of Conservation Concern List (17 species)
- ACJV, BCR 30 plan (70 species)
- PIF Area 44 Plan (50 species)
- Virginia WAP (70 species)

Approximately 56 species of conservation concern are known to breed on the refuge.

Bald Eagle
The refuge was established for the primary objective of protecting essential nesting, feeding, and roosting habitat for bald eagles (USFWS, 2005a). Records of bald eagle use date back to the 1700s, showing multiple nest sites and summer roosts hosting concentrations of 50 or more birds. During the 1960s, populations dwindled locally, as they did nationally, due to increased pesticide use and habitat destruction (USFWS, 2009). With greater awareness, better protection nationally and regionally of the birds and their habitat, and reduction in pollution, the eagle population has made a recovery (USFWS, 2005a).

Three active eagle nest sites exist on the refuge. Other areas frequented by eagles in the vicinity of the refuge are the roost and a nest site on Kanes Creek in the neighboring State park, a nest and roost on the north border of the refuge and Gunston Hall, a nest site between Gunston Manor and Hallowing Point communities, and a nest site on undeveloped land on the north portion of the peninsula. Historically, eagles abandoned the nest near the heron rookery and moved out along the shore between Anchorage Road and High Point. Though active for 3 years, we suspect the proximity resulted in competition between the herons and the High Point Creek bald eagle. In 2002, the occupied bald eagle breeding site was abandoned and has not been occupied since (USFWS, 2005a). The inset table in map 3.2 highlights the nesting territories and productivity of bald eagles on Mason Neck Refuge from 1990 to 2010.

The year 2005 marked the completion of 6 years of bald eagle surveys along the shoreline of the Potomac River between Fort Washington, Maryland and Aquia Creek, Virginia. The field study was designed to examine the distribution and abundance of the bald eagles and to assess potential human impacts or the effects that activities might have on their distribution and relative abundance. In general, there was a three-fold increase in the overall number of eagles observed along the shoreline, with an average of 20 birds observed in 2000 to an average of 64 birds observed in 2005. The relationship between their distribution and the availability of perching and foraging habitat along the river suggests that the eagles are avoiding developed areas along the river (USFWS, 2005a).


Bill Wallen
Breakwater off Mason Neck Refuge

Waterfowl
Waterfowl that breed at the refuge include the American black duck, a highest priority species in BCR 30. The refuge also supports hooded merganser *(Lophodytes cucullatus)* and wood duck, which are both considered of moderate priority by BCR 30. Although Mason Neck Refuge is out of the mainstream of the Atlantic Flyway, the refuge, as part of a series of small marshes along the Potomac River, provides migrating and wintering habitat for over 20 different waterfowl species. The AP Canada goose (BCR 30 highest priority) and the tundra swan (BCR 30 high priority) are common migrants at the refuge.

Each year at Mason Neck Refuge, approximately 75 ducks are banded at Great Marsh by the VDGIF. The majority of banded ducks are wood ducks, approximately 5 to 10 are usually teal, and 3 to 5 are mallards. Aerial surveys around the refuge area have not been conducted in the past seven years because of flight area restrictions.

Raptors
Fifteen species of raptors (table A.1, appendix A) have been known to breed on or visit the refuge. In addition to bald eagles, nesting has been documented for BCR 30 ranked high priority broad-winged hawk *(Buteo platypterus)*, the VDGIF ranked American kestrel (*Falco sparverius*; Tier II), and VDGIF ranked red-shouldered hawk (*Buteo lineatus*; Tier V). VDGIF ranked owls of conservation concern found nesting on the refuge include the barred owl *Strix varia*; Tier II) and barn owl *(Tyto alba*; Tier V). Definitions of tier levels are explained in appendix A.

Shorebirds, Gulls, Terns, and Allied Species
Great Marsh and the refuge's Potomac River shoreline provide only marginal habitat for shorebirds because of the steep banks. The refuge is also located out of the main migration corridor. A total of 19 species of shorebirds, gulls, and terns have been reported at Mason Neck Refuge. In the winter, ring-billed *(Larus delawarensis)*, herring *(Larus argentatus)*, and great black-backed gulls *(Larus marinus)*, and the PIF 44 (Tier V) and State-listed (Tier IV) Forster's tern *(Sterna forsteri)* comprise the bulk of this community. Small populations of migrating shorebirds, including the wintering greater yellowlegs *(Tringa melanoleuca)* (BCR 30 high-priority), and common snipe *(Gallinago gallinago)* (BCR 30 moderate-priority), are also observed.

Marsh- and Waterbirds
The refuge hosts 14 species of marsh and waterbirds during the spring and summer. Most abundant are the great blue heron, green heron *(Butorides virescens)*, and great egret *(Ardea alba)* that use the small marshes and Potomac River shoreline for feeding, nesting, and roosting. Extensive marsh bird surveys were last conducted at Mason Neck and Occoquan Bay Refuges in June and July of 1999.

Two species of colonial waterbirds—the great blue heron and great egret—breed on the refuge. The number of great blue heron, in particular, contributes to this being one of the largest rookeries in the Mid-Atlantic region. Both are PIF 44 listed as Tier V birds of conservation concern. The population size of the heron rookery in the southwest corner of the refuge grew from 30 nests in 1979 to over 1,679 nests at its peak in 2003, during which time the reproductive potential for the heron has varied considerably and may be related to weather-related factors. The estimated average size of the rookery at Mason Neck Refuge during the period 1992 to 2004 was 1,386 nests, with a range between 1,026 to 1,679 nests, based on a total census of nests during the fall or winter. The rookery has been comprised primarily of great blue heron with some great egret nests. The number of great egret nests has typically ranged from only 15 to 25. These birds have consistently located in the southwest corner of the rookery site (Witt, 2006). More recently, the entire rookery has decreased markedly in size to fewer than 800 nests (Witt, personal communication, 2008). The portion of the refuge on which the heron and egret rookery is located is closed to the public.

Migratory Songbirds
The refuge supports a wide diversity of songbirds. A complete list can be viewed at: *http://www.fws.gov/masonneck/wildlife.html* (accessed June 2011). Several of these are birds are listed of "Highest" conservation concern in the BCR 30 plan, including blue-winged warbler *(Vermivora cyanoptera)*, prairie warbler *(Dendroica discolor)*, and wood thrush. There are also 14 songbird species of "high" concern in BCR 30 that breed on the refuge. Those are listed in appendix A. Several others known to breed on the refuge are listed as FIDS of conservation concern in the Chesapeake Bay area, including, red-eyed vireo *(Vireo olivaceus)*, Louisiana waterthrush, hooded warbler *(Wilsonia citrine)*, and ovenbird *(Seiurus aurocapilla)*.

The Institute for Bird Populations (IBP) from Port Reyes Station, California has continued operating two Monitoring Avian Productivity and Survivorship (MAPS) stations on Mason Neck Refuge, which were started in 1995. The refuge was included in a partnership with nearby Fort Belvoir to monitor nesting bird activity as part of the MAPS Program. The refuge's stations are Mason Neck-1, located on Sycamore Road near Old Barn Road, and Mason Neck-2, on Little Marsh Road northwest of the High Point eagle nest. Volunteers, trained by IBP, operate the stations and conduct an average of eight banding sessions between May and August each summer. At the site, birds are captured with mist-nets, identified, sexed, and measured. The 2005 field season resulted in 38 birds being newly banded with 11 recaptured from previous years at Mason Neck-1 site; and 54 birds being newly banded with 6 recaptured from previous years at Mason Neck-2 site.

Game Birds
The game bird species that occur on the refuge are wild turkey *(Meleagris gallopavo)*, mourning dove *(Zenaida macroura)*, northern bobwhite quail *(Colinus virginianus)*, ruffed grouse *(Bonasa umbellus)*, and woodcock *(Scolopax minor)*. Mourning doves are abundant on the refuge yearround, while woodcock are commonly seen in the spring. Both bobwhite quail and ruffed grouse are rare on the refuge.

Reptiles and Amphibians
The refuge's vernal pools, creeks, tidal marshes, and woodlands offer a diverse array of habitats for reptiles and amphibians. There are 54 species of reptiles and amphibians known or suspected to occur on the refuge. Table A.2 in appendix A lists those species known or suspected to occur on the refuge.

Reptiles
Eight turtle species and four lizard species are either known or suspsected to occur on the refuge (Klimkiewicz, 1972a). Of the eight turtle species, two are considered species of greatest conservation need in Virginia: eastern box turtle (*Terrapene carolina*; Tier III) and spotted turtle (*Clemmys guttata*; Tier III) (VDGIF, 2005).

Two researchers from local schools have conducted studies on the snake community of Mason Neck Refuge. A 2001 doctoral thesis was completed by Terry R. Creque of George Mason University (Creque, 2001), and a 2001-2003 study of eastern worm snakes *(Carphophis amoenus)* was completed by John Orr of J.E.B. Stuart High School in Fairfax, VA (Orr, 2006). The 2 studies found a total of 12 species of snakes on the refuge and 6 more species are suspected to occur on the refuge. Of the 16 snake species, 2 are considered species of concern by the State of Virginia: common (or eastern) ribbon snake (*Thamnophis sauritus*; Tier IV) and eastern hognose snake (*Heterdon platirhinos*; Tier IV) (VDGIF, 2005).

Amphibians
Nine salamander species are either known or suspected to occur on the refuge (Klimkiewicz, 1972b). To determine what frog and toad species occur on the refuge, anuran call count surveys were conducted each year from 2000 to 2002. These surveys found 15 species of frogs and toads on the refuge and were also used to find out what habitat sites are important to breeding frog and toad populations.

Mammals
Currently, 31 species of mammals are known to inhabit the refuge (USFWS, 2005a). Common mammal species include gray squirrel *(Sciurus carolinensis)*,

red fox *(Vulpes vulpes)*, eastern cottontail rabbit *(Sylvilagus floridanus)*, and white-tailed deer. The mammals that have been observed on Mason Neck Refuge are listed in appendix A, table A.3 (Jones and Klimkiewicz, 1975).

White-tailed Deer
White-tailed deer are one of the most visible species on Mason Neck Refuge. The refuge's large deer population reflects overall high population levels throughout northern Virginia. Extensive development in the area has reduced the amount of habitat available for wildlife which taxes remaining habitats more heavily. White-tailed deer populations at high levels may negatively impact habitat quality and other wildlife species. Deer are particularly prone to habitat alteration due to their high reproductive potential (Rooney and Waller, 2003). Through their foraging habits and preferences, they can change plant composition and structure with subsequent impacts on other wildlife such as songbirds (McShea and Rappole, 2000). These impacts are magnified when other factors, such as mild weather, availability of alternative food sources, and reduced annual mortality allow populations to quickly increase in numbers (USFWS, 2007b). In addition to a general decrease in habitat quality, high deer densities can also decrease overall deer population health as evidenced by decreased body weights, increased occurrence of deformities, increased levels of internal and external parasitism, decreased body fat deposits, and disease transmission (USFWS, 2007b).

Mason Neck's deer population appears to be having impacts on the refuge's forests. In 2009, the VDF determined that the refuge's hardwood forest was unhealthy, suffering from a lack of regeneration, missing an understory of shrubs and herbaceous plants, and was considerably "overstocked." The lack of hardwood regeneration, shrub layer, and herbaceous plants is likely due to overbrowsing from high deer populations (VDF, 2009). We are particularly concerned about the lack of recruitment of canopy trees, which are important habitat for bald eagles.

The refuge began a deer management program in 1989 to control and reduce deer numbers and to improve the quality of the forest habitat which had been severely degraded. This was clearly evidenced by distinct browse lines and lack of understory vegetation. The refuge currently uses deer health data such as weight, fat deposits, antler growth, and bone marrow fat content as indicators of herd health. Harvest data indicate that the population is stable and that habitat is improving, however densities are still above desired levels and deer are still nutritionally stressed.

Interjurisdictional and Other Fish Species
The tidal Potomac River and tributaries support a diversity of interjurisdictional fish species that depend in part on the larger tributaries (including the Occoquan River and Occoquan Bay) and the smaller streams and marshes along the Virginia shoreline for habitat. Interjurisdictional fish of interest to the Service and considered species of concern by VDGIF (2005) include the shortnose sturgeon (*Acipenser brevirostrum*; Tier I), Atlantic sturgeon (Tier II), alewife (Tier IV), American shad (Tier IV), and American eel (Tier IV). Other fish of greatest conservation need in the Coastal Plain-Potomac EDU include the bridle shiner (*Notropis bifrenatus*; Tier I), and yellow lance (*Elliptio lanceolata*; Tier III), least brook lamprey (*Lampetra aepyptera*; Tier IV), ironcolor shiner (*Notropis chalybaeus*; Tier IV), and logperch (*Percina caprodes*; Tier IV). Table A.4 in appendix A lists the fish species of conservation concern in the refuge area.

Cultural Resources

Mason Neck Refuge contains an important and unusually diverse archaeological and historical record, which offers evidence of thousands of years of settlement by Native Americans, and of later occupations by Euro-Americans and African-

Americans. Twenty-five known Native American sites occur on the refuge and represent occupations that began as early as 9,000 years ago, and continued into the mid-seventeenth century. There are also 15 known historical archaeological sites, which offer insights into Euro-American settlement that occurred after the seventeenth century. Unfortunately, the refuge's archaeological resources are seriously threatened by shoreline erosion and a recent reconnaissance study assessed the impacts of this erosion (Johnson, 2005). Appendix F presents a detailed discussion of the cultural resources of Mason Neck Refuge.

Visitor Services

Mason Neck Refuge provides a variety of opportunities for the public to participate in wildlife-dependent recreational activities. The Refuge Improvement Act identifies six wildlife dependent public uses that are a priority on refuges and directs us to give them enhanced consideration during CCP development. Five of the six priority uses have been found compatible on this refuge in designated areas, including: wildlife observation, nature photography, hunting, interpretation, and environmental education. Recreational fishing is not offered on the refuge because no opportunities are present in areas open to public access. For example, virtually all of the refuge shoreline is closed to public access due to concerns with wildlife disturbance, impacts to sensitive habitat areas, or accelerating shoreline erosion. Our public use program areas of emphasis for Mason Neck Refuge are wildlife observation, photography, and interpretation.

Visitation

In 2009, our total annual visitation was 19,172 visitors. The majority (approximately 75 percent) of our visitors engage in wildlife observation and photography.

Wildlife Observation and Photography

The three trails on the refuge facilitate wildlife observation and photography. A brief description of the trails follows.

USFWS

Joseph V. Gartlan, Jr. Great Marsh Trailhead on Mason Neck Refuge

Joseph V. Gartlan, Jr. Great Marsh Trail

The Great Marsh Trail is a paved, ¾-mile, accessible trail that follows a forested ridge along a natural peninsula and terminates at an observation platform at Great Marsh (USFWS, 2004). The large observation platform features an accessible Mark-1 telescope for viewing wildlife. Interpretive sites on the Great Marsh Trail are located at a kiosk near the parking lot and a wayside interpretive panel at the observation platform. Information about the refuge, Joseph V. Gartlan, Jr., Great Marsh, plants, and wildlife can be found at these sites.

Woodmarsh Trail

The 3-mile Woodmarsh Trail loops through a hardwood forest, carpets of ferns, over small streams, and along a marsh (USFWS, 2004). Interpretive sites on Woodmarsh Trail are located at a kiosk at the parking lot, an interpretive panel at the beginning of the trail, and a kiosk at the end of the trail adjacent to Sycamore Road. These sites provide information about the refuge, white-tailed deer, bald eagles, other refuge wildlife, invasive plants, rules and regulations, and a trail map (USFWS, 2005). Portions of the trail are closed from December through July due to bald eagle nesting activity.

High Point Trail

The High Point Trail was dedicated at the Elizabeth Hartwell Mason Neck Earth Day celebration in April of 2005 (USFWS, 2005a). It is a multi-purpose, Americans with Disabilities Act (ADA)-compliant trail which parallels High Point Road from Gunston Road through the refuge to the Mason Neck State

Park Visitor Center. Only ½-mile of the 3-mile trail occurs on the refuge. The trail was developed to provide a safe alternative to pedestrians that were using High Point Road to access the State Park. This is the only trail on the refuge that allows bicycling and other non-motorized pedestrian uses, along with foot traffic.

Environmental Education
According to Service policy (605 FW 6), environmental education is a curriculum-based process designed to teach citizens and visitors of all ages about the history and importance of conservation and the significance of natural resources. In general, environmental education programs may incorporate some of the following: onsite, offsite, and distance learning materials, activities, programs, and products based on a course of study designed for specific audiences.

Over the past few years, the role of refuge staff in environmental educational activities has shifted from an active role to one of a facilitator. In addition, diminishing school budgets have resulted in a decrease in the number of schools utilizing the refuge. However, we continue to encourage educators to use the refuge with their primary and secondary students to participate in hands on activities in which they learn basic biological principles and are taught about the Chesapeake Bay watershed. High school and college level teachers and faculty have also led students on more advanced studies.

Environmental education facilities on the refuge include an education pavilion and loop trail located off Sycamore Road, which is maintained when staff and funding allows. This area is not open to the general public and is managed via a special use permit. Other educational programs also occur elsewhere on the refuge. For example, Thomas Jefferson High School has used the refuge to conduct advanced science projects. Four times a year, students survey specific vernal pool sites for salamanders and test new computer monitoring devices. In another study, students collect and analyze deer pellets. The coordinator of the project has been very excited about the advanced science work completed by the students and the opportunity to use the refuge. A new program, led by Virginia Polytechnic Institute (Virginia Tech), began in 2007 and has students from Freedom High School collecting dendrochronology (tree-ring) information.

Interpretation
The Service defines interpretation as " [a] communication process that forges emotional and intellectual connections between the audience and resource" (603 FW 7). Interpretation is the means by which the refuge presents historical and cultural information and explains concepts of ecology and methods of resource management to the public. The Service's guiding principles for its interpretive programs include the following:

- Developing a sense of resource stewardship
- Minimizing conflicts between visitors engaged in wildlife-dependent recreation
- Promoting an understanding and appreciation for the individual refuge, the Refuge System, and America's natural and cultural resources

Interpretation facilities on the refuge include three kiosks with interpretive panels as noted above. Two are located at the trail heads of Great Marsh and Woodmarsh Trails. An additional kiosk is located further down Woodmarsh Trail, close to Sycamore Road. Each kiosk contains a map panel to physically orient the visitor and additional panels covering topics such as viewable wildlife, bald eagles, invasive and exotic plant and animal species, and white-tailed deer.

All interpretive panels on the Great Marsh Trail were updated in 2001. One panel provides information on Joseph V. Gartlan, Jr., what visitors are likely to see along the trail, and refuge regulations. Another provides information on Great Marsh with photographs of plants and wildlife commonly seen at the marsh. New panels at the Woodmarsh Trail parking lot include a trail map and an aluminum trailhead map and information panel. Six panels at the Sycamore Road kiosk include panels on white-tailed deer, bald eagles, other wildlife in the area, and invasive plants, as well as a trail map.

Interpretive tours are given by staff on special occasions, including festivals and other community events. Refuge brochures on a variety of topics are also available to facilitate self-guided interpretation.

Hunting

A white-tailed deer management program was initiated in 1989 (USFWS, 2005b) to reduce the population of deer on the refuge and thereby protect and restore understory vegetation on both the refuge and adjacent State park. A large, unmanaged population of deer had created a noticeable browse line due to the lack of available food. In partnership with the State park and VDGIF, the refuge holds an annual hunt in November and December as part of its deer management program. Hunters selected through an application and lottery process are required to attend an orientation session to learn the rules, restrictions, and management goals of the hunt. Table 3.12 summaries harvest information from 1998 to 2009.

From a biological perspective, white-tailed deer hunting is a viable management tool needed to reduce the deer population on the refuge and Mason Neck State Park. From a recreational perspective, these hunts serve to continue the legacy and heritage of hunting in the region. We will continue to offer an annual hunt due to the quick and continual repopulation of this area by deer.

Table 3.12. Annual Mason Neck Refuge Deer Harvest Results (1998-2009)

Year	Number of Does Harvested	Number of Bucks Harvested total	(antlered/ button)*	Totals
1998	44	53	(38/15)	95
1999	34	60	(34/26)	93
2000	53	56	(33/22)	109
2001	48	44	(27/17)	92
2002	41	31	(23/8)	72
2003	48	67	(46/21)	115
2004	39	60	(54/ 6)	99
2005	39	50	(37/13)	89
2006	60	61	(47/14)	121
2007	44	67	(40/27)	111
2008	55	53	(37/16)	108
2009	30	40	(30/10)	70

**Male deer under 1 year of age are considered "button bucks."*

Featherstone Refuge Environment

Refuge Establishment and History

Refuge Size and Location

Featherstone Refuge consists of 325 acres of woodland and freshwater tidal marsh. It lies along the northern shore and mouth of Neabsco Creek and north around Featherstone Point along Occoquan Bay. It is located approximately 4 miles southwest of Mason Neck Refuge, and 22 miles from Washington, D.C. in Prince William County, Virginia. Refuge Complex staff are responsible for its management.

Establishment Authority and Purpose

Featherstone Refuge was established with the purpose to protect the features of a contiguous wetlands area. Public Law 91-499, approved October 22, 1970 (84 Stat 1095), authorized the Secretary of Interior to acquire, by purchase or exchange, portions of a tract of land in Prince William County, Virginia from the District of Columbia. The law required that both the Secretary and the District mutually agree the lands were wetlands and areas necessary to protect surrounding natural features of such wetlands (*http://www.fws.gov/laws/lawsdigest/nwracts.html#Featherstone*; [accessed June 2011]).

History of Refuge Land Acquisition

It was not until 1979 that the Service acquired land to establish Featherstone Refuge from the District of Columbia. The refuge then consisted of 164 acres of land along Farm Creek in eastern Prince William County. An additional 161 acres of land were acquired for the refuge with a donation from Prince William County in 1992. Elizabeth Hartwell, a noted conservationist in the region, was also instrumental in the establishment of Featherstone Refuge, along with Mason Neck Refuge and Mason Neck State Park.

Public Access

There has been no authorized public access to Featherstone Refuge since its establishment. However, in chapter 4 under goal 2 for Featherstone Refuge, we describe new opportunities that will be offered upon CCP approval. Official administrative access is by two rights-of-way, neither of which is accessible to vehicles, and which only provide access to the refuge boundary, not its interior. Refuge staff use the VRE commuter rail station landing built next to the refuge as one way to gain quick access across the tracks to the refuge.

Illegal trespass is a common problem on the refuge but has been dramatically reduced with the addition of a full-time refuge law enforcement officer. Violations recorded include illegal hunting, fishing, camping, and dumping of trash.

Community Demographics and Planning

Featherstone Refuge is located on Occoquan Bay in the eastern-most portion of the town of Woodbridge, Virginia which is a U.S. census-designated place (CDP). According to the U.S. Census Bureau, the Woodbridge CDP has a total area of 10.8 square miles, of which 10.5 square miles (97 percent) is land and 0.3 square miles (3 percent) is water. Woodbridge is geographically located about 22 miles from Washington, D.C.

Population Statistics

As of the census of 2000, there were 31,941 people, 10,687 households, and 7,769 families residing in the Woodbridge CDP. The population density was 3,047.8 people per square mile. There were 11,026 housing units at an average density of 1,052.1 per square mile. The racial makeup of the CDP was 56.34 percent White, 23.45 percent African American, 0.55 percent Native American, 4.90 percent Asian, 0.17 percent Pacific Islander, 9.62 percent from other races, and

4.96 percent from two or more races. Hispanic or Latino of any race were 19.07 percent of the population. There were 10,687 households out of which 41.5 percent had children under the age of 18 living with them, 52.3 percent were married couples living together, 14.2 percent had a female householder with no husband present, and 27.3 percent were non-families. Of all households, 20.4 percent were made up of individuals, and 3.9 percent had someone living alone who was 65 years of age or older. The average household size was 2.96 and the average family size was 3.40.

The median income for a household in the CDP was $50,525, and the median income for a family was $52,362. Males had a median income of $35,538 versus $28,587 for females. The per capita income for the CDP was $19,810. About 4.6 percent of families and 5.5 percent of the population were below the poverty line, including 7.7 percent of those under age 18 and 5.9 percent of those age 65 or over.

Potomac Heritage National Scenic Trail

The PNHST is a developing network of locally managed trails and routes between the mouth of the Potomac River and the Allegheny Highlands in the upper Ohio River Basin (NPS, 2009). The PHNST network is one part of the National Trails System created by the National Trails System Act of 1968. The Department completed a feasibility study for the PHNST in 1974 and Congress passed legislation designating the PHNST in March 1983 (Public Law 98-11), establishing a foundation for development of the PHNST network of approximately 704 miles of trails in Virginia, Pennsylvania, Maryland, and Washington, D.C.

To date, approximately 830 miles of existing and planned trails have been recognized as segments of the PHNST network (NPS, 2009; *http://www.nps.gov/pohe* [accessed June 2011]). The trail network is not yet continuous, but many trails and segments have been completed. For example, people can now hike 375 miles from Washington, D.C. to Seward, Pennsylvania (Lillard & Talone, 2006) using the Chesapeake and Ohio Canal Towpath, Great Allegheny Passage, and Laurel Highlands Hiking Trail. Existing and planned routes in northern Virginia total approximately 100 miles, and bicycling routes in southern Maryland and on the Northern Neck of Virginia total over 225 miles.

Existing, planned, and proposed segments of the PHNST through Prince William County parallel the Potomac River shoreline, including a segment within Featherstone Refuge (see map 4.3). The proposed route near the refuge would use an existing pedestrian crossover at the VRE station, pass east of the railroad tracks, continue north along an abandoned railroad right-of-way within the refuge, and connect with Featherstone Drive on the north end of the refuge. The segment of PHNST proposed within the refuge is contingent upon the availability of parking spaces at the VRE station and use of the pedestrian crossover.

Refuge Administration

Refuge Revenue Sharing Payments

Featherstone Refuge's revenue sharing payments to Prince William County from 2003 to 2009 are listed in table 3.13. Revenue sharing checks are sent by the Service electronically to Prince William County on an annual basis.

For more information on refuge revenue-sharing payments, see our discussion under "Refuge Administration" for Mason Neck Refuge.

Table 3.13. Refuge Revenue Sharing Payments to Prince William County, Virginia from 2003-2009

Fiscal Year	Refuge Revenue Sharing Payments
2009	$633
2008	$816
2007	$844
2006	$911
2005	$807
2004	$912
2003	$949

Special Use Permits

The refuge issues special use permits for various activities such as research, surveys and censuses, and environmental education. Each request is considered on a case-by-case basis and decisions are based on the following criteria: type, purpose, and appropriateness of activity; whether the activity supports refuge goals; and what kind of impact will the activity have on other users. Prior to issuing a special use permit, the refuge manager evaluates the use's appropriateness and compatibility with other refuge purposes.

Partners

The refuge coordinates with Prince William County and the Immigration and Naturalization Service for certain law enforcement actions and with VDGIF for fish and wildlife issues.

The Friends group, along with the Prince William Soil and Water Conservation District, provides volunteers for specific maintenance projects and clean-ups.

Refuge Terrain and Habitats

Topography

The refuge's topography is almost entirely flat with patches of bottomland hardwoods and tidal marsh (map 3.8) The majority of the refuge is wetlands with relief lower than 10 feet above sea level.

Land Cover

The refuge currently consists of 325 acres, including 80 acres of upland mature mixed-deciduous forest, 220 acres of palustrine wetlands, and 25 acres of open water (map 3.9). The shoreline along the banks of the Potomac River consists of narrow beaches. The Richmond, Fredericksburg, and Potomac Railroad parallels the western boundary of the refuge from north to south with built up elevations of 80 feet. An abandoned railroad grade also crosses the refuge. Farm Creek passes through the northeastern portion of the refuge before draining into Occoquan Bay and the Potomac River.

Soils

The soils of Featherstone Refuge are shown on map 3.10 and described in table 3.14.

Shoreline Erosion

Similar to Mason Neck Refuge, shoreline erosion is also an issue at Featherstone Refuge. Over the years, refuge staff have observed active shoreline erosion at Featherstone Refuge; however, no formal measuring or monitoring has occurred.

Map 3.8. Featherstone Refuge Topography

Map 3.9. Featherstone Refuge General Land Cover

Map 3.10. Featherstone Refuge Soils

Table 3.14. Characteristics of the Soils of Featherstone Refuge (Source: NRCS 2006)

Soil Type	Characteristics
Codorus soils	Occur on level slopes of floodplains and formed in alluvial materials containing medium to large quantities of mica derived from schist, gneiss, phyllite, and other metamorphic rocks. About 20 percent are wooded, mostly mixed hardwoods.
Dumfries soils	Occur on narrow ridges and side slopes in the northern part of the Atlantic Coastal Plain. These soils developed in sandy feldspathic sediments in highly dissected Coastal Plain terraces. Most of this soil is in hardwood and mixed hardwood and pine forest. Few areas are used for pasture, residential, and commercial development.
Elsinboro soils	Formed in unconsolidated, old alluvium, derived from crystalline rock that contains high amounts of mica. Permeability is moderate in the solum. The potential for surface runoff is negligible to medium. Native vegetation consists of maple, oaks, poplar, hickory, and beech.
Featherstone soils	Occur on level floodplains in the Coastal Plain. They do not flood daily but are subject to high seasonal tides and storm tides. The water table is at the surface 6-8 months each year and most areas are subject to ponding. They are very poorly drained; very slow to ponded runoff; moderate permeability. It is dominated by woody species with few larger trees of red maple and sweetgum. Cattails, skunk cabbage, and reeds make up much of the vegetation. Many areas are partially covered with debris.
Hatboro soils	Occur on nearly level flood plains. They formed in alluvium largely from schist, gneiss, and other metamorphic and crystalline rocks. They are poorly drained. Permeability is moderate. Index surface runoff class is high or very high. These soils are subject to periodic stream overflow, which usually occurs during the winter and spring months. Woodland areas are in mixed hardwoods.
Kelly soils	Formed in residuum weathered from gray to brown hornfel and granulite. Somewhat poorly drained. The potential for surface runoff is low to medium. Permeability is slow or very slow. In undisturbed areas, the depth to the top of the seasonal high water table ranges from 10 to 20 inches for some time in most years. About 40 percent of the area is in native forest of oaks, hickory, ash, and Virginia pine.
Lunt soils	Occur on gently sloping to moderately steep Coastal Plain uplands. They formed in fluviomarine Coastal Plain sediments. Most of the Lunt soils are used for urban development, idle land or woodland. The dominant species in the wooded areas are pines, oaks, hickory, gum, and poplar
Marr soils	Formed in a regolith of unconsolidated very fine and fine sandy loams. Most of the present woodlands consist of mixed hardwoods, dominated by oaks. Some areas have moderate to heavy stands of Virginia pine, and in places shortleaf pine.
Marumsco soils	Occur on level to gently sloping low Coastal Plain terraces. These soils developed in stratified marine sediments of sand, silt, and clay that contain a relatively high content of feldspar. Most of the acreage is in hardwood and pine forest. Some areas are used for urban development.
Quantico soils	Occur on medium to broad drainage divides of the older coastal plain terraces. These soils developed in stratified fluvio-marine sediments that have a high content of feldspathic sands. Largest acreage is in hardwood and pine forest. Many areas are used for residential and commercial developments. Small acreage is used for crops. Native vegetation consists of northern red oak, Virginia pine, red maple, yellow-poplar, and sweet gum.
Sycoline soils	Occur on upland sideslopes. The soils developed from hornfel and granulite. Moderately well to somewhat poorly drained; slow to rapid runoff; moderately slow permeability in upper solum, very slow permeability in lower solum.

Wetlands Habitat

Tidal freshwater marshes are a diverse group of herbaceous wetlands occurring along the upper tidal reaches of coastal plain rivers and tributaries which are flooded daily. These marshes tend to occur in the uppermost estuary zones, where a large volume of freshwater from upstream can effectively dilute the inflow of saltwater from tidal influence. Tidal freshwater marshes provide habitat for several rare plant species, including the potential for the federally listed sensitive joint-vetch, and important breeding habitat for many birds species, including the least bittern and Virginia rail. Common plant species occurring in the marshes include wild rice (*Zizania aquatica var. aquatica*), arrow-arum *(Peltandra virginica)*, dotted smartweed (*Polygonum punctatum var. punctatum*), and pickerelweed *(Pontederia cordata)*. Sea level rise is increasing

salinity and, along with the introduction of invasive plant species, is threatening native species and shifting the vegetative composition of tidal freshwater marshes (VDCR, 2006b; *http://www.dcr.virginia.gov/natural_heritage/ncEIa.shtml;* [accessed June 2011]).

Emergent tidal wetlands of Featherstone Refuge.

USFWS

A large portion of the Featherstone Refuge is tidally influenced freshwater wetlands. Portions of "Hidden Lake," the main section of Farm Creek running through the refuge, were at one time diked. This dike was likely used for fisheries management in the late 1800s or early 1900s, but has greatly deteriorated. Currently, only a few pilings are left in the water, as well as a short earthen section that no longer serves as a barrier (USFWS, 2005a).

The forested wetlands on the refuge are comprised of red maple, sweetgum, yellow poplar, and water willow (*Andrographis* spp.). Emergent marsh is located mainly on the southern section of the property (USFWS, 2005a).

Table 3.15 below describes in more detail the Featherstone Refuge National Wetlands Inventory types which are illustrated in map 3.11.

Table 3.15. Featherstone Refuge Wetland Types

Wetland Type	Characteristics
Forested	Characterized by woody vegetation that is 6 m tall or taller.
Scrub/Shrub	Includes areas dominated by woody vegetation less than 6 m tall.
Emergent	Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.
Riverine	The riverine system includes all wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connecting link between the two bodies of standing water.
Deciduous	Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season.
Persistent	Dominated by species that normally remain standing at least until the beginning of the next growing season.
Seasonally Flooded	Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years.

Upland Habitats

The refuge's upland forests features mature oaks, yellow poplars, and red maples at or near climax stage with Virginia and loblolly pine. These large bottomland hardwoods provide habitat for woodland warblers and nest cavities for pileated *(Dryocopus pileatus)* and red bellied woodpeckers *(Melanerpes carolinus)*, barred owls, and prothonotary warblers. Areas bordering Neabsco Creek consist of steep slopes with an understory of mountain laurel *(Kalmia latifolia)*.

Endangered or Threatened Plants

Federally threatened and endangered plant species that occur in Prince William County or adjacent counties include: harperella (*Ptilimnium nodosum*; endangered, occurs in adjacent county), sensitive joint-vetch (threatened, occurs in adjacent county), and small whorled pogonia (threatened, occurs in Prince William County). None are documented on the refuge.

Map 3.11. Featherstone Refuge National Wetlands Inventory

Two other State rare plant species may occur in the vicinity of the refuge, although they have not been identified on the refuge. Parker's pipewort occurs in intertidal zones and river bulrush inhabits fresh tidal marshes (VDCR, 2010). Table A.10 in appendix A lists plant species of concern for the refuge area.

Invasive Plants
The invasive plant Phragmites *(Phragmites australis)* is not yet a major problem in Featherstone Refuge's wetlands, but it could pose a future threat. Phragmites has become a destructive weed in Virginia, quickly displacing desirable plants species such as wild rice, cattails, and native wetland orchids. Invasive stands of this species eliminates diverse wetland plant communities, and provide little food or shelter for wildlife (VDCR, 2010). Other invasive plants of concern include mile-a-minute and Japanese stiltgrass in the upland forests.

Refuge Wildlife

Endangered or Threatened Animals
There are no known occurrences of any federally listed animal species on Featherstone Refuge. The federally endangered dwarf wedgemussel *(Alasmidonta heterodon)* may occur in Prince William County, but it is not known to occur on, or in the vicinity of, the refuge.

Birds
Table A.6. in appendix A lists bird species of conservation concern that are either known or suspected to occur on Featherstone Refuge. The table includes both the species compiled by Jim Waggoner, a local birder, based on his observations and what we suspect may occur based on refuge habitats and sightings in other nearby areas.

Bald Eagle
Bald eagles are often observed using the refuge, primarily for foraging. The shoreline provides important feeding and perching habitat. Since the early 1990s, a pair of bald eagles have nested on or near the refuge, although they have not always produced young (USFWS, 2005a). Map 3.2 displays the bald eagle nesting sites in the vicinity of the refuge.

Waterfowl
Featherstone Refuge provides important wintering and nesting habitat for waterfowl, wading birds, and shorebirds. Wintering and migrating waterfowl of conservation concern include American black duck, mallard, blue-winged teal *(Anas discors)*, wood duck, hooded merganser, green-winged teal *(Anas crecca)*, gadwall, and lesser scaup (USFWS, 2005a).

Raptors
Osprey *(Pandion haliaetus)*, red-tailed hawks *(Buteo jamaicensis)*, red-shouldered hawks northern harrier *(Circus cyaneus)*, American kestrel, and Cooper's hawks *(Accipiter cooperii)* have been recorded on the refuge (USFWS, 2005a).

Shorebirds, Gulls, Terns, and Allied Species
Featherstone Refuge does not provide quality nesting or foraging habitat for shorebird, gulls, terns, and allied species due to the dense vegetation on the refuge. Also, mudflats exposed at low tide are high in fine sediments and are anaerobic, producing little vegetation or macroinvertebrates to attract birds (USFWS, 2005a).

Marsh- and Waterbirds
The dense and diverse marsh vegetation attracts many wading birds including great blue heron, great egret, and double-crested cormorants *(Phalacrocorax auritus)* (USFWS, 2005a).

Game Birds
There are no known game birds on the refuge and there is no public hunting of any kind allowed on the refuge. None of the birds listed as game birds by the VDGIF are likely to occur on the refuge considering the extensive wetlands and limited upland habitat.

Reptiles and Amphibians
There have been no recent surveys or studies of reptiles or amphibians conducted on Featherstone Refuge; however many of the reptile and amphibian species found in Prince William County are likely to occur on the refuge. Table A.7 in appendix A lists the amphibians and reptiles known or suspected to occur on the refuge.

Mammals
Common mammals observed on Featherstone Refuge include white-tailed deer, red fox, gray squirrel, and beaver (USFWS, 2005a). There have been no recent mammal surveys or studies conducted on the refuge; however, many of the mammals found in Prince William County are likely to occur on the refuge. Table A.8 in appendix A lists the mammal species known or suspected to occur on the refuge.

Interjurisdictional and Other Fish Species
The tidal Potomac River and tributaries support a diversity of interjurisdictional fish species that depend in part on the larger tributaries (including the Occoquan River and Neabsco Creek), the smaller streams that include Farm Creek, and the marshes along the Virginia shoreline for habitat. Interjurisdictional fish of interest to the Service and considered species of concern by VDGIF (2005), include the shortnose sturgeon (Tier I), Atlantic sturgeon (Tier II), alewife (Tier IV), American shad (Tier IV), and American eel (Tier IV). Table A.9 in appendix A lists the fish species of conservation concern known or suspected in the refuge area.

Cultural Resources

Presently, there is one known historical site and two archaeological sites on the refuge, including a Native American site of undetermined age. Although no professional surveys or site testing have been conducted at Featherstone Refuge, there is a high likelihood that other sites are present. Appendix F describes the cultural resources of Featherstone Refuge.

Featherstone Refuge shoreline

Bill Wallen

Chapter 4

John Mosesso Jr/NBII

American widgeon

Management Direction and Implementation

- Introduction
- Part One—Mason Neck Refuge Management
  - Introduction
  - General Refuge Management
  - Conducting Additional NEPA Analysis
    - Mason Neck Refuge Goals, Objectives, and Strategies
      - Detailed Objectives and Strategies to Meet Refuge Goals
- Part Two—Featherstone Refuge Management
  - Introduction
  - General Refuge Management
  - Conducting Additional NEPA Analysis
    - Featherstone Refuge Goals, Objectives, and Strategies
      - Detailed Objectives and Strategies to Meet Refuge Goals

Introduction

This chapter begins with a description of the process we used to formulate the management direction and implementation for both Mason Neck and Featherstone Refuges. Next, we present the management direction and implementation for the refuges in two parts: Part One covers Mason Neck Refuge; Part Two covers Featherstone Refuge. Parts One and Two both start with a description of actions that are required by law or regulation, have been previously approved, or that help to achieve multiple refuge goals. We also identify decisions we are not making at this time and that will require additional NEPA analysis before a final decision can be made. We conclude with the goals, objectives, and strategies for managing each refuge.

The management direction and implementation we describe in this chapter includes a set of refuge goals, objectives to achieve those goals, and a series of strategies to implement them. The array of management actions described here are those that, in our professional judgment, will best achieve that refuge's purposes, vision, and goals, and best respond to public issues.

Refuge goals are intentionally broad, descriptive statements of the desired future condition for a refuge's resources. By design, they are less quantitative and more prescriptive in defining the targets of our management. They also articulate the principal elements of refuge purposes and our vision statements, and provide a foundation for developing specific management objectives and strategies. As noted in chapter 1, developing a strategic plan to achieve the goals is the purpose for developing the CCP.

Objectives are essentially incremental steps toward achieving a goal and they further define management targets in measurable terms. They provide the basis for determining more detailed strategies, monitoring refuge accomplishments, and evaluating our success. The Service guidance in "Writing Refuge Management Goals and Objectives: A Handbook" (USFWS, 2004) recommends that objectives possess five properties to be "SMART":

1) Specific
2) Measurable
3) Achievable
4) Results-oriented
5) Time-fixed

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

The strategies for each objective are the specific or combined actions, tools, or techniques we may employ to achieve an objective. The list of strategies under each objective identifies the potential suite of actions we may implement. We will evaluate most of them further as to how, when, and where they should be implemented in refuge step-down plans. We will measure our success, in part, by how well our strategies achieve our objectives and goals.

We also list biological monitoring elements which are recommended ways to measure our success with respect to achieving our biological program objectives. The results of this monitoring may also trigger adjustments to our management strategies, or trigger a reevaluation or revision to our objectives.

Part One—Mason Neck Refuge Management

Introduction

We believe the management goals, objectives, and strategies described below provide the best combination of actions to meet the Refuge System mission and policies, meet refuge purposes and goals, and to address public issues. We plan to enhance and expand our partnerships to help achieve priority work and obtain the best resource information available. Our management focus will be on those actions that protect and enhance the refuge's tidal marsh and forest habitats, with emphasis on benefiting bald eagles, forest-dependent migratory songbirds, waterfowl, and wading and waterbirds, such as great blue heron

As noted above, our highest priority is to protect and enhance the diversity, integrity, and health of the refuge's Great Marsh and the mature hardwood-mixed forest habitats to support Federal trust resources and species of conservation concern. We will also work with partners to develop shoreline protection measures and address climate change impacts. We will develop a Habitat Management Plan (HMP) to outline the detailed, site-specific prescriptions and strategies we intend to employ in those habitats to benefit a broad array of wildlife, including our focal species, amphibians and reptiles, fish and other aquatic resources, and other native wildlife of conservation concern. The HMP will also include detailed plans to improve Little Marsh impoundment and other refuge wetlands. We will also improve our program to treat invasive species. Our mapping, inventorying, and monitoring program of wildlife and habitats will increase to help assist us in measuring our successes.

We will enhance our visitor services program by improving our infrastructure and the quality of our programs, and offering new opportunities. For example, we will improve our existing parking facilities and trails, and create new trails and observation platforms on Sycamore and Treestand Roads. These actions will provide additional opportunities for wildlife observation, photography, and interpretation. Once we have resources in place, we will also offer a new youth turkey hunt and consider expanding our deer hunt. Our outreach to the local community will improve through increased Service visibility, an improved volunteer program, and enhanced visitor services programs and services.

We will manage the refuge as part of the Refuge Complex from new headquarters on Occoquan Bay Refuge once constructed. The approved Refuge Complex staffing chart identifies a total of 16 positions; an increase of 10 positions from our current staffing levels. We have identified the vacant positions we recommend in this CCP which we believe are key to implementing this plan's goals and objectives. They include wildlife biologists and maintenance, law enforcement, and visitor services staff.

General Refuge Management

There are some actions we propose to take in managing Mason Neck Refuge over the next 15 years that are required by law or policy, or represent actions that have undergone previous NEPA analysis, public review, agency review, and approval. Others may be administrative actions that do not necessarily require public review, but we want to highlight them in this public document. They may also be actions we believe are critical to achieving the refuge's purpose, vision, and goals.

It is important here to reemphasize that CCPs provide long-term guidance for management decisions through goals, objectives, and strategies. They represent our best estimate of future needs. This CCP details program levels and activities that are substantially above current budget allocations and, as such, should be

viewed as strategic in nature. Our budgets are determined annually by Congress and distributed through our Washington and Regional office before arriving at field stations. In summary, the actions proposed in this CCP represent our strategic vision for the future. Final CCPs do not constitute a Service commitment for staffing increases, funding for operations and maintenance, or future land acquisition. Implementation must be adjusted annually given the reality of budgets, staffing, and unforeseen critical priorities.

All of the following actions, which we discuss in more detail below, are current practices or policies that will continue:

- Using an adaptive management approach, where appropriate
- Consolidating and improving refuge lands and facilities
- Staffing and refuge administration
- Coordinating with refuge partners, Friends of Potomac River Refuges, and the Mason Neck Refuge community
- Protecting federally listed and recently de-listed species
- Managing invasive plants
- Controlling pest animals
- Monitoring and abating wildlife diseases
- Managing forest health and condition
- Supporting research and investigations
- Developing refuge step-down plans
- Distributing Refuge Revenue Sharing payments to Fairfax County
- Protecting cultural resources
- Supporting wildlife-dependent recreational uses
- Continuing a fishing closure
- Conducting appropriateness and compatibility determinations
- Conducting additional NEPA analysis

Using an Adaptive Management Approach

We will employ an adaptive management approach for improving resource management by learning from management outcomes. In 2007, Secretary Kempthorne issued Secretarial Order No. 3270 to provide guidance on policy and procedures for implementing adaptive management in Departmental agencies. In response to that order, an intradepartmental working group developed a technical guidebook to assist managers and practitioners: "Adaptive Management: The U.S. Department of Interior, Technical Guide." It defines adaptive management, the conditions under which we should consider it, the process for implementing it, and evaluating its effectiveness (Williams et al., 2007). You may view the technical guidebook at: *http://www.doi.gov/initiatives/AdaptiveManagement/documents.html* (accessed June 2011).

The guidebook provides the following operational definition for adaptive management:

> *Adaptive management is a decision process that promotes flexible decisionmaking that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increase scientific knowledge, and reduces tensions among stakeholders.*

This definition gives special emphasis to the uncertainty about management impacts, iterative learning to reduce uncertainty, and improved management as a result of learning. At the refuge level, our monitoring of management actions, outcomes, and key resources will be very important to implementing an adaptive management process. Our invasive species and integrated pest management activities are examples of refuge programs or activities where an adaptive management approach may be implemented to ensure we are protecting the health and integrity of our habitats. Responding to climate change impacts will also require an adaptive management approach because of the uncertainty as to how, when, and where habitats and species will respond to those impacts.

The refuge manager will be responsible for changing management actions and strategies if they do not produce the desired conditions. Significant changes from what we present in our final CCP may warrant additional NEPA analysis and public comment. Minor changes will not, but we will document them in our project evaluation or annual reports. Implementing an adaptive management approach supports all the goals of the refuge.

Consolidating and Improving Refuge Lands and Facilities

Consolidating Refuge Lands

We will continue discussions with the NVRPA, Fairfax County, and elected officials about options for consolidating Service fee ownership of refuge lands. Presently, 789 of the refuge's 2,277 acres are under a 60-year lease agreement with NVRPA that began in 1982; 31 years remain on that lease which will expire in 2042. Acquiring this land in fee would provide the Service maximum management flexibility. This would be especially desirable when implementing forest management or wetlands restoration projects.

Building a New Refuge Headquarters/Visitor Center

We will continue to pursue funding to build a new Refuge Complex headquarters and visitor center on Occoquan Bay Refuge. Staff, equipment, interpretive materials, and exhibits at this facility would support the outreach, interpretive, and educational objectives identified for Mason Neck Refuge. We have completed a separate EA for locating and developing this facility (USFWS, 2009a).

Maintaining Visitor Facilities

We will continue to make incremental progress in maintaining and upgrading existing visitor services facilities, such as interpretive and informational signs and parking areas. We will also continue to identify and remove those structures that have no useful purpose or that pose safety hazards. Our objective is to continue to maintain our facilities to Service standards to keep them safe, functional, and attractive.

Providing Refuge Housing
We will pursue options for providing refuge staff housing onsite (see map 4.1). Affordable housing in the area is limited and refuge staff must often travel extended distances to find housing they can reasonable afford. It has been very challenging to find seasonal or temporary staff under these circumstances. Travel time between the refuges within the Refuge Complex during the workday can also be problematic and inefficient. Currently, due to traffic congestion on U.S. Route 1, refuge staff can spend over one hour commuting between refuges less than 15 miles apart. The resulting travel time between home and work, or between refuges, also decreases the Service's ability to respond to incidents or emergencies. Having housing located near the refuge would

- increase resource and visitor protection;
- provide a Service presence in the area, even when the refuge is closed;
- promote greater awareness of the refuge and its resources by having an employee in the local community conducting outreach, both planned and opportunistic;
- provide affordable housing for Service employees; and
- provide short-term housing for temporary staff, researchers, interns, and employees on detail.

Our provisional location for the housing is on refuge lands adjacent to the entrance road on uplands east of Kane's Creek close to the refuge boundary. We will conduct archaeological and threatened and endangered species surveys and water percolation tests for a septic system before a final location is selected. The building will be a two-story duplex set back from the road so as to be less visible to refuge visitors. It will have a garage and an approximately 50 foot length driveway, and be serviced by well-water and a septic field. The construction of the building will disturb no more than 1 acre of land.

Also on refuge lands, we will continue to pursue installing a pad and facilities hookups for a recreational vehicle (RV) to be used as seasonal temporary quarters for refuge volunteers. It will be located at the Mason Neck Refuge maintenance facility, or other feasible location on the refuge where infrastructure could be placed without diminishing resource values or public activities.

Ovenbird

Bill Thompson

We will obtain all Federal and State reviews and permits required for these construction activities on refuge lands.

Best Management Practices for Construction and Maintenance Activities
We will implement best management practices for all construction and maintenance activities to the extent applicable and practicable on refuge lands. Recommended practices include, but are not limited to, the following:

- Operate machinery and construction vehicles outside of stream-beds and wetlands; use synthetic mats when in-stream work is unavoidable.

Map 4.1. Mason Neck Refuge Existing and Planned Public Use Features

- Preserve the top 12 inches of material removed from wetlands for use as wetland seed and root-stock in the excavated area.

- Design erosion and sedimentation controls in accordance with the most current edition of the "Virginia Erosion and Sediment Control Handbook". These controls should be in place prior to clearing and grading, and maintained in good working order to minimize impacts to State waters. The controls should remain in place until the area is stabilized.

- Place heavy equipment, located in temporarily impacted wetland areas, on mats, geotextile fabric, or use other suitable measures to minimize soil disturbance, to the maximum extent practicable.

- Restore all temporarily disturbed wetland areas to pre-construction conditions and plant or seed with appropriate wetlands vegetation in accordance with the cover type (emergent, scrub-shrub, or forested). The applicant should take all appropriate measures to promote revegetation of these areas. Stabilization and restoration efforts should occur immediately after the temporary disturbance of each wetland area instead of waiting until the entire project has been completed.

- Place all materials which are temporarily stockpiled in wetlands, designated for use for the immediate stabilization of wetlands, on mats or geotextile fabric in order to prevent entry in State waters. These materials should be managed in a manner that prevents leachates from entering State waters and must be entirely removed within 30 days following completion of that construction activity. The disturbed areas should be returned to their original contours and stabilized within 30 days following removal of the stockpiles, and restored to the original vegetated state.

- All non-impacted surface waters within the project or right-of-way limits that are within 50 feet of any clearing, grading, or filling activities should be clearly flagged or marked for the life of the construction activity within that area. The project proponent should notify all contractors that these marked areas are surface waters where no activities are to occur. Measures should be employed to prevent spills of fuels or lubricants into State waters.

- Minimize natural area loss on new and rehabilitated federal facilities.

- Adopt low-impact development and best management technologies for stormwater, sediment and erosion control, and reduces impervious surfaces.

- Consider construction design consistent with the "Conservation Landscaping and Bay-Scapes for Federal Land Managers Guide."

- Use, where possible, water or chemicals for fugitive dust control.

- Install and use hoods, fans, and fabric filters to enclose and vent the handling of dusty materials.

- Cover open equipment while conveying materials.

- Promptly remove spilled or tracked dirt or other materials from paved streets and remove dried sediments resulting from soil erosion.

- Reduce, reuse, and recycle all solid wastes generated.

- Minimize and properly handle generated hazardous wastes.

Staffing and Refuge Administration

Permanent Staffing and Operational Budgets

Our objective will continue to be to sustain annual funding and staffing levels that allow us to achieve our refuge purposes, as interpreted by the goals, objectives, and strategies in this CCP. Many of our most visible projects since refuge establishment were achieved through special project or "earmarked" funds that typically have a 1 to 2-year duration. While these funds are very important to us, they are limited in their flexibility since they typically cannot be used for any other priority project that may arise.

In response to Refuge System operational funding declines nationwide, a Regional Work Force Plan was developed in 2006 to support a new base budget approach. The goal was to have a maximum of 75 percent of a refuge complex's budget cover salaries and fixed costs, while the remaining 25 percent or more will be operations dollars. The intent of this strategy is to improve the refuge manager's capability to do the highest priority project work and not have the vast majority of a refuge's budget tied up in inflexible, fixed costs. Unfortunately, in a stable or declining budget environment, this may also have implications on the level of permanent staffing.

Within the guidelines of the new base budget approach, we will maintain, at a minimum, the six current full-time staff positions for the Refuge Complex, which include a refuge manager, assistant refuge manager, visitor services specialist, law enforcement officer, administrative assistant, and maintenance worker. Staff will continue to be shared within the Refuge Complex and will be assigned tasks at any of the three refuges based on the refuge manager's determination of how resources should be distributed to accomplish priorities. This CCP proposes an increase in staff based on the national staffing model developed for refuges by the Service in 2008. See our discussion that follows on "Implementation of the National Staffing Model."

Implementing the National Staffing Model

In 2008, the Assistant Director of the Refuge System convened a team to develop a national staffing model that would more effectively represent what is needed to operate and manage the diversity of field stations in the Refuge System. The team was directed to develop a model that would take into account the variety of refuge purposes in the Refuge System, contribute to the Refuge System mission, and comply with the 1997 Refuge Improvement Act and other laws, regulations, and policies. The team was also directed to build upon information and lessons learned from previous Systemwide staffing modeling efforts.

The model developed considers 15 factors which drive refuge workloads, including consideration of the amount of acres under management and the level of intensity of management. For example, such things as the amount of invasive species management, endangered species management and monitoring, active habitat management and biological monitoring, wilderness management, visitation and visitor services programs, volunteer programming, Friends Group coordination, maintenance and facilities management, aircraft or ocean travel needs, subsistence uses, and law enforcement are factors evaluated. The model identifies a total number of full-time equivalents (FTEs) a refuge should have, but does not dictate what the specific positions should be, nor does it determine a priority order for filling them. These more detailed decisions are made by the Regional Director, after advisement from the Assistant Regional Director for the Refuge System and recommendations from respective refuge managers.

The national staffing model recommends 16 positions for the Potomac River Refuge Complex. We have proposed which specific positions are recommended to fill out 16 positions. We present the recommended staff in appendix E "Staffing Chart." We also identify our recommended priority order for acquiring new staff in appendix C "Refuge Operations Needs System (RONS) and Service Asset Maintenance Management System (SAMMS)."

Refuge Operating Hours
We will continue to open the refuge for public use year-round during refuge hours of operation. These hours of operation are typically 7:00 am to 7:00 pm from April 1 to September 30 and 7:00 am to 5:00 pm from October 1 to March 31. We temporarily close the refuge to all but hunters during scheduled refuge hunt days. However, the refuge manager does have the authority to issue a special use permit to allow access outside those periods. For example, we may permit access for research personnel or hunters at different times, or allow organized groups to conduct nocturnal activities, such as wildlife observation, environmental educational, and interpretive programs. To insure visitor safety and protect refuge resources, the refuge manager also has the authority to close the refuge at any time.

Coordinating with Partners, Friends of Potomac River Refuges, and the Mason Neck Refuge Community

Partners
We will continue to maintain active involvement in the Mason Neck Land Managers Group (Managers Group). The Managers Group is a partnership among all public land management agencies on the Mason Neck Peninsula including the refuge, Mason Neck State Park, the BLM, Gunston Hall, and the Pohick Bay Regional Park. It is designed to achieve habitat and public use management objectives that benefit public lands beyond the refuge boundary.

As part of the Managers Group, we will continue to

- communicate and coordinate regularly with the other agencies to discuss common goals, issues, and concerns, share technical information, and identify opportunities for cooperative management;
- rotate responsibility for hosting quarterly managers meetings;
- pursue formal memorandums of understanding(MOU)/memorandums of agreement (MOA) with these agencies, where warranted, to facilitate sharing of resources; and
- maintain the existing MOU with BLM to share in law enforcement.

In addition to the Managers Group, we will continue to evaluate opportunities for new partnerships with conservation organizations, educators, research and academic institutions, and other State and Federal agencies who share similar missions and goals. We will develop formal MOU/MOAs or cooperative agreements, as warranted, to facilitate the sharing of resources and implementation of programs.

With existing and future partners, we will make a greater effort to highlight our programs, opportunities, and successes through use of media links (e.g., Web site) and the development of quality outreach materials with clear and consistent messages. Many of our objectives that follow in this chapter also identify key partners working with us on specific programs.

Friends of Potomac River Refuges
We will continue to look for opportunities to enhance our relationship with the Friends of Potomac River Refuges. We will also encourage them to work with other local citizens' groups as an extension of our community outreach program. We will work closely with the Friends Group to

- implement their strategic plan;
- conduct monthly information and strategy meetings;
- protect federally listed and recently de-listed species;
- contribute information to their newsletter and Web site; and
- support their efforts at sponsoring community events and programs.

Protecting Federally Listed and Recently De-listed Species

The bald eagle was removed from the Federal list of threatened and endangered species in 2007. However, we will continue to protect nesting bald eagles and their habitat on the refuge because their protection was the primary purpose for establishing the refuge. Furthermore, the bald eagle remains a State-listed threatened species in Virginia and continues to be protected federally under the MBTA and the Eagle Act. There are currently three nesting bald eagle pairs on the refuge, and we will continue to monitor the nests and breeding activities and prohibit the public from disturbing them.

The Service has identified two federally listed plants in Fairfax County which have not been documented but may be present on Mason Neck Refuge: sensitive joint-vetch (threatened) and small whorled pogonia (threatened). We will continue to survey for these plants wherever we propose any ground disturbing activities on the refuge. If located, we will work with the respective species' Recovery Team, VNHP, and other experts to develop plans to protect them.

Managing Invasive Plants

The establishment and spread of 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."

The unchecked spread of invasive plants threatens the biological diversity, integrity, and environmental health of all refuge habitats. In many cases, these plants 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 general public have become more acutely aware of the negative effects of invasive species. There are many plans, strategies, and initiatives targeted toward more effective management of invasive species, including *The National Strategy for Management of Invasive Species* for the National Wildlife Refuge System (National Invasive Species Management Strategy Team 2003), *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 (2002). New information and updates on recent advances in control techniques are continually provided through the Refuge System biological discussion database and relevant workshops. There are also more funding sources, both within the Service's budget and through competitive grants, to conduct inventories and control programs.

Guidance for managing invasive species on refuges is found in the Service Manual (620 FW 1.7G). These actions, as stated in the Service Manual, serve to define our general strategies on the refuge:

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

2) Conduct refuge habitat management activities to prevent, control, or eradicate invasive species using techniques described through an Integrated Pest Management Plan (IPM), or other similar management plan, which comprehensively evaluates all potential integrated management options, including defining threshold/risk levels that will initiate the implementation of proposed management actions.

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 Complex integrated pest management planning to address the abilities and limitations of potential techniques including chemical, biological, mechanical, and cultural techniques.

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

6) Continue treatment of the most problematic species as funding and staffing permit.

7) Maintain early-detection/early-response readiness regarding new invasions.

8) Remove parent sources of highly invasive species (species that are high seed producers, or vigorous rhizome producers) from along edges of management units.

9) Maintain accessibility to affected areas for control and monitoring.

10) Continue and increase efforts to involve the community in promoting awareness of invasive species issues, and to seek assistance for control programs on and off the refuge.

In addition to these general strategies, we will continue to refine our control program to address the most critical problems first. Further, our priorities may be adjusted to reflect changes in Regional Service priorities, and/or based on new information or resource availability. We will identify those priorities and treatment needs in an IPM Plan for the Refuge Complex that will specify the tools, procedures, and mitigation measures we will use to address invasive plant problems on all three refuges. Until the plan is finalized, we will track the spread of invasive plants on the refuges and address their control as warranted. Currently, our particular concern on Mason Neck Refuge is the spread of mile-a-minute and Japanese stiltgrass. Other problem plants we are tracking include beefsteak plant, tree-of-heaven, Japanese barberry, Japanese honeysuckle, and Japanese wisteria *(Wisteria floribunda* (Willd.) DC.)

We will continue to treat invasive plants as needed using mechanical means (e.g. mowing or trimming) and hand-pulling, as well as herbicides. We will only use herbicides approved by the Regional Contaminants Coordinator and only in accordance with approved rate and timing of application. Consideration of impacts on target and non-target species is part of the approval process. The extent and frequency of approved herbicide use will depend on funding.

Controlling Pest 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." That definition could include the invasive species defined above, but in this section, we describe some situations involving native species and under what conditions we would initiate control.

In controlling pests, whether invasive or native species, we will continue to use an integrated approach. The Refuge Manual (7 RM 14.4C) defines integrated pest management 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."

An integrated approach uses various methods, including natural, biological, manual, mechanical, and chemical controls. Some examples and potential remedies of pest management follow.

Problem: Deer browsing on newly planted tree seedlings causing unacceptable levels of mortality

Potential solutions: Use tree shelters or plant clover in advance of tree planting to provide alternative food source. This will be a site-specific strategy to protect a specific valued resource at one location. Our general strategy for keeping deer populations in balance with overall refuge habitat conditions is through public hunting.

Problem: Beaver girdling large trees adjacent to public use facilities, potentially causing injury to visitors or damaging facilities from falling trees and branches

Potential solutions: Wrap trees with hardware cloth to prevent girdling. Temporarily employ State-licensed trappers to remove individuals from the population from selected locations. Remove dead trees before they fall. Also, see discussion below about furbearers and the discussion on general strategies.

Problem: Beaver damming and flooding creeks or other drainage areas, potentially killing native trees or flooding roads, preventing access or threatening public safety, and altering tidal flow

Potential solutions: Remove individual problem beavers by trapping and shooting.

Problem: Mute swans are competing with native waterfowl and damaging protected wetland areas

Potential solution: Work with Federal and State partners (e.g., VDGIF) to capture and remove mute swans. The Service goal is zero productivity for mute swan in the Region due to the swan's negative impact on native waterfowl and their habitats.

Problem: Resident Canada geese increasing in number and using protected wetland areas and grazing and depositing manure on Little Marsh dike and other grassy areas and on the adjacent Mason Neck State Park.

Potential solution: Work with Federal and State partners (e.g., VDGIF) to capture and remove resident Canada geese.

Problem: Furbearers, such as raccoons *(Procyon lotor)*, causing unacceptable levels of predation on nesting birds.

Potential solutions: If nest boxes are in use, construct predator guards. Employ mechanical removal or herbicides on invasive vines, such as Japanese

honeysuckle, that facilitate climbing predator's access to nests. Use a State-licensed trapper to remove individuals from the population in selected areas, if necessary.

We do not intend to initiate a public or recreational trapping program at this time. Trapping is considered a commercial activity and must meet a higher standard of compatibility than priority wildlife-dependent public recreational uses or other non-commercial uses. We will reconsider our position if future situations arise in which predation, habitat loss, or disease is severe, and we determine public trapping to be an effective, essential element in managing them. Until that is necessary, we will only use trapping on a case-by-case basis to help alleviate a particular problem. Trapping will only be conducted by refuge staff, their agents, or contractors, to achieve a specific management objective. As such, it will be considered a management or administrative activity and not subject to compatibility review.

We will continue to use the following general strategies in pest management:

1) Determine the need for site-specific control based on the potential to affect our management objectives for a given area. Although we will employ an adaptive management strategy, we also expect the lethal control or removal of individual animals to be the exception rather than the rule. Unfortunately, to establish general thresholds for that action is difficult. Instead, we will determine our solution by each site. For example, in some areas, beaver activity (e.g., ponding, flooding, tree-girdling, tree-falling, etc.) enhances our management objectives for wildlife and habitats. In other areas, extensive beaver activity (e.g., tree-felling, trees dying from flooding, blockage of water control structures, etc.), could begin to affect habitat significantly for migratory birds and other sensitive species. In summary, we will base our beaver management actions on the extent and impact of damage, and not on the number of beavers present. We will focus on how they affect sensitive resources, neighboring marshes and fields, refuge infrastructure, and accessibility. When non-lethal techniques are not feasible, or they are no longer a viable remedy, we will consider targeted trapping or shooting by refuge staff, their agents, or contractor.

2) Employ integrated pest management techniques, including those described in the examples above, when a species is having a significant impact on an area resulting in major habitat replacement and loss of valuable canopy trees, such as oaks.

3) Monitor results to ensure that pests do not exceed acceptable levels.

Monitoring and Abating Wildlife Diseases

The Service Manual chapter on Disease Prevention and Control is not yet published. Until it is, we derive guidance on this topic from the Refuge Manual and specific directives from the Director of the Service or the Secretary. Refuge Manual 7-RM-17.3 lists three objectives for disease prevention and control:

1) To manage wildlife populations and habitats so the likelihood of disease contraction and contagion are minimized

2) To provide for early detection and identification of disease mortality when it occurs

3) To minimize losses of wildlife from disease outbreaks

These objectives were published in 1982. Since that time, in addition to diseases that cause serious mortality among wildlife, significant attention has been

given to those diseases that are transmitted through wildlife to humans. For example, Lyme disease transmitted by ticks and West Nile virus transmitted by mosquitoes.

A serious wildlife disease receiving considerable attention worldwide is avian influenza. Of particular concern is the highly pathogenic Eurasian form (H5N1). In 2006, all refuges were instructed to prepare an Avian Influenza Surveillance and Contingency Plan. The plan covering the Refuge Complex was approved in July 2006 (USFWS, 2007a). It discusses methods for dealing with this disease should it ever be identified on the refuge.

Another disease of significant concern to both the Service and VDGIF is chronic wasting disease (CWD). CWD attacks the brain and spinal cord of deer, elk, and moose, and is typically fatal. While the exact cause is unknown, it is believed to be caused by a prion, an altered protein that causes other normal proteins to change and cause sponge-like holes in the brain. CWD was first identified in the 1960s in a Colorado research facility, and since that time it has been found in Wisconsin, Wyoming, Nebraska, New Mexico, South Dakota, Illinois, Utah, Kansas, Minnesota, Montana, Oklahoma, New York, West Virginia, and Canada. Prion diseases, like CWD, do not move easily between species. There is no scientific evidence that CWD has been transmitted to animals other than deer, elk (Cervus canadensis), and moose (Alces alces). There is also no evidence that any human has ever been infected with chronic wasting disease.

The VDGIF is conducting active surveillance for CWD during deer hunting seasons. To establish whether CWD occurs in Virginia, VDGIF commenced Statewide CWD surveillance in 2002. Deer have been sampled from every county in the Commonwealth. In January 2010, the VDGIF confirmed the first case of CWD in Virginia *(http://www.dgif.virginia.gov/wildlife/diseases/cwd/;* accessed June 2011). It was detected in a white-tailed deer killed by a hunter in Frederick County, near the West Virginia State line. VDGIF recommends that people take precautions to avoid exposure to animals infected with chronic wasting disease. Specifically, they recommend not consuming meat from any deer that appears abnormal, sick, or is known to be infected with CWD. They also recommend wearing gloves when dressing and boning deer meat. For more detailed information on VDGIF's response to chronic wasting disease, you can access their Chronic Wasting Disease Response Plan at: *http://www.dgif.virginia.gov/cwd* (accessed June 2011). We also developed a CWD plan for the Refuge Complex in 2006 and will continue to communicate and coordinate with VDGIF to monitor for the presence of the disease on and near the refuge.

Managing Forest Health and Condition

In addition to wildlife diseases, we will continue to be attentive to diseases and insect pests that affect forest health and condition. Since we place high value on hardwood forests on the refuge, diseases and insects that affect oaks are of special concern. Oaks in the U.S. are affected by more than 80 documented insects and diseases, with escalating international trade likely to introduce new pests. Impacts of these pests range from minor defoliation to rapid mortality. In some years, pests cause the loss of a major portion of the acorn crop, impeding oak regeneration. A few pests have altered, or may alter, eastern U.S. oak forests on a broad scale. For example, the spread of the introduced gypsy moth, a defoliator, has been aided in the last few decades by the accidental transport of egg masses by humans.

The emerald ash borer is another forest pest of increasing concern in the region. This beetle affects all ash species in North American. The canopy of infested trees will thin and die back above infested portions as the borer destroys the water and nutrient conducting tissues under the bark. One-third to one-half of

the branches may die in one year. Most of the canopy will be dead within 2 years of when symptoms are first observed.

General strategies for pest and disease prevention and control include the following:

1) Conduct pest and disease surveillance in conjunction with other field work.

2) Monitor forests and other habitats for indicators of increased occurrence of pests or disease. For example, note changes in flowering or fruiting phenology, physical damage, decay, weakening, sudden death, particularly of canopy and source trees of major host species, and note changes in wildlife use of habitats such as the absence of breeding birds that used to be seen regularly.

3) Cooperate with Federal and State agencies, particularly VDGIF and U.S. Department of Agriculture-Forest Service (USDA-FS) in conducting surveillance, providing access for sampling, and following protocols in the event of an outbreak.

4) Follow protocols outlined in national, State, and refuge-specific disease prevention and control plans.

In 2009, the VDF completed a Forest Health and Condition Inventory and Assessment of Mason Neck Refuge. Overall, they determined that the Mason Neck Refuge's hardwood forest was unhealthy, suffering from a lack of regeneration, missing an understory of shrubs and herbaceous plants, and was considerably "overstocked." The lack of hardwood regeneration, shrub layer, and herbaceous plants is likely due to overbrowsing from high deer populations. The VDF report included recommendations for improving forest health and habitat quality for bald eagles and forest interior dependent birds. Specific recommendations we plan to adopt are highlighted as strategies under each objective.

Supporting Research and Investigations

Guidance on conducting and facilitating research and investigations on refuges is found in the Refuge Manual and the Service Manual. In 1982, the Service published three objectives for supporting research on units of the Refuge System in the Refuge Manual (4 RM 6.2):

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 (603 FW 1.10D (4)) provided supplemental guidance on the appropriateness of research on refuges, as follows: "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."

All research conducted on the refuge by others must be determined in writing by the refuge manager to be both appropriate and compatible before a special use permit is issued to allow the activity. As noted in chapter 3, we have found several research projects to be appropriate and compatible. We expect that additional opportunities to conduct research on the refuge will arise in the future. In making determinations on the appropriateness and compatibility of future research proposals, we will follow guidance in the Refuge and Service Manuals and will employ the following general strategies:

- Seek qualified researchers and funding to help answer refuge-specific management questions.
- Participate in appropriate multi-refuge studies conducted in partnership with USGS.
- Facilitate appropriate and compatible research by providing temporary housing and equipment, if available, for persons conducting field work.
- Pursue peer-reviewed publications of research, and/or ensure the Service is acknowledged as a contributor in research conducted on the refuge by others.

Generally, we will approve permits for research projects that provide a direct benefit to the refuge or that will strengthen our decisions on managing natural resources or public use programs on the refuge. The refuge manager also may consider requests that do not relate directly to refuge objectives, but instead relate to the protection or enhancement of native species and biological diversity in the region and support the goals of ecoregional conservation plans, such as the ACJV.

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. We will ask our refuge biologists, other divisions of the Service, USGS, select universities or recognized experts, VNHP, and the VDGIF to peer review and comment on research proposals and draft publications, and will share research results internally, with these reviewers, and other conservation agencies and organizations. To the extent practicable, and given the publication type, all research deliverables will conform to Service graphic standards.

Some projects, such as depredation and banding studies, will require additional Service permits. The refuge manager will not approve those research projects until all required permits are received and the consultation requirements under the Endangered Species Act have been met.

Developing Refuge Step-down Plans

Service planning policy identifies 25 step-down plans that may be applicable on any given refuge. We have identified those that are most relevant to this planning process and have prioritized the completion of those plans yet to be developed. We will modify and update plans as new information is available to keep each plan relevant. All plans completed are incorporated by reference and their implementation assumed in this CCP. Completion of step-down plans supports all refuge goals.

Refuge Complexwide Plans
We will continue to complete Refuge Complex step-down plans according to the following schedule, with details on specific refuges incorporated in them:

- Chronic Wasting Disease Plan (completed 2006)
- Avian Influenza Plan (completed 2006)
- Law Enforcement Plan (in preparation; high priority)
- Safety Plan (updated annually)
- Emergency Action Plan (updated annually)
- Continuity of Operations Plan (updated annually)
- Hazard Communications Plan (updated annually)
- Hurricane Plan (updated annually)
- Fire Prevention Plan (updated annually)
- Integrated Pest Management Plan (moderate priority)

Refuge-specific Plans
The following are refuge-specific plans developed to address the specific conditions and requirements that pertain to Mason Neck Refuge. The priorities for completing the refuge plans are noted below.

- Fire Management Plan (FMP) (completed in 2004; planned for update)
- Habitat Management Plan (HMP) (highest priority; to be completed after CCP approval)
- Visitor Services Plan (VSP) (high priority)
- Inventory and Monitoring Plan (IMP) (moderate priority; dependent on completing HMP)
- Sign Plan (moderate priority)

Distributing Refuge Revenue Sharing Payments

As described in chapter 3, we pay Fairfax County refuge revenue sharing payments based on the acreage and the appraised value of Service fee-owned refuge lands. These annual payments are calculated by a formula determined by, and with funds appropriated by, Congress and authorized by the Refuge Revenue Sharing Act (16 U.S.C. § 715s). 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.

Protecting Cultural Resources

As a Federal land management agency, we are entrusted with the responsibility to locate and protect cultural resources, including archaeological sites and historic structures that are eligible for the National Register of Historic Places. This applies not only to resources that are located on refuge lands, but also those on lands affected by refuge activities, as well as any museum properties. There are many recorded historical and archaeological sites within the refuge area. Considering the refuge's location on the tidal Potomac River, it is likely that additional sites of various periods will be identified in the future. Appendix F includes an overview of refuge cultural resources.

During the release of the public draft CCP/EA, we consulted with the Virginia State Historic Preservation Officer (SHPO) regarding our proposed cultural resource management. In their response, the Virginia SHPO stated they fully support our cultural resource management program and agree it supports and fulfills the Service's stewardship responsibilities under Section 110 of the National Historic Preservation Act (Eaton 2011 personal communication). We will continue to conduct evaluations of the potential for refuge projects

to impact archaeological and historical resources and to consult with our regional archaeologist and Virginia SHPO, as appropriate. This will be especially important for those projects that include moving or displacing soil, as preservation in place is our preferred treatment for archaeological sites. A pre-project evaluation of activities will ensure we comply with Section 106 of the National Historic Preservation Act. That compliance may require any or all of the following: a State Historic Preservation Records survey, literature review, or field survey. In addition to any surveys and reviews, we will seek to minimize adverse impacts to eligible archaeological sites through limiting public access and monitoring by law enforcement officials.

We also plan to work with State and local historical societies and preservation offices to interpret cultural resources on the refuge and to explain the importance of protection and preservation of those resources.

Supporting Wildlife-dependent Recreational Uses

The 1997 Refuge Improvement Act designated six wildlife-dependent priority public uses on national wildlife refuges: hunting, recreational fishing, wildlife observation, wildlife photography, environmental education, and interpretation. Per the General Guidelines for Wildlife-dependent Recreation, Fish and Wildlife Service Manual (605 FW 1), we will strive to ensure any wildlife-dependent recreation program

1) promotes safety of participants, other visitors, and facilities;

2) promotes compliance with applicable laws and regulations and responsible behavior;

3) minimizes or eliminates conflict with fish and wildlife population or habitat goals or objectives in an approved plan;

4) minimizes or eliminates conflicts with other compatible, wildlife-dependent recreation;

5) minimizes conflicts with neighboring landowners;

6) promotes accessibility and availability to a broad spectrum of the American people;

7) promotes resource stewardship and conservation;

8) promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources;

9) provides reliable/reasonable opportunities to experience wildlife;

10) uses facilities that are accessible to people and blend into the natural setting; and

11) uses visitor satisfaction to help define and evaluate programs.

In 2005, the Regional Visitor Services Review Team identified priority wildlife-dependent public use programs of emphasis for each refuge. They identified wildlife observation and interpretation as the emphasis for Mason Neck Refuge. This determination was based on careful consideration of the refuge's natural resources, existing staff, operational funds, existing and potential facilities, and which programs we would be most effective in providing "quality" opportunities for visitors. While all of the priority public uses are important, and all but

fishing are offered on this refuge (see discussion below), wildlife observation and interpretation will receive greater emphasis when prioritizing projects and the distribution of refuge resources. As always, we look to our conservation partners, as well as the Friends of Potomac River Refuges and volunteers, to help develop and assist with all refuge public use programs.

Continuing a Fishing Closure at Mason Neck Refuge

Mason Neck Refuge has never been open to fishing and will continue to be closed to this use. There are several reasons for this. We are concerned that anglers walking along the refuge shoreline have the potential to disturb nesting and wintering bald eagles, waterbirds, and waterfowl. We are also concerned with trampling of sensitive tidal marsh vegetation and contributing to shoreline erosion. There are also areas on the shoreline with high, eroding banks where safety is a concern. In summary, there are no areas along the refuge shoreline where we could offer a fishing opportunity and not be concerned with resource damage, wildlife disturbance, or safety. We will continue to direct people to the adjacent State Park for fishing.

Conducting Appropriateness and Compatibility Determinations

Chapter 1 describes the requirements for appropriateness and compatibility determinations. Appendix B includes appropriateness and compatibility determinations to support the activities in this chapter. We will only allow activities determined appropriate and compatible to meet or facilitate refuge purposes, goals, and objectives.

Activities Not Allowed
We have received requests for non-priority, non-wildlife dependent activities that have never been allowed on Mason Neck Refuge. Activities evaluated by the refuge manager and determined not to be appropriate on refuge lands include the following:

- Taking of native plants, berry picking, and mushroom harvesting
- Jogging
- Horseback riding
- Picnicking
- Biking off of designated routes
- Swimming and sunbathing
- Non-wildlife-dependent group gatherings (e.g. weddings, family reunions, and other similar parties)
- Geo-caching (a “treasure-hunting” game using global positioning system (GPS) devices

Appendix B documents the refuge manager’s decision on their appropriateness. Most of these activities are sufficiently provided nearby on other ownerships, so the lack of access on the refuge does not eliminate the opportunity in the area. According to Service policy 603 FW 1, if the refuge manager determines a use is not appropriate, it can be denied without determining compatibility.

Another request from local residents for a proposed public trail system is in development on the Mason Neck Peninsula. The proposed plans indicate that part of this trail system would terminate at the trailhead parking area for the refuge’s Great Marsh Trail. This proposed trail would be multi-use and allow activities

prohibited on the Great Marsh Trail such as bike riding and rollerblading. Given the preliminarily information provided by proponents of the trail, we have been disinclined to allow it on the refuge until the following concerns are addressed.

First, some of the uses allowed on the proposed tail are not compatible and would conflict with users on the Great Marsh Trail. Some of the uses on the public trail are not wildlife-dependent uses and are not necessary to support priority public uses on the refuge. User conflicts may also decrease the enjoyment of refuge visitors engaged in wildlife-dependent use of the Great Marsh Trail. We do not feel that terminating a public trail that allows incompatible uses at a refuge trailhead will support any refuge purpose, objective, or goal and will not benefit the natural or cultural resources present on the refuge.

Secondly, it is predicted that some individuals using the public trail system will park in the Great Marsh Trailhead parking lot, thus decreasing the amount of parking available for refuge visitors engaged in priority public uses. This could also result in increased use of other refuge facilities by non-refuge users, such as restrooms and trash receptacles. The refuge would incur the costs of increased maintenance of these facilities. We also expect an increase in instances of prohibited uses (e.g. bicycling, rollerblading, jogging) on the Great Marsh Trail by visitors that do not differentiate between the refuge trail and the proposed public trail system. These instances would create an increased workload for the refuge law enforcement officer.

Finally, most of the proposed trail would lay off-refuge or traverse the border of the refuge. We are concerned with who would assume responsibility for trail maintenance and the enforcement against illegal or unauthorized uses. Most of the public would likely assume the trail is owned and maintained by the refuge and would, therefore, expect refuge staff, including the law enforcement officer, to address any trail issues.

Non-Priority Activities Allowed
In addition to the five priority recreational and educational uses we allow, we have determined that several other activities are appropriate and compatible on refuge lands under certain circumstances. They include: dog walking (leash only), research, and certain outdoor events. These activities are either discussed earlier in this section or described in detail under "Goals, Objectives, and Strategies," and included in appendix B.

Special Use Permits
A special use permit may be issued for specialized or unique activities allowed on the refuges. The refuge manager will evaluate each activity for their appropriateness and compatibility on a case-by-case basis as they are requested. These activities could include groups of 10 or more individuals or self-guided groups who wish to host their own wildlife-dependent activities, or research activities. Groups of 10 or more are required to have permission for wildlife observation and photography, environmental education, and interpretation. Each request must be presented in writing with details of who, what, where, when, why, and how the activity will be conducted. Each request has different logistics and, therefore, will be evaluated for impacts on the refuge mission. Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of refuge regulations, a special use permit will be issued outlining the framework in which this use can be conducted. Refuge staff will ensure compliance with the special use permit.

Conducting Additional NEPA Analysis

For all major actions, NEPA requires site-specific analysis and disclosure of their impacts, either in an EA or an environmental impact statement (EIS). Most of the major actions in this CCP were fully analyzed in the draft CCP/EA and

are described there in enough detail to comply with NEPA, and do not require additional environmental analysis. Although this is not an all-inclusive list, the following project examples fall into this category:

- Biological inventories and monitoring
- Modifications to our public use programs, including expanded deer hunting and a new youth turkey hunt
- Controlling invasive plants and animal pests
- New refuge housing
- An RV pad for trailer parking
- New trails on existing roadbeds

Although we analyzed the impacts of most management actions in the draft CCP/EA, additional or supplemental NEPA analysis will be necessary for certain types of actions. An example of this is our proposal to evaluate the need for, and feasibility of, shoreline protection projects on the refuge. Should we determine a proposed action that requires major construction to protect the refuge shoreline, we will conduct a detailed NEPA analysis, including public involvement, before a decision on a particular design is reached. Similarly, if we determine the need to conduct extensive forest management activities to address forest health or improve wildlife habitat, we will conduct a detailed NEPA analysis, including public involvement, before a decision is made. In either case, these are management actions whose precise details and therefore consequences cannot be known by the Service at this time.

Green heron

Eugene Hester/USFWS

Mason Neck Refuge Goals, Objectives, and Strategies

Detailed Objectives and Strategies to Meet Refuge Goals

GOAL 1: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities, including species of conservation concern.**

Objective 1.1 Mature Hardwood-mixed Forest—Bald Eagles

Actively manage 1,883 acres of forest to provide bald eagle nest and roost sites (for a minimum of 3 pairs of eagles). Protect all known sites by preventing disturbance using VDGIF and Service recommendations. Provide for potential new nest trees which are typically taller than the surrounding canopy with a large, branching limb structure providing easy access and wide views near marshes and rivers.

Rationale

Bald eagles generally nest near coastlines, rivers, large lakes, or streams that support an adequate food supply. In forested areas, bald eagles often nest in mature or old-growth trees, selecting the tallest trees with limbs strong enough to support their nests, which can weigh up to 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water where the eagles usually forage (USFWS, 2007b). For warmth during the winter, bald eagles sometimes use conifers and floodplains bounded by river bluffs at nighttime or when wind is severe (INHS, 2008).

The Potomac River and other major tidal rivers in Virginia also have areas where non-breeding eagles are known to concentrate for roosting and feeding. These areas may be used by non-breeding eagles in both summer and winter. These eagle concentration areas are extremely important because they are used by eagles from throughout the East Coast, as well as by resident eagles (USFWS/VDGIF, 2000).

A variety of food sources best satisfies the bald eagles' dietary needs (VAFWIS, 2010). The geographic area and season determines the diet. Bald eagles acquire the majority of their food in the shallow waters of low tide. Bald eagles use a variety of hunting techniques such as striking fish and scavenging carcasses. Infrequently, bald eagles pursue waterfowl in the air, particularly injured birds (INHS, 2008). Brown bullhead *(Ameiurus nebulosus),* chain pickerel (Esox niger), white sucker *(Catostomus commersoni),* white perch *(Morone americana),* and smallmouth bass *(Micropterus dolomieui)* are major food sources for inland nesting bald eagles. However, marine mainland bald eagles predominately eat alewife, blueback herring, and American eel. In the winter, food sources include common goldeneye, bufflehead *(Bucephala albeola),* and red-breasted merganser *(Mergus serrator)* (VAFWIS, 2010).

In this region, eagle pairs build their nests from October through January, lay eggs from January to April, rear their young from February through June, and fledge their young from May to August. During this entire period, eagle reproductive success may be adversely affected by human disturbance. If agitated by human activities, eagles may inadequately construct or repair their nest, may expend energy defending the nest rather than tending to their young, or may abandon the nest altogether. Activities that cause prolonged absences of adults from their nests can jeopardize eggs or young. Depending on weather conditions, eggs may overheat or cool too much and fail to hatch. Unattended

eggs and nestlings are subject to predation. Young nestlings are particularly vulnerable because they rely on their parents to provide warmth or shade, without which they may die as a result of hypothermia or heat stress. If food delivery schedules are interrupted, the young may not develop healthy plumage, which can affect their survival. In addition, adults startled while incubating or brooding young may damage eggs or injure their young as they abruptly leave the nest. Older nestlings no longer require constant attention from the adults, but they may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly or care for themselves. Once fledged, juveniles range up to ¼ mile from the nest site, often to a site with minimal human activity. During this period, until about 6 weeks after departure from the nest, the juveniles still depend on the adults to feed them (USFWS, 2007b).

This refuge was established in 1969 as the Nation's first refuge dedicated to protecting bald eagle, using funds provided under the Endangered Species Act. Eagles nested and wintered on the peninsula as far back as colonial times, but in the 1950s and 1960s they succumbed to habitat loss due to human development and contamination from pesticides. With greater awareness, an increase in their protection both nationally and regionally, and a reduction in pollution, the eagle population has made a remarkable recovery. The removal of the bald eagle from the Federal list of endangered and threatened species was predicated on the assumption that they would continue to thrive in areas they presently occupy. Mason Neck Refuge is one location where their protection will remain a priority, regardless of the bird's status, since it supports the principal purpose for which the refuge was established. We will continue to be concerned about their health, productivity, and any disturbance or threats during nesting season. As we noted in chapter 1, the bald eagle continues to be protected by the Eagle Act and the MBTA.

USFWS

Bald eagle

The Service developed the National Bald Eagle Management Guidelines (2007) to help minimize impacts to bald eagles. To avoid disturbing nesting bald eagles, the guidelines recommend (1) keeping a distance between the activity and the nest (distance buffers), (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees. These measures are all in place on the refuge.

With enhanced local and regional support for the existing and proposed strategies identified below, we believe the refuge can make an important

contribution to sustaining bald eagle nesting and wintering in the Chesapeake Bay region. Hiring a wildlife biologist will be an important component to accomplishing this objective.

Strategies

Continue to

- Protect all known active nest sites from human disturbance by restricting public access during sensitive nesting periods. The size of closed area depends on topography, vegetation, and sight distance.
- Post trail closures and/or warning signs at appropriate, visible locations to explain to visitors the restriction.
- Cooperate with VDGIF and Mason Neck State Park staff in monitoring bald eagle nesting activity.
- Use refuge law enforcement officer to conduct outreach and enforce restrictions.

Over the 15 years of CCP implementation:

- Hire additional biological staff as identified in the staffing chart (appendix E) to plan, coordinate, and implement activities.
- Work with Service and VDGIF bald eagle experts to define potential nest and roost stands, in addition to those currently used by eagles. Identify possible stand treatments to enhance both potential and currently used areas; consider such actions as thinning, planting, tree release, and fuel reductions to protect areas from potential wildfires and provide optimum growth for potential nest trees.
- Ensure management actions meet or exceed the guidelines for protection and management of eagle sites as identified in the Service's National Bald Eagle Guidelines (2007).
- Develop nest and/or roost site management plans as warranted, prioritizing actions and developing an implementation schedule. Incorporate plans into HMP.
- Create and maintain a GIS database with locations of active and potential nest and roost sites, and any management activities. Annotate database with results of annual surveys.
- Work with VDGIF to conduct mid-summer and mid-winter surveys on the refuge. If funding allows, also conduct nest productivity surveys.

Monitoring Elements

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, or trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:
  - Monitor changing bald eagle roost and nest use and make modifications or restore sites as necessary to ensure favorable site conditions. Monitor and control invasive plants, erosion, human disturbance, and other sources of habitat degradation to protect the integrity of roost, nest, and concentration areas on refuge property.

- Continue to incorporate nest and roost stands into ongoing biological surveys, such as habitat-based landbird count surveys, winter and summer bald eagle surveys, migration and winter bird counts. Landbird point count habitat classifications in or near roosts will be updated to track changes in habitat relative to bird habitat use.

Objective 1.2 Mature Hardwood-mixed Forest—Migrating Forest-dependent Birds

Protect and manage a healthy, contiguous, mature hardwood-mixed forest on 1,883 acres benefiting migrating forest-dependent birds, as well as breeding forest-interior dwelling birds and other native wildlife. A healthy mature hardwood mixed forest is characterized by

- canopy dominant and co-dominant species consisting of oaks, hickory, poplar, maple, sweet gum, black gum, and beech with patches of coniferous trees such as Virginia and loblolly pine;
- low edge to interior ratio;
- basal area of less than 100 square feet per acre;
- advanced regeneration of canopy trees (1-4 inches diameter at breast height (DBH)) greater than 300 stems per acre; and
- a diverse, native shrub layer represented by low and highbush blueberry, mountain laurel, pawpaw, arrowwood, *Viburnum* spp., wintergreen, greenbriar, Virginia creeper, partridgeberry, Solomon's seal, and wild yam with stem densities of greater than 1,500 per acre.

Rationale

Consistent with managing for bald eagles (objective 1.1) and the heron rookery (objective 1.3), our mature mixed forest management will emphasize habitat for migrating forest-dependent birds. Coastal forests and woodlands within the ACJV's BCR 30 region are crucial stopover sites during migration and overwintering for neotropical migrants (Steinkamp, 2008). Within BCR 30, forested upland communities provide habitat for the second highest number of priority bird species in the region (Steinkamp, 2008). Destruction and fragmentation of forests in both breeding and wintering areas are factors in forest bird species declining abundance (Roth et. al., 1996). Many of the declining forest birds are also associated with dense understory conditions created by local disturbance. These conditions have become less common due to a lack of forest management and overbrowsing by white-tailed deer (Rich et al., 2004).

Of particular concern in forest habitats in the region is the decline of forest interior dwelling species or FIDS, which require large contiguous forested tracts to maintain viable populations. A minimum habitat patch size is considered to be at least 50 acres in size with 10 or more acres of "forest interior" habitat (i.e., forest greater than 300 feet from the nearest forest edge) (Jones et al., 2000). This minimum habitat patch size, in fact, would only be capable of supporting less area-sensitive FID species. The larger the contiguous forest patch, the higher the probability of supporting a diversity of productive breeding pairs.

Among a number of management recommendations for forest birds made in the BCR 30 Plan are the following:

- Increase and improve active management of forests to improve habitat quality within existing and high priority upland forest (e.g., loss of shrub layer).
- Manage upland forest communities to provide post-fledging habitat (e.g., a habitat mosaic, including shrubby areas and openings; targeted species is the wood thrush).

- Develop and implement programs to control invasive plant species.

In 2009, the VDF completed an assessment of forest health and condition on the refuge's 1,883 forested acres to inform decisionmaking in respect to managing bald eagles and neotropical migrants. One of the major threats to forest health and condition is deer overabundance. At Mason Neck Refuge, the lack of midstory woody species diversity is likely due to intense browse pressure of white-tailed deer leading to the widespread growth of holly and beech, and shrubs and forbs known to be unpalatable to deer (McGlone and Lasher, 2009). Ensuring deer browse pressure does not significantly impact regeneration of woody species regeneration is essential in the success of the development of the refuge's forest understory. Numerous studies have found when white-tailed deer browse pressure is high, it can alter the growth, reproduction (Knight, 2003), diversity (Latham et al., 2005), and, ultimately, survival of plants within a specific population (Alverson and Waller,1997, Cote et al., 2004). In areas where deer density exceeds 20 deer per square mile, deer herbivory is related to declines in mid-story bird species (deCalesta, 1994). Other threats include gypsy moth infestations and spread of invasive plant species.

We believe refuge lands make an important contribution to the regional bird populations of FIDs such as wood thrush, Acadian flycatcher, and prothonotary warbler. These species are known to breed on the refuge and are listed as birds of conservation concern by various authorities (appendix A). According to the PIF Area 44 Plan, the BCR 30 plan, and Virginia WAP, other birds species of conservation concern that would benefit from a diverse, mature, mixed-deciduous forest include the eastern wood peewee, Kentucky warbler, cerulean warbler, Louisiana waterthrush, yellow-throated vireo, whip-poor-will *(Caprimulgus vociferus),* northern flicker *(Colaptes auratus),* scarlet tanager (Piranga olivacea), and raptors such as red-shouldered hawk, northern saw-whet *(Aegolius acadicus),* and barred owl (Rosenberg et al., 1999).

Hiring a refuge biologist and obtaining increased project funding will allow us to increase inventory, protection, and management of forest dependent species and the habitat features on which they depend.

Strategies
Continue to
- Support partner-led MAPS station bird survey work.
- Support volunteer-led bird survey work on an opportunistic basis.
- Work with VDGIF to assess deer populations and deer impacts on native vegetation.
- Conduct annual deer hunt as a means of keeping deer population in check and prevent deterioration to the forest understory and herbaceous layer.
- Work with USDA-FS to evaluate threat of gypsy moth outbreak.
- Be vigilant for unusual concentrations of pests, pathogens, and invasive plants and respond with respective treatments accordingly. These may include both chemical and mechanical controls (also see objective 1.5 below).
- Work with researchers, educators, conservation partners, and/or volunteers on an opportunistic basis to collect resource information on forest dependent wildlife and plants.
- Conduct outreach, education, and interpretation with visitors to explain the refuge's importance to the full complement of forest wildlife and plants.

- Minimize the potential for disturbance to unique habitat features by restricting public access to designated trails only.

- Interpret the importance of vernal pools and the other habitat features as important to a wide variety of wildlife in refuge literature and during refuge programs.

Over the 15 years of CCP implementation:

- Hire additional biological staff as identified in the staffing chart (appendix E) to plan, coordinate, and implement activities identified under this and all other objectives under goals 1 and 2. For example, these staff will develop HMP, IMP, and IPM plans, coordinate all field survey work, conduct GIS mapping, and coordinate forest management treatments. The senior biologist will also take a lead role in communicating with conservation partners.

- Enlist forest ecologists to conduct and evaluate results of forest health and condition inventory and assessment identifying the most significant threats to sustaining biodiversity, stand structure, function, and composition. If possible, work with State and Federal agencies, non-governmental conservation organizations, and/or universities with this expertise and that have worked in this region.

- Develop forest prescriptions with consideration of meeting migration requirements for neotropical landbirds and improving forest health; incorporate prescriptions, stand treatments, and implementation schedule in HMP. The range of possible treatments may include prescribed fire, thinnings, plantings, and patch cuts or regeneration cuts to restore, enhance, and maintain desired structural and species composition.

- Evaluate, with FMP update planned in 2011, needs to reduce fuel loading given the wildland-urban interface.

- Prioritize and implement those treatments that will protect forest health, reduce wildfire safety concerns, and complement bald eagle and migratory bird objectives.

- Maintain all data collected in GIS database.

- Consider other methods to reduce the deer herd in addition to the established public hunt, if further reductions are recommended to protect forest health and condition.

- Continue coordination with the USDA-FS for gypsy moth or other pest monitoring and control. Also coordinate with Mason Neck State Park and other adjacent landowners on Mason Neck Peninsula to make control measures more efficient.

- Evaluate all management actions to ensure they do not contribute to further forest fragmentation

- Develop a GIS based habitat map and maintain it to current Regional protocols

- Incorporate survey updates and map occurrences of vernal pools and other unique fine-scale habitat features; as sites are identified, determine if there are opportunities to further protect, restore, create, and/or enhance sites to benefit species of conservation concern. Include any plans for management and their priority and schedule in HMP. Incorporate detailed plans for a given year in an annual habitat work plan (AHWP).

- Establish priority needs to inventory and/or monitor for forest wildlife and plants of conservation concern. Incorporate planned activities, their priority, and schedule in the IMP. Given available funding and staffing, or under partnerships, implement priority activities.


Bill Wallen
Water pipit

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits, to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native forest species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Conduct spring and fall landbird surveys for measuring species composition and relative abundance within the refuge's mature hardwood-mixed forests.

  - Evaluate the effectiveness of white-tailed deer hunting program on regeneration of native trees, shrubs, and forbs by conducting vegetation surveys to gather information on species composition, abundance, and diversity.

  - Maintain desired quality and characteristics of forests for forest interior migratory birds by annually conducting scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than five percent of refuge upland acreage, and fundamental objectives are not compromised.

  - Monitor presence of coyotes *(Canis latrans)* and beaver and work with USDA–Animal and Plant Health Inspection Service (APHIS) or other licensed agent to control these species, as necessary to protect public safety and refuge resources.

  - Conduct surveys of anurans (frogs and toads), to monitor overall diversity and indications of habitat changes that affect local populations or to evaluate for further vernal pool protection or management.

Objective 1.3 Heron Rookery

Actively protect 61 acres of mature hardwood-mixed forests that support one of the largest great blue heron breeding colonies in the Mid-Atlantic region by maintaining a vegetative buffer zone of at least 1,000 feet surrounding the rookery and managing public access to prevent disturbance to roosting and nesting birds.

Rationale

Great blue heron breed across the U.S. and southern Canada, and more than half of the Atlantic coast's breeding population nest in Chesapeake Bay—predominantly in wetlands. The Chesapeake Bay, coupled with surrounding wetland and forested areas in its river tributaries, provides both the ideal food and habitat necessary for great blue heron survival. Optimal habitat conditions for nesting great blue herons include: 1) close proximity (approximately 1.4 miles) to quality foraging habitat and 2) protection from disturbance and predators (typically islands, trees in swamps, or high branches). Great blue herons nest mostly in trees, but the selection of tree species is highly variable. Herons are present year round in the refuge area; however, the refuge is best known for its large rookery. The Mason Neck Refuge colony supported an estimated 1,400 nests as recently as 2003, although our monitoring has indicated numbers have declined to approximately 800 nests in recent years. We are not sure of the

reasons for their decline and, unfortunately, have not had the opportunity to study it further.

In other areas of the Chesapeake Bay watershed, loss of nesting sites and deterioration of water quality and wetland habitat are issues of concern for their survival. Natural generation of new nesting islands, created when old islands and headlands erode, has decreased due to artificial hardening of shorelines with bulkheads. Poor water quality reduces the amount of large fish and invertebrate species available in wetland areas. If suitable feeding and nesting areas are not maintained, populations of great blue heron will eventually decline. Toxic chemicals that enter the bay from runoff and industrial discharges pose yet another threat. Although great blue heron currently appear to tolerate low levels of pollutants, these chemicals can move through the food chain, accumulate in the tissues of prey, and may eventually cause reproductive failure in heron.

Care must be taken to preserve nesting sites, as well as feeding areas. Erosion of island nesting areas due to artificial structural development, as well as sea level rise, needs to be carefully monitored. Human disturbance at nesting sites can be a problem and studies recommend that people maintain a distance of at least 660 feet to minimize disruption of the heron colony. If heron are disturbed frequently, they may abandon their nests or neglect their young. To avoid this concern, the refuge does not allow public access during the nesting season. Deterioration of SAV limits foraging area potential. Wetland foraging sites within 9 to 12 miles of heron colonies need special protection to ensure prey availability.

Recently, the MDNR and the VDGIF sponsored surveys to monitor populations and annual nesting success of great blue heron. They also monitor colonies of other species of heron and egrets. In early spring before the trees have leaves, aerial surveys are conducted to locate colony sites and count nests. At larger colonies, ground counts are made of active nests.

In order to maintain a relatively stable, substantial population of great blue heron in the watershed, protection of shallow water habitat, feeding areas, and rookeries must remain a priority (USFWS–CBFO, 2009). On Mason Neck Refuge, we will continue to protect the rookery from human disturbance while also monitoring its population and evaluating the habitat condition to determine whether any habitat enhancements are needed.

Strategies

Continue to

- Prohibit public access to Little Marsh and surrounding bluffs and adjacent forest. Both foot and boat access is prohibited.
- Communicate the unique and regional significance of the heron rookery at outreach opportunities such as refuge programs, events, on the Web site, and in other refuge printed information.
- Allow volunteer-led efforts to count nest sites.
- Use law enforcement officer to conduct outreach and enforce closure area.

Over the 15 years of CCP implementation:

- Work with experts to assess and implement measures to increase shoreline and bluff protection to reduce potential loss of nesting trees (also see objective 2.4).
- Using Sea Level Affecting Marshes Model (SLAMM) analysis results, monitor and evaluate conditions in the marshes over the next 15 years with respect to climate change and sea level rise. Coordinate with regional efforts and initiatives where possible and applicable.

- Increase Service visibility and law enforcement presence, increase signage, and other measures, as warranted, to keep unauthorized persons away from the rookery during breeding season.

- Establish a rookery monitoring program with partners and volunteers, and incorporate data in GIS. Monitor such things as nest numbers, locations, and shifts in their use between years, impacts to vegetation, and impacts from predators (e.g. raccoons) on the population.

- Consult with waterbird experts to determine whether any vegetation management actions could enhance rookery conditions. Incorporate any plans into HMP.

Monitoring Elements

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, or trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Monitor changing heron roost and nest use and make modifications or restore sites, as necessary, to ensure the favorable roosting conditions of the site.

  - Monitor and control invasive plants, erosion, human disturbance, predators, and other sources of habitat degradation to protect the integrity of roost, nest, and concentration areas on refuge property.

- Continue to incorporate these stands into ongoing biological surveys, such as habitat-based landbird count surveys, winter and summer bald eagle surveys, migration and winter bird counts, and anuran call counts. Landbird point count habitat classifications in or near roosts will be updated to track changes in habitat relative to bird habitat use.

GOAL 2: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of wetland habitats and shorelines to support native wildlife and plant communities, including species of conservation concern.**

Objective 2.1 Great Marsh Management

Develop an index of ecological integrity for the Great Marsh wetland complex and a baseline for future monitoring of the biological integrity, diversity, and environmental health of this 207-acre tidal freshwater marsh. Implement strategies, as warranted by monitoring results, to insure that no degradation of integrity occurs, including protection against increases in the extent or abundance of invasive plants. Management will emphasize and reflect the composition, function, and diversity of this habitat type, benefiting migrating and wintering waterfowl (e.g., American black ducks, blue and green-winged teal, northern shoveler) and wading birds (e.g., great egrets, great blue herons, and green herons).

Rationale

Freshwater tidal marshes were once extensive along the Coastal Plain rivers of the Mid-Atlantic region of the United States. After thousands of years of relatively low-impact use by Native Americans and several centuries of intense development by European Americans, freshwater tidal marshes have been reduced to scattered remnants that are now incapable of providing the extent of ecosystem services characteristic of widespread, healthy marsh ecosystems (Odum et al., 1984). Nonetheless, even remnant marshes provide numerous goods and services that benefit human society, including resident and migratory wildlife

habitat, refuge for endangered and other rare species, spawning and nursery grounds for anadromous fish, attenuation of tidal energy, shoreline stabilization, flood control, water quality enhancement, carbon storage, aesthetic enjoyment, and recreational activities (Odum et al., 1984). Consequently, maintenance and enhancement of remaining tidal marsh is imperative both socially and ecologically.

Chronic sea level rise is advancing the salinity gradient upstream in rivers on the Atlantic Coast, leading to shifts in vegetation composition and the conversion of some tidal freshwater marshes into oligohaline marshes.

The 207-acre Great Marsh represents the largest tidal marsh on the refuge and is considered regionally significant due to its size and undisturbed setting. The marsh hosts a large concentration of wintering waterfowl. Species commonly seen include Canada geese, American black ducks, mallards, wood ducks, blue- and green-winged teal, northern shovelers *(Anas clypeata),* tundra swans, and northern pintails. Marsh birds commonly seen include great blue herons, great egrets, green herons, and pied-billed grebes *(Podilymbus podiceps).* Bald eagles have nested on an island in the marsh for over a decade and portions of the Woodmarsh Trail are closed during nesting to prevent nest disturbance. VDGIF annually conducts banding operations in the marsh, primarily for black and wood ducks. They also sample for avian influenza.

Strategies

Continue to

- Prohibit public access to Great Marsh; both foot and boat access is prohibited.
- Communicate the unique and regional significance of the Great Marsh at outreach opportunities such as refuge programs, events, on the Web site, and in other refuge printed information.
- Work with VDGIF to conduct winter waterfowl banding and avian influenza monitoring in this area.
- Use law enforcement officer in the field to conduct outreach and enforce closure area.

Over the 15 years of CCP implementation:

- Develop an index of ecological integrity to
- determine the current integrity ranking;
- determine what areas of integrity are low and need attention;
- prioritize management actions to ensure that the index does not decrease; and
- establish a baseline from which to measure against the targeted 5 to 10 percent improvement.
- Inventory the flora and fauna of Great Marsh to establish a baseline of natural features and water quality to monitor in the future. In particular, determine presence and extent of native marsh and aquatic vegetation, such as spatterdock and wild rice, which are important waterfowl foods.
- Work with VNHP and other experts to conduct inventories for rare, threatened, and endangered plants species in Great Marsh. Potential species occurring in the marsh include sensitive joint-vetch, Parker's pipewort, and river bulrush.

- Using SLAMM analysis results, monitor and evaluate conditions in the marshes over the next 15 years with respect to climate change and sea level rise. Coordinate with regional efforts and initiatives, where possible and applicable.

- Work with State and Federal agency partners to address any significant water quality issues as they arise in the Potomac River.

- Work with volunteers, the Friends Group, and/or other partners to establish a clean-up program in the marsh.

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits, to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native tidal freshwater marsh species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Develop the integrity index and use to determine what areas of integrity are low and need attention.

  - Conduct vegetation surveys within the marsh to determine species composition and diversity.

  - Conduct inventories and monitoring of waterfowl and wading birds. Use data to document the effectiveness of management activities and adjust management, as necessary.

  - Conduct fish surveys to document species abundance, composition, and diversity.

Beaver are common on the refuge.

- To maintain desired quality and characteristics of the tidal freshwater marsh, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand-replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than five percent of refuge wetland acreage, and fundamental objectives are not compromised.

- Monitor presence of beaver and work with the USDA-APHIS or other licensed agent to control these species, as necessary to protect public safety and refuge resources.

Objective 2.2 Little Marsh Management

Manage the existing 50-acre Little Marsh impoundment and 1.5-acre Little Marsh Road impoundment to enhance quality habitat for wading birds (e.g., least bitterns, great blue herons, and black-crowned night-herons *[Nycticorax nycticorax]*) and waterfowl (e.g., wood ducks and hooded mergansers) during the breeding season and during peak spring and fall migration periods, while also providing habitat for other priority species of concern identified in the BCR 30 plan (e.g., bald eagles, Louisiana waterthrush, and prothonotary warblers) and other native wildlife identified as species of greatest conservation concern in the Virginia WAP (e.g. American bittern, king rail, little blue heron *(Egretta caerulea),* and yellow-crowned night-heron *[Nyctanassa violacea}*). Actively manage through a combination of water level management, wetland restoration, and invasive species control. These measures will include the following:

1) Annually provide high quality foraging habitat for wading and marsh birds, specifically great blue herons (summer: July-late August). This habitat will consist of open, shallow water (2-10 inches water depth) with patches of emergent wetland plants that support fish, invertebrates, and amphibians.

2) Annually support migratory waterfowl through a mix of shallow (6-24 inches water depth) flooded vegetation (*Carex* spp., *Polygonum* spp., *Peltandra* spp.) at times of peak migration (spring: late March, and fall: late October).

3) Annually support migratory wading birds through a mix of shallow remnant pools (6-12 inches water depth) at times of peak migration (spring: late March, and fall: late August).

Rationale

The Little Marsh impoundment provides bald eagles and great blue heron a relatively secluded wetland with surrounding mature hardwoods and conifers and an abundance of food in close proximity. This juxtaposition of habitat features is critical to supporting nestlings and fledglings for all the species noted in the objective, particularly bald eagles and great blue herons.

The 50-acre Little Marsh contributes significantly to biological diversity on the refuge. It hosts a variety of wintering and migrating waterfowl, similar to Great Marsh. Water levels in the marsh can be regulated with a water control structure. Throughout most of the year, the water level is kept high to control growth of undesirable woody vegetation and to provide winter habitat for waterfowl. In July, the marsh is drawn down to promote the growth of preferred waterfowl foods around the perimeter while concentrating fish in the deeper channels which increases the availability of prey for fledgling eagles and herons.

The 1.5-acre Little Marsh Road impoundment is an upgradient impoundment that provides opportunities for effectively managing a small freshwater wetland for a diversity of species of conservation concern. The following birds of conservation concern are known to breed on Mason Neck Refuge and could benefit from enhanced management of the Little Marsh Road impoundment:

prothonotary warbler, Louisiana waterthrush, bald eagle, wood duck, hooded merganser, least bittern, black-crowned night-heron, great blue heron, and green heron. Their conservation status in various ecoregional plans is presented in appendix A.

Hiring a biologist and obtaining increased project funding will allow us to upgrade our management and protection of the Little Marsh Road impoundment.

Strategies
Continue to

- Prohibit public access to Little Marsh; both foot and boat access is prohibited.
- Maintain signs alerting boaters it is prohibited to land on the dike.
- Use law enforcement officer to conduct outreach and enforce restrictions.
- Maintain water control structures and road culverts.
- Conduct a slow drawdown, lasting about 4 weeks in summer, to improve foraging habitat for wading birds, specifically great blue herons.
- Exclude public from Little Marsh Road to protect sensitive wildlife and habitats.

Over the 15 years of CCP implementation:

- Determine the water level regime by season that will best promote quality marsh habitat favored by bald eagles, wading- and waterbirds, and waterfowl. Implement plans to manipulate water levels and vegetation at draw down times throughout the year, and incorporate actions in HMP. In developing water level management, consider:
  - Lowering water level to allow bottom to dry out and oxygenate to allow better emergent plant growth, and/or reflooding to a lower level to provide better access to feeding areas by wading birds.
  - Timing drawdown initiation when great blue heron young are observed in the nests. This will allow for sufficient time to conduct the drawdown and concentrate food resources.
  - In the summer, consider only drawing down water levels to the point where water primarily remains only within the channels and various coves of the impoundment. Thus, concentrating prey resources into the smallest volume of water accessible to great blue herons.
  - Maintain high water levels throughout a growing season and/or use prescribed fire to eliminate perennial woody vegetation that is encroaching upon the impoundment. Frequency of woody vegetation management may be dictated by heron use.
  - Reflood the impoundment prior to fall frost and freezing weather to allow amphibians and reptiles sufficient time to locate underwater overwintering habitat. Maintain water depths throughout the winter that are sufficient for fish populations.
- Control beaver, if needed, to meet water regime objectives. Both non-lethal and lethal measures will be employed, as warranted.
- Inventory the flora and fauna of the marsh to establish a baseline of priority natural resources to monitor in the future. In particular, determine presence and extent of native marsh vegetation.

- Work with VNHP and other experts to conduct inventories for rare, threatened, and endangered plants species in Great Marsh. Potential species occurring in the marsh include sensitive joint-vetch, Parker's pipewort, and river bulrush.

- Determine fish species that currently and/or historically use the impoundment for spawning and rearing.

- Upgrade the water control structure, as needed, to improve management capability and consider placing a "windowed" stop-log water control structure to allow fish passage into the impoundment.

- Hire additional maintenance staff, as indicated on the staffing chart (appendix E), to help manage and maintain water control structures.

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits, to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native wetland species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Monitor bird response to drawdown rates and water depths to determine optimal water depths for target species groups.

  - Conduct vegetation surveys within the marsh to determine species composition and diversity.

  - Conduct fish surveys to document species abundance, composition, and diversity.

  - To maintain desired quality and characteristics of the refuge's impoundments, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than five percent of refuge wetland acreage, and fundamental objectives are not compromised.

  - Monitor presence of beaver and work with USDA-APHIS or other licensed agent to control these species as necessary to protect public safety and refuge resources.

Objective 2.3 Shoreline Protection

Increase efforts to maintain the integrity of the 4.4. miles of refuge shoreline and minimize bluff erosion on the Potomac River by working with partners to monitor and maintain the existing 200 feet of breakwater structures and conduct a risk assessment to prioritize additional restoration areas and protection methods.

Rationale

Refuge lands currently include approximately 4.4 miles of shoreline at the base of high bluffs along the Potomac River and Occoquan Bay. Erosion of the shoreline by tidal and storm flows, undermining of the bluffs by beach loss, and erosion by wind and rain have been incrementally removing the substrate, and the resulting tree loss shrinks important upland habitats. This is especially problematic along the refuge southwestern corner, where tree loss threatens the heron rookery. We will continue to explore and evaluate stabilization techniques to determine which is most effective and practical for refuge lands.

Obtaining increased funding and staffing will allow us to enhance our efforts to address this continuing threat to refuge habitat integrity as well as better protect archaeological resources along the shoreline.

Strategies
Continue to
- Minimize public access to shoreline.
- Seek partnerships to fund and install breakwaters and/or other measures to protect the shoreline.
- Work with partners to maintain the refuge shoreline and monitor the 200 feet of breakwater structures.

Over the 15 years of CCP implementation:
- Engage in public outreach and education to explain the sensitive nature of shoreline habitats and the importance of reducing human disturbance, particularly along the proposed Captain John Smith Chesapeake National Historic Trail.
- Manage public use in these areas to ensure compatibility of visitor's activities, especially during sensitive times of the year for wildlife.
- Monitor areas of substantive loss and work with experts to determine the feasibility of projects to mitigate shoreline erosion and wetlands impacts, especially in the context of predicted sea level rise.
- Seek partners and funding to implement priority projects assuming they are practical and feasible, cost effective, and commensurate with resource values.

Monitoring Elements
- Conduct appropriate monitoring and survey programs, as funding and staffing permits. The following are all components of how we will measure our success with respect to our objectives, and the results may trigger adjustments to our management strategies, or trigger a reevaluation or revision to our objectives. Examples of monitoring or surveys that we may implement include:
  - Work with partners to monitor the effectiveness of existing refuge shoreline breakwater structures in reducing erosion along the protected area of the shoreline.
  - Partner to monitor the erosion rates along unprotected areas of the shoreline and determine the areas in greatest need of protection.

Objective 2.4 Aquatic Habitat and Water Quality

Improve the water quality and aquatic habitat of Great Marsh and other tidally influenced marshes and inlets through an active role in local, State, and Federal partnerships to reduce contaminants and enhance spawning, nursery, foraging, and cover habitat for Federal trust fish populations, including American eel, alewife, blueback herring, hickory shad *(Alosa mediocris),* American shad, menhaden, striped bass, Atlantic and shortnose sturgeon, and other native aquatic species. Partnerships may involve facilitation, research, monitoring, and management.

Kraft, C.E., D.M. Carlson, and M. Carlson. 2006. *Inland Fishes of New York (Online),* Version 4.0. Department of Natural Resources, Cornell University, and the New York State Department of Environmental Conservation.

Alewife

Rationale
The tidal Potomac River and associated marshes and tributaries support a diversity of interjurisdictional fish species that depend in part on the larger tributaries (including the Occoquan River and Neabsco Creek),

the smaller streams that include Great Marsh creek, and the marshes along the Virginia shoreline for habitat. Interjurisdictional fish that are listed as species of concern by VDGIF (2005) and are Service Regional high priorities include the shortnose sturgeon (Tier I), Atlantic sturgeon (Tier II), alewife (Tier IV), American shad (Tier IV), and American eel (Tier IV). Other species of management concern listed in the Service's Region 5 Strategic Fisheries plan include: blueback herring, hickory shad, menhaden, and striped bass (USFWS, 2009b). All of the species listed above occur from the fall line to the mouth of the river at some time during their life cycle.

Due to lack of available staff, the refuge is reliant upon partnerships to improve aquatic habitat and operates in the capacity of allowing others access to the Potomac River and its tributaries in order to support the needs of Federal trust fish species. We respond to requests for assistance related to fisheries issues from our Virginia Fisheries Program Office, as well as from VDGIF and the Potomac River Fisheries Commission (PRFC). The VDGIF and PRFC regulate the fisheries of the main stem of the tidal Potomac River from the Maryland/ District of Columbia boundary line (near the Woodrow Wilson Bridge), to the mouth of the river at Point Lookout, Maryland and Smith Point, Virginia. The PRFC regulates and issues licenses for all recreational and commercial fishing, crabbing, oystering, and clamming in the main stem tidal Potomac River. The PRFC coordinates regulations with the Maryland DNR, the Virginia Marine Resources Commission (VMRC) and VDGIF, and with the other Atlantic Coastal States through the Atlantic States Marine Fisheries Commission (ASMFC). Obtaining increased funding and staffing will allow us to upgrade our efforts to better facilitate this much needed monitoring, management, and research.

Strategies

Continue to

- Provide assistance to researchers upon request, typically as logistical support, to facilitate their research on fish and other aquatic species on the refuge and in the tidal Potomac River.

- Monitor invasive aquatic species and distribution, and treat when funding and staffing allows.

Over the 15 years of CCP implementation:

- Coordinate with the Service's Virginia Fisheries Program Coordinator's Office to assess fisheries resources on the refuge and determine enhancement opportunities.

- Participate in partnerships with other State and Federal agencies to address interjurisdictional fish issues related to the refuge and nearby Potomac River waters.

- Work with the Virginia Ecological Services Office to provide information and input to the contaminant and TMDL regulation process at the Federal and State level.

- Participate in spill prevention, control, and countermeasure plans or other environmental emergency action plans related to protection of Great Marsh and the Potomac River.

- Work with Virginia Ecological Services and the Virginia Fisheries Coordinators Office in coordinating and providing technical assistance to fish passage, stream, and riparian restoration projects within the Potomac River watershed that have potential to increase available habitat for species utilizing the refuge or improvements to water quality.

Monitoring Elements

- Establish and coordinate development of a water quality monitoring station at the refuge with interested parties such as George Mason University.
- Work in partnership with local universities, as well as State and Federal agencies, to complete a series of fish inventories to obtain baseline information of fish species diversity and species health in order to evaluate impacts of tidal marsh water quality changes.
- Conduct inventory surveys of bird, mammal, amphibian, and turtle populations within and around the freshwater tidal marsh in partnership with local universities. Utilize data to assess the short-term and long-term impacts of management activities and adjust management protocols as necessary.

GOAL 3: Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation, wildlife observation, and photography.

Objective 3.1 Deer Hunting

Continue to improve the annual, public, high-quality white-tailed deer hunt program to support deer population and forest health and condition objectives.

Rationale

Deer hunting accomplishes a very significant function on the refuge by keeping the deer population within the carrying capacity of the habitat. Our hunt program is primarily designed to manage the herd size on the refuge to benefit forest integrity, diversity, and health, as well as the health of the deer herd. The recreational opportunity it affords is a secondary benefit. We, however, recognize hunting as a healthy, traditional outdoor pastime, deeply rooted in our American heritage and are pleased to be able to provide the opportunity. Public hunting opportunities have been on the decline as development pressures increase in the region. Hunting is one of the six priority wildlife-dependent public uses of the Refuge System as established in the 1997 Refuge Improvement Act. In addition, Presidential Executive Order #113443- Hunting Heritage, "…directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat."

Deer management must occur across the entire Mason Neck Peninsula in order to be effective in balancing population with quality habitat conditions throughout the area. We will continue to cooperate with the Mason Neck Management Area to ensure that broader population goals are met. Our hunt is a joint effort with Mason Neck State Park, combining both land ownerships in the hunt area, in a permit-only and closely monitored hunt. Elsewhere on the peninsula, Gunston Hall has a limited hunt but is exploring ways to expand it, and the BLM is working with VDGIF, Fairfax County, and the refuge to continue hunting opportunities initiated in 2009. Using data collected by the VDGIF from harvested animals, we estimate population condition, age, and sex structure to help adjust the hunt program annually, as needed.

Since the refuge establishment in 1969, the deer population increased until 1990 when the refuge was opened to firearm and archery hunting. The refuge hunt program conforms to State regulations and additional refuge regulations stipulated in Title 50 of the Code of Federal Regulations. As the objectives in the 1990 hunt plan state, we intend to maintain the deer population at a level compatible with available refuge habitat (between 90 and 120 deer), to limit the amount of damage to public and private property in the vicinity of the refuge, and to provide a wildlife-oriented recreational opportunity for the public. As in all refuge programs, we make special accommodations upon request, whenever possible, to further facilitate accessibility.

The following are the guiding principles of our hunting program, according to Service policy (605 FW 2):

1) Manage wildlife populations consistent with Refuge System-specific management plans approved after 1997 and, to the extent practicable, State fish and wildlife conservation plans.

2) Promote visitor understanding of, and increase visitor appreciation for, America's natural resources.

3) Provide opportunities for quality recreational and educational experiences.

4) Encourage participation in this tradition.

5) Minimize conflicts with visitors participating in other compatible, wildlife-dependent recreation.

Strategies

Continue to

- Cooperate with VDGIF in assessing deer population and condition estimates
- Provide technical support for deer hunt programs on other public lands on Mason Neck Peninsula
- Maintain current shotgun deer hunt program which includes
  - State and local partners involvement in hunt administration;
  - Mason Neck State Park as part of hunt area; and
  - an average target of 90 to 100 deer harvested per year; or otherwise a target number recommended by VDGIF biologists.

Over the 15 years of CCP implementation:

- Increase Service support for deer hunt programs on all public lands on Mason Neck Peninsula, encouraging each agency to implement a program; work collaboratively within the existing Mason Neck Manager's Working Group to design hunts.
- Consider increasing length of shotgun season, number of hunters, and their distribution when declining forest health and conditions warrant an increased harvest. Indicate changes each year in annual hunt plan.
- Annually review the amount of staff time involved with the hunt, and consider ways to be more efficient with its administration, such as seeking new partners, staying informed of new technology, and use of Web-based programs.
- Provide an archery deer hunt for qualified archers during the regular State archery season as soon as determined practicable and resources are available (similar to the program that was implemented in past years). Prior to implementation, ensure all administrative requirements are completed. Also, ensure adequate funding and enough refuge staff, VDGIF, and other partners are in place to help coordinate, administer, and support hunt. Implement hunt under the following guidelines:
  - Archery hunt area will be in refuge areas otherwise closed to visitors (so other refuge visitors are not affected) and will be a safe distance away from all trails open to non-hunting refuge visitors.

- Archery hunters will park in designated hunter parking areas away from the trailhead parking areas.

Objective 3.2 Youth Turkey Hunting

Work with VDGIF and other conservation partners to develop and implement a youth wild turkey hunt.

Jonathan Priday/USFWS

A new youth turkey hunt is planned for the refuge.

Rationale

As we mentioned in our discussion under objective 3.1, hunting is identified in the Refuge Improvement Act as a priority wildlife-dependent public use on refuges. In addition, Presidential Executive Order #113443- Hunting Heritage, "…directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat." We also presented our guidelines for a quality hunt program under objective 3.1.

We recognize wild turkey hunting as a traditional outdoor pastime. When managed responsibly, it can instill a unique appreciation of wildlife, their behavior, and their habitat needs.

We also recognize that we must be proactive in engaging young people in wildlife conservation stewardship of the environment if we are to maintain a legacy of abundant wildlife and healthy habitats for future generations. One way to do that is to offer quality opportunities for youth participation in hunting on our refuges.

Strategies

Within 15 years of CCP implementation:

- Provide an annual youth turkey hunt under the following guidelines:

- Complete all administrative requirements for a new hunt as soon as determined practicable and when resources are available. Resources include adequate funding and enough refuge staff and partners to help coordinate, administer, and support hunt. Potential partners include VDGIF and National Wild Turkey Federation.

- Implement the hunt during the State's spring turkey hunting season. Only gobblers would be harvested and only by shotgun.

- Allow up to a maximum of five youth per day, over a three-day period. The three hunt days might not be consecutive. Each hunt day would be from sunrise to noontime.

- Locate youth hunt areas in pre-designated, well-distributed areas, which are otherwise closed to the public, to minimize user conflicts (so other refuge visitors are not affected). The pre-designated areas will be a safe distance away from all trails open to other refuge visitors.

- Require hunters to complete data forms to document their observations and hunt success.

Objective 3.3 Waterfowl Hunting

Enhance opportunities for more people to engage in waterfowl hunting in State waters near the refuge by actively supporting VDGIF's program.

Rationale

Since Mason Neck Refuge was established in 1969, the Service has not allowed waterfowl hunting on the refuge because it conflicts with the original refuge

establishment purpose of protecting bald eagles. Further, areas in Great Marsh are specifically closed to waterfowl hunting by Director's order (34 FR 34 194; October 9, 1969).

In less sensitive areas on the Potomac River and Occoquan Bay, we fully support waterfowl hunting as a legitimate wildlife-based recreational pursuit. We plan to support VDGIF in ensuring the public has opportunities for waterfowl hunting in those State waters near the refuge where it is currently allowed.

Strategies
Continue to
- Coordinate with VDGIF conservation officer in addressing any waterfowl hunting issues

- Prohibit waterfowl hunting on refuge lands

Over the 15 years of CCP implementation:
- Work with VDGIF to evaluate the use of temporary floating blinds to replace fixed blinds in State waters near the refuge shoreline to provide waterfowl hunting opportunities to more people.

Objective 3.4 Wildlife Observation and Photography

Enhance opportunities for wildlife observation and photography by upgrading trail and parking facilities, and constructing new trails, observation platforms, and photography blinds.

Rationale
The Refuge Improvement Act identifies wildlife observation and photography as priority wildlife-dependent recreation. Wildlife observation has also been identified by our Regional Visitor Services Review Team as an area of emphasis for this refuge. Both wildlife observation and photography promote the understanding and appreciation of natural resources and their management on all lands and waters in the Refuge System. Since 1971, the refuge has provided daily opportunities for wildlife observation and photography on refuge trails.

Pursuant to Service policy (605 FW 4 and 5), we follow these guiding principles for wildlife observation and photography opportunities at the refuge.

1) Provide safe, enjoyable, and accessible wildlife viewing and photography opportunities and facilities.

2) Promote visitor understanding of, and increase visitor appreciation for, America's natural resources.

3) Focus on providing quality recreational and educational opportunities, rather than quantity, consistent with Service criteria defining quality (605 FW 1 Part 1.10).

4) Minimize conflicts with visitors participating in other compatible, wildlife-dependent recreation.

Existing opportunities are available on the Great Marsh and the Woodmarsh Trails. These trails include parking areas, interpretative panels, and overlooks and observation platforms. These trails are promoted and described on informational signs, in refuge brochures, and on the refuge Web site. We will enhance existing infrastructure and site accessibility to increase the safety, quality, and diversity of these opportunities. We also plan to create additional trails, assuming archaeological field surveys verify that acceptable, or no, impacts to archaeological resources occur, on Sycamore Road and Treestand Road (map 4.1). These new and existing trails will be supplemented with new viewing platforms and photography blinds. The location of the new trails,

platforms, and blinds will provide visitors with quality viewing opportunities, while also minimizing disturbance to wildlife or sensitive plant communities. Not all of the platform locations have been finalized yet, as additional archaeological site evaluations need to occur.

Refuge trails will remain open during refuge hours of operation (typically April through September from 7:00 am to 7:00 pm and during October through March from 7:00 am to 5:00 pm, except as otherwise permitted under a special use or hunt permit). Only foot travel will be allowed on these existing and planned refuge trails.

One additional trail, the High Point Trail, begins outside the refuge boundary, but runs through the refuge and terminates at Mason Neck State Park (3.0 miles total; 0.5 miles on refuge). This is an asphalt multi-use trail, where bicycles and other non-motorized pedestrian uses are allowed. This trail is cooperatively administered and managed with Mason Neck State Park.

Strategies

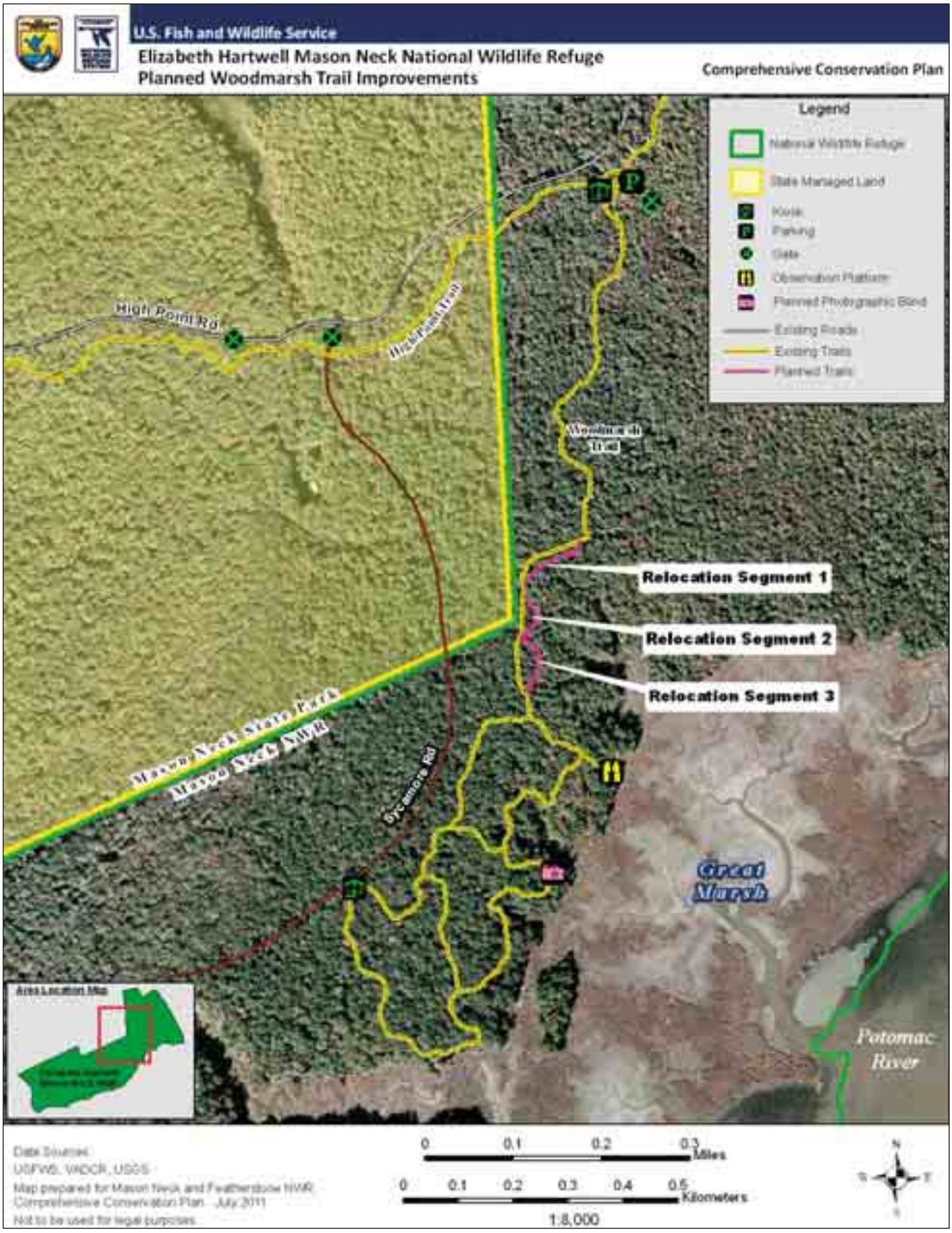
Continue to

- Maintain the current refuge trails:
- Woodmarsh Trail (2.5 miles)
- Great Marsh Trail (0.75 miles)
- Close portions of the Woodmarsh Trail from December to June to protect nesting bald eagles.
- Allow foot travel as the only mode of transportation on Woodmarsh and Great Marsh Trails.
- Cooperate in managing and maintaining the multi-use High Point Trail (3.0 miles total; 0.5 miles on refuge) with Mason Neck State Park; allowing all forms of non-motorized pedestrian access and travel.
- Prohibit motorized use and horseback riding on all trails.
- Prohibit geo-caching, letterboxing, and other forms of "treasure hunting" on the refuge.
- Continue to collect monthly visitor use data for the High Point, Great Marsh, and Woodmarsh Trails.

Over the 15 years of CCP implementation:

- Hire visitor services and maintenance staff as indicated in staffing chart (appendix E) to support new and/or improved refuge facilities, increased and enhanced visitor and outreach programs, and other expanded public uses and outreach identified under goals 3 and 4.
- Prioritize list of improvements and new construction noted below and implement projects as funding allows.
- Improve Woodmarsh Trail (see map 4.2) including:
  - Trail realignment to higher ground along approximately 1,000 feet by rerouting trail through aesthetically pleasing terrain to afford sustainable upkeep.
  - Improving trail surface to all-weather.

Map 4.2. Planned Woodmarsh Trail Improvements at Mason Neck Refuge



- Considering making part or all of the trail accessible.
- Improving boardwalks over wet areas.

- Improve Woodmarsh trailhead, including drainage, paving, lighting, gates, kiosk, and welcome and directional signs.
- Reconfigure Woodmarsh Trail within existing loops to bypass sensitive eagle area, but allow for additional access.
- Develop a trail leading from the Woodmarsh Trail-Sycamore Road kiosk to the end of Sycamore Road and the Potomac River overlook. This segment will be known as Sycamore Trail. Consider building a viewing platform overlooking Potomac River, if feasible. Ensure trail and platform construction do not adversely affect archaeological resources likely to be in the vicinity or sensitive nesting or roosting sites. Allow foot travel as the only mode of transportation on Sycamore Trail.

USFWS

Habitat diversity on Mason Neck Refuge

- Develop Treestand Road as a trail connecting Woodmarsh and Great Marsh Trails. This segment will be known as Treestand Trail. Create marsh viewing area if minimal vegetation would be impacted. Allow foot travel as the only mode of transportation on Treestand Trail. Seasonal closures may be warranted if disturbance to wildlife might occur.
- Collect visitor use data, according to Service guidance, to determine the number of visitors and what activities they are engaged in.Enhance the refuge's interpretive program to more effectively communicate to the public the values and regional significance of refuge habitats, wildlife, and cultural resources.

Objective 3.5 Interpretation Program

Enhance the refuge's interpretive program to more effectively communicate to the public the values and regional significance of refuge habitats, wildlife, and cultural resources.

Rationale

The Refuge Improvement Act identifies interpretation as a priority wildlife-dependent recreational activity. Interpretation has also been identified by our

Regional Visitor Services Review Team as an area of emphasis for this refuge. Interpretation includes, but is not limited to, activities, talks, publications, audio-visual media, signs, and exhibits that convey key messages about natural and cultural resources to visitors. Visitors who experience interpretation have the opportunity to make their own connections to the resource leading to possible resource stewardship and the understanding of resource relationships and human impacts.

The refuge interpretive program includes a variety of experiences that appeal to varying audiences, visitor interests, and learning styles. By having quality self-guided programs, in addition to staff and partner-led interpretation, we are able to reach a larger audience, be more readily available, and allow visitors to explore at their own pace while still allowing for discussion and providing answers to questions. Current efforts include on and offsite talks and tours, as well as written information provided through informational signs, brochures, and refuge Web sites. We use visitor and program attendee feedback to evaluate the effectiveness of our activities.

Service policy (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 to 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 develop their own conclusions.
- Organize activities around theme statements.

We strive to follow those principles, which will serve to enhance visitors' understanding of the area's significant resources, as well as the important role the refuge plays in their conservation.

Another effort underway related to interpretative activities on the refuge is the proposed Captain John Smith Chesapeake National Historic Trail. In September 2010, the NPS released for public review and comment the draft

Comprehensive Management Plan and EA for this trail. The trail is the first national water-trail and commemorates the explorations of John Smith on the Chesapeake Bay and its tributaries in 1607-1609, tracing approximately 3,000 miles of his voyage routes. The final plan was approved in February 2011.

The NPS is working with many partners to plan, develop, and manage the trail, including other national wildlife refuges in the Chesapeake Bay area. Other partners include the Friends of the Captain John Smith Trail, the Chesapeake Bay Gateways and Watertrails Network, Federal and State agencies, communities, nonprofit organizations, and businesses. The draft plan and EA outline how the NPS and these partners will develop component water trails, provide access to the trail, interpret the John Smith voyage, and protect the important resources related to the trail. Refuges in the Chesapeake Bay area, including the Refuge Complex, have been coordinating with the NPS on identifying compatible opportunities on refuge lands to support this effort. We will continue to coordinate with the NPS on developing opportunities for the trail consistent with this CCP.

Strategies

Continue to

- Distribute general refuge brochure and post at kiosks.
- Maintain interpretive and other pertinent refuge information at the three kiosks located at the Woodmarsh Trailhead, the Woodmarsh Trail near Sycamore Road, and the Great Marsh Trailhead.
- Install interpretive panels along trails to explain refuge resources and management activities, and to enhance self-guided interpretive opportunities.
- Work with the Mason Neck State Park to participate in interpretive events.
- Coordinate with the NPS to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations.
- Work with the Mason Neck Managers Group in constructing a joint agency kiosk on Gunston Road near the entrance to the Mason Neck Peninsula to orient visitors and tell the story about each agency. This kiosk should
  - Contain a map of the area including respective agency lands; and
  - Information about the purposes and management of each agency, recreational opportunities, and regulations for each area.

Over the 15 years of CCP implementation:

- Develop a Visitor Services step-down plan to address the Service's and Refuge System missions, refuge purposes, infrastructure, and specific Service and Regional emphases. Include the following:
  - Interpretation of bald eagle biology and exploring options for meeting visitor expectations of seeing eagles without disturbing them.
  - Installation of interpretive panels along trails to explain refuge resources and management activities, and to enhance self-guided interpretive opportunities.
  - Clarification in materials distinguishing Mason Neck State Park and refuge through various forms of media, programming, and standardized signing.

- ✺ Explanation of what is a compatible, wildlife-dependent public use and why that is a priority for the Refuge System.
- ✺ Interpretation of management practices through various forms of media and in clear terms for urban visitors.
- ✺ Addressing law enforcement issues relating to visitor safety and resource protection through interpretive programming.
- ✺ Initiate a Refuge Watch Program for the public to report crimes and criminal activity.
- ✺ Provide access to quality materials via a Refuge Complex Web site.

- Assess refuge signs to add, move, replace, or update them to conform to Regional Service sign standards and be consistent with Refuge Complex sign plan. Install appropriate welcome and directional signs, trailblazer signs, trailhead signs, waysides, and other required signs.
- In coordination with VDOT, install standard State highway directional Trailblazer signs to the refuge on I-95 and U.S. Route 1.
- Explore option of using trained volunteers and Friends Group members to conduct onsite and offsite interpretive programs and interpretive walks.
- Explore option of installing a Travelers Information System on Mason Neck Peninsula. This AM radio station and frequency will be dedicated to broadcasting general, emergency, and interpretive information about the refuge and Mason Neck State Park.

Objective 3.6 Environmental Education Program

Enhance environmental education opportunities on the refuge by rehabilitating outdoor education facilities and increasing education partnerships and educator-led programs.

Rationale

The Refuge Improvement Act identifies environmental education as a priority wildlife-dependent recreational activity. It teaches students of all ages the history and importance of conservation and ecological principals and scientific knowledge of our Nation's natural resources. Through that process, we can help 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 have not actively pursued an environmental education program on the refuge in recent years due to limited staffing and funding. As discussed earlier in this chapter, our Region made a difficult decision at each refuge regarding which two of the six priority public uses would receive management emphasis to make efficient use of what funding and staffing was available. Although it was determined that wildlife observation and interpretation are the priorities for this refuge, the refuge has valuable resources that offer excellent environmental education opportunities.

Our program to date has been limited to providing access for teacher-led research projects by students from Thomas Jefferson High School. While we facilitate these programs, we do not otherwise design or implement programs.

Additional staffing and funding will allow us to be more proactive in developing a core environmental education program in conjunction with the facilities and

programs of Mason Neck State Park, as well as through rehabilitation of our own educational facilities on Sycamore Road.

Strategies
Continue to
- Allow Thomas Jefferson High School to conduct environmental educational activities on the refuge including vernal pool studies and deer pellet counts.
- Facilitate other environmental education opportunities and programs upon request.

Over the 15 years of CCP implementation:
- Partner with Mason Neck State Park to integrate education programs into the existing teachers workshops being offered at the park's Visitor Center.
- Provide information to educators upon request that supports State curriculum standards and emphasizes key themes related to habitat management for bald eagles and great blue heron, and regional and national themes such as connecting children to nature and global climate change.
- Rehabilitate the old environmental education site and trail for use by teacher-led groups.
- Encourage Friends Group and volunteers to work with county agencies, local schools, and other educational institutions to enhance utilization of refuge resources for educator-led environmental education programs. Support development of basic lesson plans with these partners.
- Support use of the refuge by Fairfax County School District.

GOAL 4: **Enhance efforts to promote public awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.**

Objective 4.1 Volunteers Improve the refuge's volunteer program by expanding the amount and types of meaningful and engaging opportunities that support refuge goals and objectives.

Rationale
Volunteers, Friends organizations, and other partners are essential allies for many programs within the Service. Every day, these devoted individuals and organizations play vital roles in helping the Service fulfill its mission and many of our important conservation goals. Each year, volunteers, Friends organizations, and partners generously give time, expertise, and resources to the Refuge System, fish hatcheries, and other Service offices. They play an important role in helping serve over 40 million visitors who enjoy our public lands.

Volunteers help the Service in a variety of ways. Some work full-time, while others assist a few hours a week or month or during special events. Nationally, many volunteers conduct fish and wildlife population surveys, band ducks, lead tours, provide information to school groups and other visitors, assist with laboratory research, work on cultural resources projects, perform clerical and administrative duties, work with computers and other technical equipment, and much more.

Our 40 or so volunteers over the past 3 years have spent between 300 and 800 hours annually on different activities at Mason Neck Refuge, including wildlife and habitat, maintenance, and recreation support. Maintaining this level of volunteer support is critical to continuing to maintain our refuge programs.

We will have an opportunity to expand our volunteer program with the additional staffing and funding recommended. These additional resources will allow us to implement many of the strategies we have identified in support of our biological and public use objectives.

Strategies
Continue to
- Enlist the help of volunteers on an opportunistic basis to support refuge programs.
- Develop community service projects to support Fairfax County court system.
- Have volunteers from the community assist in refuge cleanup activities, special events, routine maintenance of trails, roads, and other areas, invasive plant control, and bald eagle and other bird counts.
- Develop projects for Boy and Girl Scouts upon request.
- Issue the monthly Refuge Complex volunteers newsletter to identify current and upcoming events.
- Develop and implement annual volunteer recruitment, training, and appreciation and recognition events.

Over the 15 years of CCP implementation:
- Increase the number of volunteers though development of quality, well-organized projects.
- Use citizen science volunteer groups to conduct biological baseline studies and monitoring consistent with Service protocols.
- Coordinate with other agencies on Mason Neck Peninsula to recruit, train, and share volunteers.
- Use volunteers and Friends Group members as docents to lead interpretive walks and as general guides during peak use times (also see objective 3.5).
- Use refuge training funds to provide special technical training to qualified volunteers to enhance their capability to assist in refuge programs.
- Address desires of refuge neighbors to participate in refuge management through volunteer opportunities.
- Pursue a resident volunteer program (e.g., a retired couple). Partner with another agency on the Mason Neck Peninsula or in the region, if necessary, to find a suitable location for housing volunteers. For example, this may be accomplished through a cooperative agreement with the NVRPA at Pohick Bay Regional Park.

Objective 4.2 Community Outreach

Ensure more than 50 percent of the adults contacted within Fairfax County will understand the importance of conserving wildlife, habitats, and cultural resources on the refuge, will know that the refuge is part of a national system of wildlife refuges, are aware of the wildlife-dependent recreational opportunities available on the refuge, and plan to visit the refuge or actively participate in refuge programs or volunteer projects within the next year.

Rationale
It is important to build a strong base of public understanding, support, and activism beyond the portion of the American public who visit refuges. To achieve this, the Service has actively supported nationwide strategies, partnerships, legislation, and departmental mandates with a strong emphasis on outreach. These include the 100-on-100 Outreach Campaign, the National Outreach Strategy: A Master Plan for Communicating in the U.S. Fish and Wildlife Service, the Cooperative Alliance for Refuge Enhancement (CARE), the Volunteer and Community Partnership Act, and the Challenge Cost-Share Program.

We are particularly interested in outreach to the local communities in Fairfax County and the Washington D.C. metropolitan area. We desire to be a welcomed and valued asset to those communities. A positive community relationship is a crucial link between public support for refuges and effective management of the Refuge System. We are aware that there are many residents who either do not know that a national wildlife refuge is nearby, or do not recognize its regional importance to the Potomac River and Chesapeake Bay ecosystems. Our current outreach program consists of news releases, participating in community events, and giving presentations to local organizations.

We are striving for a well-rounded program of public outreach to enable large and diverse segments of the public to learn about the importance of refuge wetland and upland habitats, species of conservation concern, cultural resources, refuge management, and the refuge's role in the Refuge System. An effective public outreach program can also help win friends and proactively deal with controversial refuge management activities. This program can be used to anticipate and avoid potential conflicts between the needs of wildlife and other refuge uses.

We believe that regular communication within the community is very important. News articles and personal appearances inform our neighbors about what we are doing and why, which could lead to increased understanding, appreciation, and support of our programs. The feedback we receive from these outreach efforts allows us to better understand issues that are important in our communities, and how our management may affect them.

We also believe that actively engaging people in meaningful refuge programs or projects will make a more lasting impression. We offer many opportunities for people to get involved. Partners, volunteers, and members of the Friends of Potomac River Refuges are vital to accomplishing our outreach activities. They assist us in community events and refuge visitor programs, as well as support the gathering of data and maintenance projects. This assistance supports us in meeting the refuge's goals and objectives, supports the missions of the Refuge System and the Service, and fosters good community relationships.

Strategies
Continue to
- Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities.

- Routinely respond to written, telephone, and in-person inquiries from the public.

- Maintain, and regularly update, contact information for the media and the general public.

- Inform refuge neighbors of refuge management activities via the Web site, press stories, and newsletters.
- Promote our successes in the local community via refuge and community events, project demonstrations, and media stories.
- Utilize volunteers to participate in community events in Fairfax County where effective outreach of refuge programs can occur.
- Continue to maintain Web site with links to newsletters, the Potomac River Refuge's Friends Group, and other pertinent refuge information.

Over the 15 years of CCP implementation:

- Develop and implement procedures to offer refuge "behind the scenes" tours to the media and the general public.
- Create and maintain refuge-specific fact sheets.
- Expand refuge outreach programs to include recognized events such as, but not limited to, International Migratory Bird Day and National Wildlife Refuge Week, and designed to promote wildlife-dependent recreation and natural resource education.
- Work towards more informed and productive relationships with the local media. Establish personal contacts at all local media outlets, including radio and television stations.

Objective 4.3 Partner Outreach

Continue to foster and enhance cooperation and communication with other State and Federal agencies, museums, civic organizations, and environmental and conservation groups to promote and advance the Refuge System mission and refuge goals, and identify mutually beneficial outreach projects and activities.

Rationale

Beyond the Friends of Potomac River Refuges and our volunteers, we have many other partners who help us conduct outreach within professional, academic, non-governmental organizations, and government agency arenas. This is generally achieved through means such as professional or agency meetings and presentations, publications, and refuge tours. We identify many of these partners in goals 1 and 2.

These partners include several government and local agencies active in the refuge area who share in the responsibility to conserve natural resources. Among them are BLM, NPS, USDA–National Resource Conservation Service, VDGIF, NVRPA, VDEQ, Virginia State Parks, Virginia Native Plant Society, Northern Virginia Chapter – Delta Waterfowl, Virginia Council on Indians, Audubon Society of Northern Virginia, Virginia Institute of Marine Science (VIMS), VNHP, planning district commissions, historical preservation commissions, soil and water conservation district commissions, chambers of commerce, Fairfax County government, and others. We plan to continue to work closely with some of these entities to achieve mutual outreach objectives.

We also plan to continue our collaborations with educational and research institutions to facilitate their research and investigations that help us seek answers to important natural resource issues on the refuge and within the Refuge System and to contribute our basic understanding of important natural resource issues worldwide.

Encouraging relationships with non-governmental conservation organizations active in the Potomac River Basin and Chesapeake Bay region will also be

important in our overall outreach strategies. Examples of these groups include the Potomac River Naturalists, Chesapeake Bay Foundation, the Potomac River region members of the Gateways Network, Alliance for the Chesapeake Bay, and Fairfax Watershed Network.

Strategies
Continue to
- Maintain contact list and ensure regular contact with local groups, environmental groups, and other interested parties active in the Mason Neck Refuge area.

Over the 15 years of CCP implementation:
- Review existing partner relationships to determine if outreach, or the dissemination of information, could be more collaborative and effective.
- Review Fairfax County Tourism, Gunston Hall, and other local community organization's events schedules to see if the refuge has a role or contribution.
- Seek out new partnership opportunities with museums, historical and botanical groups, civic organizations, and environmental and conservation groups to achieve mutually beneficial projects and activities.
- Improve coordination and sharing of resource information with State agencies, including VDGIF, VNHP, and the SHPO.

Objective 4.4 Elected Official Outreach

Continue to inform elected officials representing the refuge area about refuge management priorities and special events and activities on an annual basis or as significant issues arise.

Rationale
Gaining support from Federal, State, and local elected officials is essential to meeting our goals. This can only happen when these elected officials are fully informed and understand and appreciate the significant contribution of the refuge to the Refuge System and the quality of life and conservation of Federal trust resources in Virginia. We regularly inform elected officials about upcoming refuge events and have encouraged them to visit to learn more about the refuge on several occasions. Additional staffing will allow us to increase our elected official outreach efforts to promote Mason Neck Refuge.

Strategies
Continue to
- Invite Federal, State, and local elected officials to attend outreach events held on the refuge.
- Provide written or personal briefings for members of Congress and their staffs, as needed or as requested, to inform them about important refuge issues.

Over the 15 years of CCP implementation:
- Invite Federal, State, and local elected officials to attend a guided tour of the refuge, to showcase particular accomplishments, view outstanding natural resource areas, demonstrate management activities, and highlight challenges.

Objective 4.5 Research

Enhance research partnership opportunities to exchange information for making science-based management decisions and to support regional projects of interest to the Service.

Rationale
We can benefit from targeted research conducted by colleges and universities, such as George Mason University, Virginia Tech, University of Virginia, Virginia Commonwealth University, and the College of William and Mary. Research often can answer complex questions about refuge management issues and add to the wealth of scientific knowledge upon which decisions about current and future resource issues will be based.

We plan to take a more proactive role in working with partners to identify and promote, and seek funding for research projects focused on resource issues at Mason Neck Refuge. Disseminating research results, so that others will benefit from what we have learned, will also be a priority.

Strategies
Continue to
- Support inventories and research led by others, such as the MAPS station, which are a priority for the refuge and compatible with refuge purposes, goals and objectives. Use both refuge staff and volunteers to support efforts as funding allows.

Over the 15 years of CCP implementation:
- In cooperation with State agency and conservation partners, identify the highest priority research and inventory needs for the refuge and the Mason Neck Peninsula, which will further conservation and management of Federal trust resources. Refer to all proposed research and inventory and monitoring projects identified under the biological goals and objectives in CCP.

- With priority research needs identified, work with partners to develop project-specific research goals, study design, and methodology, and opportunities for alternative sources of funding.

- Facilitate the publication and dissemination of refuge research results. Consider opportunities to write for lay audiences to the extent possible, in addition to the scientific community.

GOAL 5: Enhance efforts to protect and interpret refuge cultural resources.

Objective 5.1 Archaeological Resources

Raise awareness about the importance of protecting archaeological resources and enhance efforts to preserve these resources on the refuge from damage by shoreline erosion and visitor foot traffic.

Rationale
Cultural resources that illuminate the pre-contact life of Native Americans at Mason Neck Refuge are Federal trust resources that we must protect and use to educate the public. Some of the peninsula's earliest known inhabitants were Native Americans of the Early Archaic period, over 9,000 years ago. The first recorded history of the area is from Captain John Smith, who wrote of his meeting with Dogue Indians in 1608 and charted the chief's village of Tauxenent on his map of Virginia. The area was at times referred to as Doggs Island and Doeg Neck, until the Mason family lived on the peninsula (Lutz, 2003). Additional staffing and funding will allow us to upgrade our stewardship of cultural resources on the refuge and support enhanced interpretation of the archaeological heritage and environmental history of the refuge to the public. Appendix F provides an overview of known resources on the refuge.

Strategies
Continue to
- Limit public access to designated trails in certain areas to keep visitors away from known archaeological sites on the refuge.

Bill Wallen

Entrance sign at Mason Neck Refuge

- Coordinate with the Service's regional archaeologist to determine the level of consultation required in conjunction with refuge projects that have a potential to affect archaeological resources.
- Conduct archaeological reviews, surveys, or studies of project areas, as needed or recommended by the Service's regional archaeologist.
- Monitor known archaeological sites for looting and trespass.

Over the 15 years of CCP implementation:

- Complete refugewide inventory with GPS data for known archaeological sites and resources.
- Work with State and county archaeologists and avocational archaeological societies willing to assist in performing targeted surveys with subsurface testing, and to locate and evaluate shoreline sites at risk. Ensure archaeological resources are protected from looting. Develop site management and protection plans, as warranted.
- Ensure that at least one law enforcement staff person receives ARPA training.
- Facilitate research on the refuge to achieve cultural resource protection and conservation objectives.
- Use the new proposed Sycamore Trail as an opportunity to interpret archaeological sites.
- Raise awareness of the importance of protecting archaeological resources, and interpret the existing archaeological resources through outreach and interpretive information and programs.
- Design any new refuge trails, overlooks, or other amenities to avoid impacts to archaeological resources.

- Conduct targeted surveys with subsurface testing to identify more of the many unrecorded sites likely to be on the refuge and to evaluate their condition and any threats.

- Ensure that an ARPA message is incorporated into refuge brochures and on interpretive signs at trailheads, including those produced by refuge partners.

- Work with the Virginia Council on Indians to develop interpretation, education, and outreach materials and programs related to the refuge's cultural resources.

Objective 5.2 Historical Resources

Protect historical resources on the refuge from damage by visitors, while also increasing opportunities to engage visitors through interpretation and education to instill an appreciation and promote stewardship of these resources.

Rationale

There is a rich legacy of post-contact history along the Potomac River shoreline. Mason Neck Peninsula was patented by adventurers in the mid-1600s who traveled up both sides of the peninsula via the Occoquan River and Pohick Creek, and gained familiarity with the lands in-between. In 1755, George Mason IV, author of the Virginia Declaration of Rights, built his home on the peninsula. This Georgian house, known as Gunston Hall Plantation, is on the National Register of Historic Places and is open to the public for tours. A 2,300-acre plantation owned by George Mason V included lands on both the refuge and adjacent Mason Neck State Park. Many historians and archaeologists have studied the homesite (Lutz, 2003). While 15 historical archaeological sites are recorded on the refuge, at present, none have been formally listed on the National Register (see appendix F).

Additional staffing and funding will allow us to upgrade our stewardship of cultural resources on the refuge and support enhanced interpretation of the post-contact history and related changes in the natural environment of the refuge for the public.

Strategies

Continue to

- Limit public access to designated trails to keep visitors away from historic sites on the refuge.

- Provide interpretation of historic importance of refuge in refuge brochures and kiosks.

- Monitor known historical sites for looting and trespass.

Over the 15 years of CCP implementation:

- Use new Sycamore Trail as an opportunity to interpret historic resources on the refuge with sensitivity to ensure they remain protected.

- Work with Mason Neck State Park and Gunston Hall to develop appropriate historical resources brochures and signage.

- Raise awareness of the importance of protecting historical resources, and interpret the existing historical resources through outreach and interpretive information and programs.

- Work with the Virginia Council on Indians to develop interpretation, education, and outreach materials and programs related to the refuge's cultural resources.

Part Two—Featherstone Refuge Management

Introduction

The Service will build off the wildlife and habitat actions already occurring under current management. Increased emphasis will be on monitoring and protecting sensitive areas from human disturbance, such as the refuge shoreline and riparian forest habitats. We will work with partners to develop shoreline protection measures and address climate change impacts. In addition, monitoring and controlling invasive plants, pests, and pathogens to avoid catastrophic loss or degradation of habitat will remain a priority. As funding, staffing, or partner assistance allows, we will also collect refuge habitat data, such as locations of vernal pools and nesting sites, to include in a GIS database. Research by partners will also be encouraged to support refuge goals and objectives, enhance our understanding of Federal trust resources, or address issues of concern.

The Service will continue to pursue and evaluate options with Prince William County and other stakeholders to secure public parking, and safe and legal public access to the refuge–an issue since the refuge was established. In addition, many stakeholders are seeking a means to establish a segment of the PHNST on the refuge, contributing to a concept of a continuous network between the Mount Vernon Trail (in southern Fairfax County) and Prince William Forest Park.

Once public access is secured and we have additional staff to effectively manage a visitor program, we will provide opportunities for wildlife observation and nature photography on designated refuge trails and fishing at designated sites. New proposed infrastructure construction will be contingent on available funding. Map 4.3 depicts potential locations for new public use infrastructure. With additional staff in place, we will also evaluate, in detail, a proposal to provide opportunities for hunting in cooperation with VDGIF. Other alternatives, including no action, will be considered in the hunt program evaluation, and there will be public involvement before making a final decision.

General Refuge Management

There are some common actions we will undertake in managing Featherstone Refuge over the next 15 years. Some actions are required by law or policy, or they may be administrative actions that do not necessarily require public review, but we want to highlight them in this public document. They may also be actions we believe are critical to achieving the refuge's purpose, vision, and goals. Those actions are the following:

- Coordinating with refuge partners, the Friends of Potomac River Refuges, and the Prince William County community
- Protecting federally listed and recently de-listed species
- Controlling pest plants and animals
- Monitoring and abating wildlife diseases
- Supporting research and investigations
- Distributing refuge revenue sharing payments
- Protecting cultural resources

Coordinating with Refuge Partners, Friends of Potomac River Refuges, and the Prince William County Community

We will continue to inform and coordinate with our refuge partners, including the Friends of Potomac River Refuges, VDGIF, and Prince William County, in continuing efforts to protect the integrity of refuge wildlife and habitats, and to identify opportunities for engaging the local community in stewardship of refuge resources.

Protecting Federally Listed and Recently De-listed Species

The bald eagle was recently removed from the Federal list of threatened and endangered species. However, it remains a focal species for the refuge and it continues to be protected under the MBTA and the Bald and Golden Eagle Protection Acts, as well as State law. We will continue to protect bald eagles as a priority on the refuge. There are currently no active nesting pairs on the refuge; the last nesting pair documented was in 1996. However, at least one pair has

Map 4.3. Planned Public Use Features at Featherstone Refuge

been active in the vicinity of the refuge since the early 1990s. We will continue to work cooperatively with VDGIF to monitor for nesting and breeding activity and prohibit the public from disturbing them.

The Service has identified one federally listed aquatic invertebrate, the dwarf wedgemussel (endangered), and three federally listed plants—sensitive joint-vetch (threatened), small whorled pogonia (threatened), and harperella (endangered)—as occurring in Prince William or adjacent counties. None, however, have been documented on the refuge. The dwarf wedgemussel is known to occur in the Lower Potomac watershed downriver from Featherstone Refuge. It is possible that one of these four listed species may be present on the refuge. We will continue to support partner-led efforts to survey for them. If located, we would work with the respective species' Recovery Team, VNHP, and other experts to develop protection measures.

Controlling Pest Plants and Animals

The establishment and spread of invasive plants is a significant problem that reaches across all habitat types. The unchecked spread of invasive plants threatens the biological diversity, integrity and environmental health of all refuge habitats. In many cases, these plants have a competitive advantage over native plants and form dominant cover types, reducing the availability of native plants as food and cover for wildlife. There are many plans, strategies, and initiatives targeted toward more effective management of invasive species, including *The National Strategy for Management of Invasive Species* for the National Wildlife Refuge System (2003), *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 (2002). Guidance for managing invasive species on refuges is found in the Service Manual (620 FW 1.7G).

We, or our partners, will continue to treat invasive plants as needed using mechanical (e.g. mowing or trimming), biological, and hand-pulling methods, as well as herbicides. Only herbicides approved by the Regional Contaminants Coordinator will be used, and only in accordance with approved rate and timing of application. Consideration of impacts on target and non-target species is part of the approval.

With regards to pest animal control, we, or our partners, will continue to use both non-lethal and lethal control measures, as warranted. Similar to our discussion under Mason Neck Refuge, we are concerned and remain vigilant about forest pests such as gypsy moth and emerald ash borer and take action as warranted to control their spread. Lethal control of pest animals will only be conducted by refuge staff, their agent, or contractor to achieve a management objective. As such, control activities are considered a management or administrative activity and not subject to compatibility review.

Monitoring and Abating Wildlife Diseases

The Service Manual chapter on Disease Prevention and Control is not yet published. Until it is, we derive guidance on this topic from the Refuge Manual and specific directives from the Director or the Secretary. Refuge Manual 7-RM-17.3 lists three objectives for disease prevention and control:

1) To manage wildlife populations and habitats so the likelihood of disease contraction and contagion are minimized

2) To provide for early detection and identification of disease mortality when it occurs

3) To minimize losses of wildlife from disease outbreaks

These objectives were published in 1982. Since that time, in addition to diseases that cause serious mortality among wildlife, significant attention has been given to those diseases that are transmitted through wildlife to humans. For example, Lyme disease transmitted by ticks, and West Nile virus transmitted by mosquitoes.

A serious wildlife disease receiving considerable attention worldwide is avian influenza. Of particular concern is the highly pathogenic Eurasian form (H5N1). In 2006, all refuges were instructed to prepare an Avian Influenza Surveillance and Contingency Plan. The plan covering the Refuge Complex was approved in July 2006 (USFWS, 2007a). It discusses methods for dealing with this disease should it ever be identified on the refuge.

Another disease of significant concern to both the Service and VDGIF is CWD. It attacks the brain and spinal cord of deer, elk, and moose, and is typically fatal. While the exact cause is unknown, it is believed to be caused by a prion, an altered protein that causes other normal proteins to change and cause sponge-like holes in the brain. CWD was first identified in the 1960s in a Colorado research facility, and since that time it has been found in Wisconsin, Wyoming, Nebraska, New Mexico, South Dakota, Illinois, Utah, Kansas, Minnesota, Montana, Oklahoma, New York, West Virginia, and Canada. Prion diseases, like CWD, do not move easily between species. There is no scientific evidence that CWD has been transmitted to animals other than deer, elk, and moose. There is also no evidence that any human has ever been infected with CWD.

The VDGIF is conducting active surveillance for CWD during deer hunting seasons. To establish whether CWD occurs in Virginia, VDGIF began Statewide CWD surveillance in 2002. Deer have been sampled from every county in the Commonwealth. In January 2010, the VDGIF confirmed the first case of CWD in Virginia (VDGIF 2010). It was detected in a white-tailed deer killed by a hunter in Frederick County, near the West Virginia State line. VDGIF recommends that people take precautions to avoid exposure to animals infected with CWD. Specifically, they recommend not consuming meat from any deer that appears abnormal, sick, or is known to be infected with CWD. They also recommend wearing gloves when dressing and boning deer meat. For more detailed information on VDGIF's response to chronic wasting disease, you can access their Chronic Wasting Disease Response Plan at *www.dgif.virginia.gov/cwd* (accessed June 2011). We also developed a CWD plan for the Refuge Complex in 2006 and will continue to communicate and coordinate with VDGIF to monitor for the presence of the disease on and near the refuge.

Supporting Research and Investigations

Guidance on conducting and facilitating research and investigations on refuges is found in the Refuge Manual and the Service Manual. In 1982, the Service published three objectives for supporting research on units of the Refuge System in the Refuge Manual (4 RM 6.2):

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 (603 FW 1.10D (4)) provided supplemental guidance on the appropriateness of research on refuges, as follows: "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."

All research conducted on the refuge by others must be determined in writing by the refuge manager to be both appropriate and compatible before a special use permit is issued to allow the activity. As noted in chapter 3, we have found several research projects to be appropriate and compatible. We expect that additional opportunities to conduct research on the refuge will arise in the future. In making determinations on the appropriateness and compatibility of future research proposals, we will follow guidance in the Refuge and Service Manuals and will employ the following general strategies:

- Seek qualified researchers and funding to help answer refuge-specific management questions.
- Participate in appropriate multi-refuge studies conducted in partnership with the USGS.
- Facilitate appropriate and compatible research by providing temporary housing and equipment, if available, for persons conducting field work.
- Pursue peer-reviewed publications of research, and/or ensure the Service is acknowledged as a contributor in research conducted on the refuge by others.

Generally, we will approve permits for research projects that provide a direct benefit to the refuge or that will strengthen our decisions on managing natural resources or public use programs on the refuge. The refuge manager also may consider requests that do not relate directly to refuge objectives, but instead relate to the protection or enhancement of native species and biological diversity in the region and support the goals of ecoregional conservation plans, such as the ACJV.

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

USFWS

Magnolia warbler

and the role of Service staff as key partners in funding and/or operations. We will ask our refuge biologists, other divisions of the Service, USGS, select universities or recognized experts, VNHP, and the VDGIF to peer review and comment on research proposals and draft publications, and will share research results internally with these reviewers and other conservation agencies and organizations. To the extent practicable, and given the publication type, all research deliverables will conform to Service graphic standards.

Some projects, such as depredation and banding studies, will require additional Service permits. The refuge manager will not approve those research projects until all required permits are received and the consultation requirements under the Endangered Species Act have been met.

Distributing Refuge Revenue Sharing Payments

As we described in chapter 3, we pay Prince William County refuge revenue sharing payments based on the acreage and the appraised value of Featherstone Refuge lands. These annual payments are calculated by a formula determined by, and with funds appropriated by, Congress and authorized under the Refuge Revenue Sharing Act (16 U.S.C. § 715s). Those payments will be continued in accordance with the law, commensurate with changes in the appraised market value of refuge lands or new appropriation levels dictated by Congress.

Protecting Cultural Resources

During the release of the public draft CCP/EA, we consulted with the Virginia SHPO regarding our proposed cultural resource management. In their response, the Virginia SHPO states they fully support our cultural resource management program and agreed it fulfills the Service's stewardship responsibilities under Section 110 of the National Historic Preservation Act (Eaton 2011 personal communication). We will continue to evaluate the potential for refuge projects to impact archaeological and historical resources, in consultation with the regional archaeologist and/or SHPO to ensure compliance with Section 106 of the National Historic Preservation Act. That compliance may require any or all of the following: a State Historic Preservation Records survey, literature review, or field survey. In addition to surveys and reviews, we will also seek to minimize adverse impacts to eligible archaeological sites through public access restrictions and monitoring by law enforcement. For all archaeological sites on the refuge, preservation in place is our preferred treatment.

Conducting Additional NEPA Analysis

For all major actions, NEPA requires site-specific analysis and disclosure of their impacts, either in an EA or an EIS. Most of the major actions in this CCP were fully analyzed in the draft CCP/EA and are described there in enough detail to comply with NEPA, and do not require additional environmental analysis. Although this is not an all-inclusive list, the following project examples fall into this category: conducting biological inventories and monitoring, pursuing safe public access to refuge lands and legal parking to facilitate compatible public use on the proposed trails, constructing proposed public use facilities, and controlling invasive plants and animal pests.

Although we analyzed the impacts of most management actions in the draft CCP/EA, additional or supplemental NEPA analysis will be necessary for certain types of actions. An example of this is our proposal to evaluate the need for, and feasibility of, shoreline protection projects at Featherstone Refuge. Should we determine a proposed action that requires major construction to protect the shoreline at Featherstone Refuge, we will conduct a detailed NEPA analysis, including public involvement, before a decision on a particular design is reached. Similarly, if we pursue a hunt program for Featherstone Refuge, we will conduct a detailed NEPA analysis, including public involvement, before a decision is made. In either case, these are management actions whose precise details and, therefore, consequences cannot be known by the Service at this time.

Featherstone Refuge Goals, Objectives, and Strategies

Detailed Objectives and Strategies to Meet Refuge Goals

GOAL 1: **Protect forest, wetland, and shoreline habitats to support native wildlife and plant communities, including species of concern.**

Objective 1.1 Mature Hardwood-mixed Forest Habitat and Associated Native Wildlife

Monitor habitat conditions and protect sensitive areas from human disturbance on the refuge's 80 forested acres, with emphasis on nesting bald eagles, migratory birds, and other species of conservation concern identified in the Virginia Wildlife Action Plan.

Rationale

Sustaining a contiguous, healthy, and diverse mature hardwood-mixed forest on Featherstone Refuge contributes to migratory bird conservation due to the refuge's location in a highly urbanized area. Remaining coastal forests and woodlands within BCR 30, like those on the refuge, provide stopover sites during migration and overwintering for neotropical migrants (Steinkamp, 2008). Within BCR 30, forested upland communities provide habitat for the second highest number of priority bird species in the region (USFWS, 2007). Destruction and fragmentation of forests in both breeding and wintering areas are factors in the decline in forest bird species abundance (Roth et. al., 1996). Many of these declining species are also associated with dense understory conditions created by local disturbance. These conditions have become less common due to a lack of forest management and overbrowsing by white-tailed deer (Rich et al., 2004).

Management at Featherstone Refuge will be focused on protecting habitat for bald eagles and other migratory birds of conservation concern. Because of its size, the refuge only minimally contributes to conserving habitat for FIDs and other neotropical bird species which are regionally declining due to habitat loss and fragmentation. FIDs species require large contiguous forested tracts to maintain viable populations. These species require a minimum habitat patch size of at least 50 acres in size with 10 or more acres of "forest interior" habitat (i.e., forest greater than 300 feet from the nearest forest edge) (Jones et al., 2000). However, the 50-acre minimum habitat patch size is only capable of supporting less area-sensitive FIDs species; more area-sensitive species require larger continuous forest patches. Larger patches also increase the probability of supporting a diversity of productive breeding pairs.

FIDs such as wood thrush, Acadian flycatcher, and scarlet tanagers are known to occur on the refuge and are listed as birds of conservation concern by various authorities (appendix A). According to the PIF Area 44 Plan, the BCR 30 plan, and Virginia WAP, other birds of conservation concern that will benefit from a diverse, mature, mixed-deciduous forest include raptors such as red-shouldered hawk and cavity-nesting birds such as pileated and red-bellied woodpeckers (Rosenberg et al., 1999; PWCA, 2008).

Among a number of management recommendations for forest birds made in the BCR 30 Plan are the following:

- Increase and improve active management of forests to improve habitat quality within existing and high priority upland forest (e.g., loss of shrub layer).
- Manage upland forest communities to provide post-fledging habitat (e.g. a habitat mosaic, including shrubby areas and openings; targeted species is the wood thrush).

- Develop and implement programs to control invasive plant species.

Bald eagle conservation also continues to be a priority on the refuge since their protection was a key reason for refuge establishment. After four decades of protection under the Federal Endangered Species Act, the bald eagle was officially removed from the Federal list of endangered and threatened wildlife in 2007. However, they are still protected under the Eagle Act and the MBTA. Bald eagles also continue to be State-listed as threatened in Virginia.

The refuge shoreline provides important foraging and perching habitat for bald eagles. Although the refuge does not currently support any breeding pairs of bald eagles, it has previously and will hopefully do so again in the future as Virginia's eagle population continues to grow. There are active pairs in the vicinity of the refuge. The State's population has steadily increased from a low of 33 nests in 1970 to current numbers of nearly 550 pairs in Virginia's Coastal Plain, and over 1,000 pairs throughout the Chesapeake Bay region.

For more than 30 years, the VDGIF has cooperated with the Service, with academic and research partners—in particular, the Center for Conservation Biology (CCB) at the College of William and Mary—and with public and private landowners to achieve and document recovery of bald eagles. Both VDGIF and the Service remain committed to protecting bald eagles to ensure that a healthy population is sustained. Widespread urban sprawl and habitat destruction in the Coastal Plain pose serious risks to some of the region's best eagle nesting, foraging, and roosting habitat. To address these and other threats, both agencies have developed management guidelines: the Virginia Bald Eagle Management Guidelines (2007) and the Service's National Bald Eagle Guidelines (2007). We will support VDGIF in implementing both agencies' guidelines as they apply to Featherstone Refuge.

John Mosesso, Jr./NBII

Eastern box turtle

The refuge's forests also provide habitat for native mammals, amphibians, and reptiles. Appendix A presents a listing of all species known or suspected to occur on the refuge. Of the reptile species that are likely to occur, three are listed by the Virginia WAP as species of conservation concern, including the eastern hog-nosed snake (Tier IV), spotted turtle (Tier III), and eastern box turtle (Tier III).

Strategies

Continue to

- Cooperate with VDGIF and CCB in monitoring bald eagle activity on the refuge.

Over the 15 years of CCP implementation

- Identify potential habitat improvements for bald eagle, waterfowl, or other migratory birds.

- Identify partners to conduct surveys of neotropical migratory birds and other birds of concern.

- Enlist USDA–FS, State or conservation organizations with ecological expertise, to conduct forest health and condition inventory and identify any significant threats.

- Map in GIS, and protect from adverse impacts, any vernal pools or other unique habitat features.
- Inventory invasive plant species and prioritize their treatment.
- Use chemical, mechanical, biological, hand-pulling, or prescribed fire treatments as warranted.
- Address injurious or nuisance wildlife as problems arise.
- Hire additional wildlife program staff (appendix E) to plan, implement, and monitor the refuge's biological program.

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits, to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal, to achieve structural and species diversity of native forest species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:
  - Determine the need for white-tailed deer control by evaluating regeneration of native trees, shrubs, and forbs through vegetation surveys on species composition, abundance, and diversity.
  - To maintain desired quality and characteristics of forests for FIDS and other forest-dependent migratory birds, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than five percent of refuge upland acreage, and fundamental objectives are not compromised.

Objective 1.2 Shoreline Protection, Wetlands, and Water Quality

Protect the refuge's 220 acres of wetlands and its 2.2 miles of shoreline to maintain their integrity and protect their habitat values.

Rationale

Adopting measures to monitor and evaluate shoreline erosion, and minimize other threats to the integrity of the shoreline, is important to protecting refuge lands. Once lost, attempting to restore segments of river shoreline would be tremendously expensive and may be infeasible. However, shoreline protection will be evaluated within the context of climate change and sea level rise to determine the feasibility of shoreline protection projects.

Minimizing impacts to water quality and wetlands is also vital to maintaining the integrity, and sustaining the health and diversity, of refuge habitats and wildlife populations over the long term. Water quality impacts may come from contamination in water draining the landward side, upgradient of the refuge, into Farm Creek and other smaller drainages, and from stormwater flows immediately adjacent to the refuge. From the Potomac River side, impacts may come from contaminants in the river water. The refuge has no water quality data regarding the upland side drainages. The tidal Potomac River is monitored by the EPA and surrounding jurisdictions for a variety of water pollutants and sources.

Section 303(d) of the Federal Clean Water Act requires Virginia to

1) identify waters, known as water quality limited segments where technology-based effluent limitations and other required controls cannot achieve water quality standards; and

2) for each listed water, establish TMDLs for pollutants preventing the attainment of water quality standards; and (3) offer an opportunity for public review and comment on the proposed TMDLs.

Featherstone Refuge is located in the Upper Tidal portion of the Potomac River. The Virginia Department of Environmental Quality (VDEQ, 2008) has identified the waters of the Potomac River Lower Tidal, Potomac River Middle Tidal, and Potomac River Upper Tidal on the State's 303(d) List as impaired by nutrients (1996), sediments (1996), toxins (PCBs found in fish tissue) (2002), and impacts to biological communities (2004 and 2006) (Potomac River Lower and Middle Tidal only). Additionally, the Potomac River Lower Tidal was listed as impaired by bacteria in 2004, the Potomac River Middle Tidal was listed as impaired by metals (cadmium, chromium, copper, and lead) in 1996, and the Potomac River Upper Tidal was listed as impaired by metals (copper) in 1996 and impacts to biological communities in the nontidal portions of the basin in 2006. A TMDL for fecal coliform to address the Potomac River Lower Tidal 2004 bacteria listing was approved by the EPA in 2005, a water quality analysis for cadmium, chromium, copper, and lead to address the Potomac River Middle Tidal 1996 metals listing was approved by the EPA in 2006, and a water quality analysis for copper to address the 1996 metals listing was approved by the EPA in 2006.

We will work with the VDGIF and other State agencies to address these water quality issues.

Strategies
Over the 15 years of CCP implementation

- Monitor areas of substantive loss and work with experts to determine the feasibility of projects to mitigate shoreline erosion and wetlands impacts, especially in the context of predicted sea level rise.

- Seek partners and funding to implement priority projects assuming they are practical, feasible, cost effective, and commensurate with resource values.

- Facilitate a citizen science-based water quality monitoring program if an interest and a long-term commitment are present.

- Work with VNHP and other experts to conduct inventories for rare, threatened, and endangered plants species on the refuge. Potential species include sensitive joint-vetch, Parker's pipewort, and river bulrush.

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits. The following are all components of how we will measure our success with respect to our objectives, and the results may trigger adjustments to our management strategies, or trigger a reevaluation or revision to our objectives. Examples of monitoring or surveys that we may implement include:

  - Work with partners to monitor erosion rates along the refuge's shoreline and determine the areas in greatest need of protection.

  - Work in partnership with local universities, as well as State and Federal agencies, to establish baseline species and habitat information. Use baseline data to assess the short-term and long-term impacts of management activities and adjust management protocols as necessary.

Objective 1.3 Interjurisdictional and Federal Trust Fisheries

Support the Service's Fisheries Program, VDGIF, and other partners' efforts to manage, protect, and monitor interjurisdictional and Federal trust fisheries and other aquatic resources of conservation concern on the refuge and in surrounding waters.

Rationale

Interjurisdictional fisheries are freshwater, coastal, or marine fish populations managed by two or more states, nations, or Tribal governments because of their geographic distribution or migratory patterns (USFWS, 2002). In addition, the Regional Fisheries Program includes the following guidance,

> Interjurisdictional fisheries must be under the jurisdiction of and managed by two or more states, nations, or tribal governments. The general standard for inclusion in this category is the existence of an interagency management plan among two or more states, nations, or tribal governments, or other similar formal agreement that specifically identifies the native species or population of interest and identifies a role for the Fish and Wildlife Service; and the Fisheries Program has or intends to have a consistent commitment to species restoration as evidenced by approval by Regional Fisheries (or higher level within the Fish and Wildlife Service). Interjurisdictional species or populations not covered by such a plan or agreement will be considered on a case-by-case basis" *(http://www.fws.gov/northeast/fisheries/;* [accessed June 2011]).

The tidal Potomac River and tributaries support a diversity of interjurisdictional fish species that depend in part on the larger tributaries (including the Occoquan River and Neabsco Creek) the smaller streams that include Farm Creek, and the marshes along the Virginia shoreline for habitat. Interjurisdictional fish listed as species of concern by the VDGIF (VCWCS, 2005) include the shortnose sturgeon (a federally listed endangered species and a listed by VDGIF as Tier I), Atlantic sturgeon (Tier II), alewife (Tier IV), American shad (Tier IV), and American eel (Tier IV).

It will be important to coordinate the strategies in this objective with VDGIF, and other State and Federal agencies and organizations with jurisdiction or a mission to protect these resources. For example, the National Marine Fisheries Service (NMFS), and the Service's Fisheries Program Office in Virginia will be a key partners in meeting this objective, as will the PRFC, which regulates, and issues licensees for, all recreational and commercial fishing, crabbing, oystering, and clamming in the main stem tidal Potomac River. The PRFC also coordinates regulations with the MDNR, the VMRC, and VDGIF, and with the other Atlantic Coastal States through the ASMFC.

Strategies

Continue to

- Provide assistance, typically logistical, to research partners, upon request, to facilitate their research on fish and other aquatic species in the tidal Potomac River.

Over the 15 years of CCP implementation

- Assist VDGIF, NMFS, the Service's Virginia Fisheries Program office, and other Federal and State agencies, when needed, to address interjurisdictional fish issues related to the waters of the refuge and the Potomac River.

Monitoring Elements

- Work in partnership with local universities, as well as State and Federal agencies, to establish baseline water quality and aquatic species and habitat information. Use baseline data to assess the short-term and long-term impacts of management activities and adjust management protocols as necessary.

GOAL 2: **Provide compatible, wildlife-dependent recreational opportunities to increase the enjoyment and appreciation of the refuge's resources to visitors and nearby residents.**

Objective 2.1 Public Access

Continue to work with Prince William County and other stakeholders to establish safe public parking and access.

Rationale

As we described in chapter 3, we do not currently allow public access to the refuge because we are unable to provide parking and safe, legal access to the refuge. This is essential to implementation of visitor programs on this refuge. It is important to recognize, however, that once parking and legal access is secured, we will also need to construct trails in locations that minimize impacts to natural resources. Unfortunately, there are very few options to develop public access, given the refuge's location between a residential single-family area, an industrial park, a high density housing development, and an active railroad line. However, we will continue to actively explore all possibilities as we describe below.

We have heard recommendations to open the refuge to those who live within walking distance because these users would not require parking. We do not believe that providing this exclusive opportunity to only adjacent residents is in the best interest of the American public, nor an efficient use of our limited funding and staffing resources.

Given our interests in providing access by land to the general public, we are only aware of one viable option. This option focuses on the using the current VRE parking area and platform. This has the potential to provide parking for refuge users and safe access across the CSX railroad tracks. In addition, it presents an opportunity to construct a trail from the west side of the railroad tracks to the refuge boundary and along an old roadway that has the potential to become part of the PHNST.

We will continue to discuss with Prince William County, the NPS, and other stakeholders, all viable options for resolving the access and parking issue and establishing and maintaining a 1.1-mile segment of the PHNST through Featherstone Refuge. The PHNST includes 830 miles of existing and planned trail segments linking the mouth of the Potomac River to the Allegheny Highlands with the goal of providing "… a means to explore the origins and continuing evolution of the Nation" *(http://www.nps.gov/pohe/index.htm;* [accessed June 2011]). The NPS is the Federal agency providing oversight and coordination for the PHNST. The NPS is currently working on a Memorandum of Understanding with State and Federal partners to develop a regional trails plan in the vicinity of Featherstone Refuge. The refuge would consider becoming a signatory if there is potential to resolve the public access issue. As a multi-use trail (i.e., for foot and bicycle uses), the PHNST segment would likely require an improved surface constructed according to American Association of State Highway and Transportation Officials (AASHTO) standards.

Despite the limitation of access by land and in response to public comment, we have decided to offer non-motorized boat access at one designated site along Farm Creek. Also see objective 2.4 and map 4.3.

Strategies

- Over the 15 years of CCP implementation
- Support Prince William County in pursuing VRE and CSX Station parking and crossover and platform access, as well as other viable options to provide safe public access.

- With land access and parking secured, support the NPS and other partners in development of PHNST.
- Allow non-motorized boat access at one designated location on Farm Creek (see objective 2.4).
- Hire visitor service and maintenance staff as identified in staffing chart (see appendix E).

Objective 2.2 Hunting

Evaluate opportunities for a quality hunting program in partnership with VDGIF

Rationale
Members of the public and VDGIF have recommended we allow hunting on the refuge. Specifically mentioned to us are interests in waterfowl and deer hunting consistent with State seasons. At present, we have not developed a hunt program proposal to the extent that we have enough detail to conduct a NEPA analysis and involve the public. Instead, once we have additional staff in place, we will identify and analyze a detailed proposal, and involve the public, before making a decision.

Hunting, if approved, would provide a priority public use in an area where public hunting opportunities are rapidly declining as development increases. The Refuge Improvement Act specifically identifies hunting as a priority wildlife-dependent recreational activity on refuges. Our particular interest in evaluating a hunt program on this refuge is similar to our reason for offering one at Mason Neck Refuge; that is, we are concerned about the impacts on native vegetation and forest regeneration from deer overbrowsing. Any negative effects on the ecological integrity, diversity, and health of the forest habitat would cause us to consider hunting as a potential management tool to minimize harmful impacts.

Strategies
Within 15 years of CCP implementation
- Evaluate in detail a proposal to provide opportunities for hunting consistent with State seasons in partnership with VDGIF. Other alternatives, including no action, will be considered in the hunt program evaluation, and there will be public involvement before making a final decision.

Objective 2.3 Recreational Fishing

Provide a quality recreational fishing opportunity at designated refuge sites.

Rationale
The Refuge Improvement Act identifies fishing as priority wildlife-dependent recreation for refuges. Fishing provides an opportunity for the Service to promote an understanding and appreciation of natural resources and their management in the Potomac River and Chesapeake Bay ecosystems and on all lands and waters in the Refuge System.

We will facilitate fishing at designated sites, in partnership with VDGIF, assuming access and staffing are secured to manage the program. Map 4.3 depicts where up to four fishing sites will be developed and designated, assuming no impacts to cultural resources or sensitive wildlife areas are predicted.

Increasing the use, enjoyment, and visibility of the refuge will allow us to better communicate the refuge's importance to wildlife and habitat. In turn, we hope this increases support for the Refuge System and promotes stewardship of natural resources in the local community and region.

Strategies
Over the 15 years of CCP implementation
- Once additional staff are in place, complete administrative requirements to open the refuge to fishing.

- Develop up to four designated fishing sites (see map 4.3).
- Partner with VDGIF to help manage the recreational fishing program.

Objective 2.4 Wildlife Observation and Photography

Provide self-guided wildlife observation and photography opportunities at designated locations on the refuge.

Rationale
The Refuge Improvement Act identifies wildlife observation and photography as priority wildlife-dependent recreational activities on refuges. These activities promote the understanding and appreciation of natural resources and their management on all lands and waters in the Refuge System.

Assuming safe public access by land and parking is secured, and staffing and funding to construct and maintain infrastructure is in place, we will develop a self-guided wildlife observation and photography program. Our objective will be to promote an understanding of the wildlife and habitat resources of Featherstone Refuge, as well as other refuges in the Refuge Complex. Tentative locations for infrastructure are presented on map 4.3.

Red-breasted merganser

Bill Thompson/USFWS

In an effort to provide wildlife observation and nature photography opportunities in the near term, we will allow non-motorized boat landings on a designated area of Featherstone Refuge's shoreline. The designated landing site is on tidal beach on Farm Creek (refer to map 4.3). Visitors accessing the refuge at this location by non-motorized boat will be allowed to walk approximately 0.4 miles along an existing footpath (indicated on map 4.3). Boaters will be confined to this section of footpath until the rest of the refuge is officially opened to public use, as described under goal 2, objective 2.1 "Public Access." No special infrastructure will be constructed to facilitate non-motorized boat access. We predict no short- or long-term impacts to resources given

- our expectation that less than 200 boat landings per year would occur;
- the landing site location is primarily on tidal sandy beach that is a dynamic, shifting substrate and has very little vegetation or soils that would be impacted;
- none of the vegetation in the area is of conservation concern and people would be required to stay on the existing footpath to minimize additional off-trail impacts; and

- our current knowledge of wildlife inhabiting the area indicates no disturbances to nesting or breeding wildlife would occur.

We will monitor to see if any of these conditions change, or unanticipated impacts are occurring, and would adapt management as warranted. We will also conduct regular outreach and enforcement of refuge regulations to insure minimal to no impacts results.

Strategies
Over the 15 years of CCP implementation

- Continue to pursue discussions with Prince William County on 1.1-mile segment of the PHNST and public access and parking as in objective 2.1 above.

- Assuming public access is secured, pursue staffing (see appendix E) and funding to develop and maintain a self-guided wildlife observation and photography program.

- Seek funding to develop infrastructure as presented on map 4.3, which includes approximately 0.75 miles of trails (in addition to the PHNST) and up to four observation platforms. Trails surfaces would be either dirt or stone dust. Prior to any trail development, we will work with NPS, VNHP, and VDGIF to locate and map any sensitive wildlife or plant areas in proximity to the proposed trail corridors.

- Designate one non-motorized boat landing site on Farm Creek. Brush out footpath to define and designate trail. Post information at site that conveys rules and regulations.

Objective 2.5 Interpretation

Provide informational and interpretive panels at trailheads, or other focal points of visitor activity to facilitate a self-guided experience.

Rationale
The Refuge Improvement Act identifies interpretation as priority wildlife-dependent recreation on refuges. It may include activities, talks, publications, audio-visual media, signs, and exhibits that convey key messages about natural and cultural resources to visitors. Visitors who experience interpretation have the opportunity to make their own connections to the resource leading to possible resource stewardship and the understanding of resource relationships and human impacts.

Similar to objective 2.5, once safe public access and parking is secured, and staffing and funding to construct and maintain infrastructure is in place, we will develop informational and interpretive panels at trailheads to facilitate self-guided opportunities. Occasional interpretive talks and tours will be given upon request.

Another effort underway related to potential interpretative activities on the refuge is the proposed Captain John Smith Chesapeake National Historic Trail. In September 2010, the NPS released a draft Comprehensive Management Plan and EA for the trail for public review and comment. The trail is the first national water-trail and commemorates the explorations of John Smith on the Chesapeake Bay and its tributaries in 1607-1609, tracing approximately 3,000 miles of his voyage routes. The final plan was approved in February 2011.

The NPS is working with many partners to plan, develop, and manage the trail, including other national wildlife refuges in the Chesapeake Bay area. Other partners include the Friends of the Captain John Smith Trail, the Chesapeake Bay Gateways and Watertrails Network, Federal and State agencies, communities, nonprofit organizations, and businesses. The draft plan and EA

outline how the NPS and these partners will develop component water trails, provide access to the trail, interpret the John Smith voyage, and protect the important resources related to the trail. Refuges in the Chesapeake Bay area, including the Potomac River Refuge Complex, have been coordinating with the NPS on identifying compatible opportunities on refuge lands to support this effort. We will continue to coordinate with the NPS on developing opportunities for the trail consistent with the final decision of the CCP.

Strategies
Over the 15 years of CCP implementation
- Continue to pursue discussions with Prince William County on PHNST and public access and parking as in objective 2.1 above.
- Assuming public access is secured, pursue staffing (appendix E) and funding to develop and maintain a limited self-guided interpretive program.
- Encourage trained volunteers, Friends Group members, and partners to conduct interpretive walks and related programs.
- Coordinate with the NPS to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations.

Objective 2.6 Environmental Education

Support partner-led environmental educational opportunities upon request.

Rationale
The Refuge Improvement Act identifies environmental education as a priority wildlife-dependent recreational activity on refuges. Visitors will benefit from environmental education opportunities on the refuge. These activities will promote understanding and appreciation of natural resources and their management and will help to raise awareness, understanding, and appreciation of the role of the refuge in the tidal Potomac River and Chesapeake Bay watershed and its contribution to migratory bird conservation. We will support partner-led efforts to design and implement an environmental education program. That program could include teacher-training or onsite student programs.

Strategies
Over the 15 years of CCP implementation
- Continue to pursue discussions with Prince William County on PHNST and public access and parking as in objective 2.1 above.
- Assuming safe public access is secured, encourage partners to lead quality environmental educational programs, operating under a special use permit.

GOAL 3: **Promote awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.**

Objective 3.1 Volunteers

Provide volunteer opportunities to facilitate public use and wildlife and habitat management programs.

Rationale
We benefit from volunteer support of programs on the refuge. Volunteer projects also can be an effective outreach tool to increase awareness and understanding of local and regional resource concerns.

Strategies
Over the 15 years of CCP implementation
- Develop a list of volunteer opportunities and recruit for projects as needed

Objective 3.2 Community Outreach

Conduct outreach to inform the local community about programs or activities.

Rationale
Because there is no authorized public access, except as noted under objective 2.4, we strive to find alternative ways to educate the public about Featherstone Refuge, and keep the local community informed about its values to wildlife and habitat resources, other than using onsite programs. We will continue to develop and pursue community outreach activities, which promote natural resource stewardship, and raise awareness of the Refuge System, the Refuge Complex, and this refuge's contribution to maintaining natural resources in the region.

Strategies
Continue to
- Inform visitors at other units of the Refuge Complex and local residents about Featherstone Refuge and its resources through the media, interpretive materials available at Occoquan Bay Refuge visitor contact facility, and our Web site.

- Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities.

- Respond in a timely manner to written, telephoned, or in-person inquiries from the public.

Over the 15 years of CCP implementation
- Increase communication and outreach efforts, when needed, to enhance community relations

Objective 3.3 Elected Official Outreach

Conduct outreach to elected officials to explain management priorities or highlight management issues and challenges.

Rationale
We seek support from elected officials for all our Refuge Complex programs. It is important to keep them apprised, especially when significant new programs are implemented. Also, as issues arise, it is important to provide updates and explain how the issues are being addressed.

Strategies
Continue to
- Provide written or personal briefings for members of Congress or their staffs, as needed or as requested, to inform them about important events or about issues affecting the refuge.

Over the 15 years of CCP implementation
- Enhance outreach to Federal, State, and local officials.

Objective 3.4 Research

Facilitate research, monitoring, and inventory opportunities that will enhance science-based decisionmaking and adaptive management.

Rationale
We will encourage partner-led research that would increase our understanding of wildlife and habitats at Featherstone Refuge, or that would contribute to addressing issues of regional concern to the Service and the State.

Strategies
Over the 15 years of CCP implementation
- Identify and prioritize research and monitoring needs for the refuge

- Encourage partners to conduct research and assist them in seeking alternative funding sources

Chapter 5

USFWS

Meeting at Mason Neck Refuge

Consultation and Coordination with Others

- Introduction
- Planning to Protect Refuge Resources
- Partners Involved in Refuge Planning
- Contact Information

Introduction

This chapter describes how we engaged others throughout the development of this CCP. It details our efforts to encourage the involvement of the public and conservation partners, including other Federal and State agencies, county officials, civic groups, non-government conservation and education organizations, and user groups. It also identifies who contributed in writing the plan or significantly contributed to its contents.

It does not detail the dozens of informal discussions the refuge manager and his staff have had over the last 5 years where the CCP was a topic of conversation. Those involved a wide range of audiences, including congressional representatives or their staffs, local community leaders and other residents, refuge neighbors, refuge visitors, and other interested individuals. During those discussions, the refuge manager and his staff often would provide an update on our progress and encourage comments and other participation.

According to Service policy, we must review and update our final CCP at least once every 15 years. We may need to revise it sooner, either in response to significant new information that would markedly change management direction, or if the Service Director or our Regional Director deem it necessary. If so, we will once again announce our revised planning and encourage your participation.

Planning to Protect Refuge Resources

Our refuge planning began informally in June 2006 at an initial strategy meeting between the refuge staff and regional office staff and culminates with this final CCP.

June 2 and 16, 2006: We had initial phone calls between refuge staff and regional office planning staff. We discussed the planning process and distinguished between the responsibilities of the regional office staff, refuge staff, and a potential contractor. Also, we discussed the refuges' resources and the potential issues that would need to be addressed in the plan. We developed a tentative schedule for accomplishing the major steps in the planning process and determining when and how we should involve others.

September 28-29, 2006: We held our first team meeting on Mason Neck Refuge. For both refuges, we drafted a vision statement, identified preliminary issues, determined what additional resource information we needed to collect and summarize, discussed who should participate on the core planning team, and what other experts we should consult to help us address planning issues. We also developed our timetable for the planning process.

November 6, 2006: We wrote to the executive director of the VDGIF inviting representatives from the agency join our core planning team. He responded and nominated four individuals.

January 18-19, 2007: The planning team leader met with refuge staff and the contractor to discuss aspects of the planning process that have been accomplished and what needed to be initiated. We also discussed other State agency and Service participation, drafted a vision and goals, shared information on the "Affected Environment," and developed plans for public scoping meetings.

March 7, 2007:	We distributed a one-page newsletter to over 200 citizens, local and elected officials, organizations and agencies, and members of the Friends of Potomac River Refuges mailing list to formally announce the beginning of the planning process. We also announced two public open houses we would host in later in the month.
March 27 and 28, 2007:	We hosted two open-house meetings in Woodbridge and Lorton, Virginia. We announced the meetings with notices published in local and regional newspapers, on the radio, in our newsletter, and on our regional planning Web site. Twenty-seven people attended the meetings. At both meetings, we presented an overview of current refuge management, described the planning process, and explained how people can get involved. We also shared our preliminary vision and goals for the refuges and the issues we already knew we needed to address. We asked for feedback and answered any questions about the planning process.
March 29, 2007:	We convened the core team for the first time, including VDGIF and Virginia Department of Parks and Recreation members. Topics at the meeting included: the planning process steps, what had been accomplished to date, tentative issues to address, and a draft vision and refuge goals. We also identified other preplanning needs yet to be done, and other information sources there were.
May 15-16, 2007:	Refuge staff hosted a field trip to Mason Neck Refuge for the core planning team, including VDGIF and Virginia State Parks representatives, and other State agency and Service experts. The purpose of the field visit on May 15 was to conduct a Visitor Services Review of the refuge, its current program, and potential. On May 16, State agency and Service staff evaluated the refuge's biological program and discussed issues related to bald eagle and waterbird management, and the management of Little Marsh impoundment.
May 18, 2007:	We published a NOI to prepare a CCP in the *Federal Register* (72 FR 28066).

October 4-5, 2007: We held a core team meeting to review the status of the planning process, reviewed issues and discussed how to address them, revised the vision and goals, and discussed a framework for three potential alternatives for Mason Neck Refuge. On October 5, we invited the volunteer coordinator of the Northern Virginia Soil and Water Conservation District and the Potomac River Watershed Coordinator of the VDEQ to discuss water quality monitoring the use of volunteers. Members of the Friends of Potomac River Refuges were also at the meeting to learn about the State's volunteer program.

December 2007: We distributed a planning update newsletter to everyone on our project mailing list, as well as distributed it from the Refuge Complex office and at refuge events. We also posted the newsletter on our Web site. The newsletter summarizes what we heard at our public meetings, what we have been working on as a planning team, and it encouraged continued involvement in the planning process.

January 9, 2008: We met with Mason Neck Area Managers and provided an update on the status of the CCP process. Mason Neck Area Managers include:

- Bureau of Land Management–Meadowood Special Recreation Management Area
- Northern Virginia Regional Park Authority–Pohick Bay Regional Park
- Virginia State Parks–Mason Neck State Park
- Virginia State Historic Site–Gunston Hall Plantation

January 30, 2008: We participated in the Friends of Potomac River Refuges Annual Meeting with the general membership attending. Comments were made in our presentation on the status of the CCP process and how to get involved in the process.

February 20, 2008: We met with Prince William County Supervisor Frank Principi. There was general discussion of the CCP process and the PHNST through Featherstone Refuge.

March 12, 2008: We attended a Friends of Potomac River Refuges board meeting and mentioned the status of the CCP.

April 9, 2008: We attended a Friends of Potomac River Refuges board meeting and mentioned the status of the CCP.

April 10, 2008:	We discussed the status of the CCP at the Merrimac Farm Dedication with David Whitehurst and Jerry Sims of VDGIF. In particular, we discussed management of Featherstone Refuge.
April 17, 2008:	We met with Jerry Sims and Rick Busch of VDGIF to discuss further details on the management of Featherstone Refuge.
April 19, 2008:	We co-hosted the Eagle Festival and had a general discussion with interested individuals attending the festival on the CCP process, the status of planning, and how to get involved.
April 28, 2008:	We met with Prince William County Supervisor Frank Principi, Prince William County Planner Pat Thomas, and NPS Heritage Trial Superintendent Don Briggs to discuss the CCP planning process and the PHNST routing through Occoquan Bay and Featherstone Refuges.
May 1, 2008:	During the Crows Nest Property Dedication, we had a general discussion with Rick Bush and Jerry Sims of VDGIF on the CCP process and management of Featherstone Refuge.
May 3, 2008:	We met with Jerry Sims and Rick Busch of VDGIF to discuss further details on the management of Featherstone Refuge.
May 30, 2008:	We held a core team meeting to discuss progress on writing CCP chapters. We reviewed what the contractor had done to date and provided edits.
September 16, 2008:	We held a meeting with Eddie Byrne of Kettler Development Corporation to discuss the new development adjacent to Featherstone Refuge and the refuge's needs for dedicated public parking.
September 18, 2008:	We met with Jerry Sims of VDGIF about management of Featherstone Refuge.
October 8, 2008:	We met with Jerry Sims, John Rohm, Ron Hughes, Joe Ferdenanson, and VDGIF for a tour of Featherstone Refuge and led a discussion of management activities.
October 13, 2008:	We met with the Mason Neck Area Managers and provided a CCP status update.

December 10, 2008:	We discussed the proposed Captain John Smith Chesapeake National Historic Trail with other national wildlife refuge managers from Virginia, Nathan Caldwell from the Service's Headquarters, and National Park Service Trail staff present. There was general discussion on status of trail and a conceptual plan. We provided an update on the status of the CCP.
January 23, 2009:	We provided a CCP status update at the Friends of Potomac River Refuges annual meeting.
January 29, 2009:	We met with James McGlone, VDF, to discuss forest management planning for Mason Neck Refuge, which included a discussion of the CCP and proposed goals and objectives for forest management.
February 2009–December 2010:	We continued to meet as a core planning team, meet with the Mason Neck Area Managers Group, and with VDGIF to refine our proposed goals and objectives.
January 5, 2011:	We announced the availability of the draft CCP/EA in the Federal Register for 49 days of public review and comment. We also distributed a newsletter and sent out a press release announcing the public comment period and encouraging people to participate. The Federal Register notice, newsletter, press release, and our planning Web site also announced the three open house/public meetings we planned for February 2-3, 2011.
February 2-3, 2011:	We hosted a total of three open houses/public meetings in Woodbridge and Lorton, Virginia. At each of the meetings, we gave a short overview of the refuges and the CCP planning process. We also recorded all the comments and suggestions provided at the meetings.
March 2011:	We enlisted the USDA-FS's Recreation Solutions Enterprise Team to compile and analyze all of the response we received during the public comment period.
April–June 2011:	We considered all the public comments we received and drafted a response to each substantive comment. Based on these substantive comments, we reviewed and revised, where appropriate, the draft CCP/EA.
July–August 2011:	We compiled the final CCP for Regional Supervisor, Regional Chief, and Regional Solicitor's Office before submitting it to the Regional Director for review and approval.

Partners Involved in Refuge Planning

The refuges' programs enjoy a great deal of support from outside the Service in many arenas: conducting biological surveys, enhancing public use and refuge programs, restoring habitat, and protecting land. Our partnerships will continue to expand under the increasing interest in conserving refuge resources. During the past 5 years, we have kept the following partners about the planning process and encouraged their involvement.

- Friends of Potomac River Refuges
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Forestry
- Ducks Unlimited
- Audubon Society of Northern Virginia
- Chesapeake Bay Gateways Network
- The Hartwell Foundation
- Virginia Polytechnic Institute and State University (Virginia Tech)
- Potomac River Region members of the Gateways Network
- USDA - Natural Resources Conservation Service
- USDA – Forest Service, Forest Health
- Mason Neck State Park
- Fairfax County School District
- Virginia Native Plant Society
- College of William and Mary – Center for Conservation Biology
- Audubon Naturalist Society
- Northern Virginia Bird Club
- USDA – Wildlife Services
- Prince William Conservation Alliance
- USDI-Bureau of Land Management
- Gunston Hall Plantation
- Pohick Bay Regional Park–Northern Virginia Regional Park Authority

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Bill Wallen

Occoquan Bay refuge in the fog

Chapter 6

Bill Wallen

Male cardinal

List of Preparers

Writers and Major Contributors

The following individuals contributed directly to the preparation of this CCP document.

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Other Service Program Involvement

Joe Witt — *Wildlife Biologist,* former refuge biologist at Potomac River Refuge Complex (he has since transferred to the National Conservation Training Center). Joe provided input into past and current biological program management.

Hal Laskowski — *retired Regional Division Chief of Natural Resources,* Biological Monitoring and Inventory Coordinator. Hal evaluated Little Marsh Impoundment and made recommendations on its management.

Susan Guiteras — *formerly Regional Refuge Biologist (has since transferred to the Coastal Delaware Refuge Complex).* Susan helped develop the species of concern lists in appendix A.

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Albert Spells — *Coordinator,* U.S. Fish and Wildlife Service Virginia Fisheries Program Office. Albert provided fisheries input and reviewed the draft CCP/EA.

Susan Lingenfelser — *Wildlife Biologist,* U.S. Fish and Wildlife Service Ecological Services Virginia Field Office. Susan provided information on contaminants in the area and reviewed the draft CCP/EA.

	Jan Taylor	*Northeast Regional Refuge Biologist.* Jan helped review and improve biological goals, objectives, and strategies, as well as develop monitoring elements.
	Kelly Chadbourne	*Assistant Northeast Regional Refuge Biologist.* Kelly helped review and improve biological goals, objectives, and strategies, as well as develop monitoring elements.
	Tim Binzen	*Historian,* U.S. Fish and Wildlife Service Northeast Regional Office. Tim researched and drafted overviews of the archaeological, cultural, and historic resources of both Mason Neck and Featherstone Refuges. These overviews are included as appendix F to this document.
	Les Vilchek	*Cartographer,* Chesapeake Marshlands Refuge Complex. Les created the maps found throughout this CCP.
	Cynthia Schulz	*Project Leader,* Virginia Field Office. Cynthia reviewed and approved the Section 7–Endangered Species Act, compliance documentation
	Ethel Eaton	*Senior Policy Analyst,* Virginia Department of Historic Resources. Ethel reviewed and approved the Section 110–National Historic Preservation Act, compliance documentation.
Other Involvement	**Mike Erwin**	*U.S. Geological Survey Waterbird expert.* Mike provided input on managing Little Marsh Impoundment for waterbirds.
	John H. Ghent	*USDA Forest Service–Forest Health Protection,* Forest Entomologist based out of Asheville, North Carolina. John assessed the potential for gypsy moth infestations at the Potomac River Refuge Complex and made recommendations for reducing forest stocking levels.
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	Jim McGlone	*Urban Forest Conservationist,* Virginia Department of Forestry. Jim and Terry Lasher prepared the "Forest Health and Condition Inventory and Assessment for Mason Neck National Wildlife Refuge." We used the information and recommendations outlined in this plan to develop our strategies for forest management and bald eagle conservation for Mason Neck Refuge.

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Miles Friend — *Content Analyst,* U.S. Forest Service, Recreation Solutions Enterprise Team. Miles and Kristen Thrall compiled and analyzed all of the responses we received during the public comment period on the draft CCP/EA. Their summary of public comments was the basis for appendix G "Summary of Public Comments and Service Responses on the Draft Comprehensive Conservation Plan and Environmental Assessment for Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuge" in this CCP.

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Bill Wallen

Fall colors at Occoquan Bay Refuge

USFWS

Green treefrog

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USFWS

Mason Neck Refuge

Glossary (including list of acronyms and abbreviations)

Glossary

abiotic — relating to the non-living chemical and physical factors of the environment (e.g., temperature, water, soil, atmosphere, etc.)

accessibility — the state or quality of being easily approached or entered, particularly as it relates to complying with the Americans with Disabilities Act (ADA)

accessible facilities — structures accessible for most people with disabilities without assistance; facilities that meet Uniform Federal Accesability Standards (UFAS) ; Americans with Disablity Act (ADA)-accessible; e.g., parking lots, trails, pathways, ramps, picnic and camping areas, restrooms, boating facilities (docks, piers, gangways), fishing facilities, playgrounds, amphitheaters, exhibits, audiovisual programs, and wayside sites

accreting — to grow or to increase gradually

adaptation — adjustment to environmental conditions

adaptive management — Focuses on learning and adapting, through partnerships of managers, scientists, and other stakeholders who learn together how to create and maintain sustainable ecosystems.

Adaptive managemen helps science managers maintain flexibilty in their decisions, knowing that uncertainties exist and provides managers the latitude to change direction will improve understanding of ecological systems to achieve management objectives is about taking action to improve progress towards desired outcomes.

(Source: *Williams, B. K., R. C. Szaro, and C. D. Shapiro. 2007. Adaptive Management: The U.S. Department of the Interior Technical Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC.)*

advanced regeneration — tree seedlings or small saplings that develop in the understory prior to the removal of the stand's overstory. See "canopy."

anaerobic — process occurring without oxygen

anuran — of or relating to frogs and toads

appropriate use — a proposed or existing use on a refuge that meets at least one of the following three conditions: (1) the use is a wildlife-dependent one; (2) the use contributes to fulfilling the refuge purpose(s), the System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the National Wildlife Refuge System Improvement Act was signed into law; or (3) the use has been determined appropriate as specified in section 1.11 of that Act.

anadromous fish — fish that spend a large portion of their life cycle in the ocean and return to freshwater to breed

aquatic — growing in, living in, or dependent upon water

avian — of or relating to birds

avifauna	all birds of a given region
barrier	any obstruction to fish passage; an aquatic barrier
basin	the land surrounding and draining into a water body; see "watershed"
biological diversity or biodiversity	the variety of life, including the variety of living organisms, the genetic differences among them, and the communities in which they occur
biological integrity	biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms and communities. See "biotic"
biodiversity conservation	the goal of conservation biology, which is to retain indefinitely as much of the earth's biodiversity as possible, with emphasis on biotic elements most vulnerable to human impacts
biota	the plant and animal life of a region
biotic	relating to the living components of the environment (e.g., plants, animals, fungi, bacteria)
breakwater	a barrier protecting a harbor or shore from the impact of waves
breeding habitat	habitat used by migratory birds or other animals during the breeding season
buffer zones	land bordering and protecting critical habitats or water bodies by reducing human disturbance on animals, plants, and their habitats
candidate species	plants and animals for which the U.S. Fish and Wildlife Service (FWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities (Source: *http://www.fws.gov/endangered/factsheets/candidate_species.pdf*)
canopy	the layer of foliage formed by the crowns of trees in a stand. For stands with trees of different heights, foresters often distinguish among the upper, middle and lower canopy layers. These represent foliage on tall, medium, and short trees. The uppermost layers are called the overstory.
carbon footprint	the amount of carbon dioxide (CO2) emitted from the consumption of fossil fuels by a particular person, group, organization, agency, etc.
census-designated place	is a type of place (a concentration of population) identified by the United States Census Bureau for statistical purposes
community type	a particular assemblage of plants and animals

compatible use — "a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge."—National Wildlife Refuge System Improvement Act of 1997 [Public Law 105-57; 111 Stat. 1253]

compatibility determination — a required determination for wildlife-dependent recreational uses or any other public uses of a refuge

Comprehensive Conservation Plan — mandated by the 1997 Refuge Improvement Act, a document that provides a description of the desired future conditions and long-range guidance for the project leader to accomplish purposes of the refuge system and the refuge. CCPs establish management direction to achieve refuge purposes. [P.L. 105-57; FWS Manual 602 FW 1.4]

concern — see "issue"

conifer — a tree or shrub in the phylum Gymnospermae; a tree or shrub that bears cones and has evergreen needlelike or scalelike leaves. Examples include pines and firs (family Pinaceae).

conservation — managing natural resources to prevent loss or waste; management actions may include preservation, restoration, and enhancement

conservation corridor — connections between suitable habitat that allow passage of plant or animal species

conservation easement — a non-possessory interest in real property owned by another imposing limitations or affirmative obligations with the purpose of returning or protecting the property's conservation values.

conservation status — assessment of the status of ecological processes and of the viability of species or populations in an ecoregion.

cooperative agreement — a usually long-term habitat protection action, which can be modified by either party, in which no property rights are acquired. Lands under a cooperative agreement do not necessarily become part of the National Wildlife Refuge System

cultural resource inventory — a professional study to locate and evaluate evidence of cultural resources within a defined geographic area

[N.b. Various levels of inventories may include background literature searches, comprehensive field examinations to identify all exposed physical manifestations of cultural resources, or sample inventories for projecting site distribution and density over a larger area. Evaluating identified cultural resources to determine their eligibility for the National Register follows the criteria in 36 CFR 60.4 (cf. FWS Manual 614 FW 1.7).]

cultural resource overview — a comprehensive document prepared for a field office that discusses, among other things, project prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement of how program objectives should be met and conflicts resolved

[An overview should reference or incorporate information from a field offices background or literature search described in section VIII of the Cultural Resource Management Handbook (FWS Manual 614 FW 1.7).]

database	a collection of data arranged for ease and speed of analysis and retrieval
dbh	diameter at breast height; the diameter of the stem of tree measured at breast height (usually 4.5 feet above the ground); commonly used by foresters to describe tree size.
defoliator	an agent (e.g., insect pest, herbicide) that damages trees by destroying leaves or needles
degradation	the loss of native species and processes due to human activities such that only certain components of the original biodiversity persist, often including significantly altered natural communities
desired future condition	the future qualities of the refuge that the Service hopes to develop through management actions and decisions (i.e. What will the refuge look like in the future?)
disturbance	any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, habitat availability, or the physical environment
donation	a citizen or group may wish to give land or interests in land to the Service for the benefit of wildlife. Gifts and donations have the same planning requirements as purchases.
easement	a non-possessory interest in real property that permits the holder to use another's land for a specified purpose. It may also impose limitations or affirmative obligations on the holder of the land subject to the easement. An agreement by which landowners give up or sell one of the rights on their property (e.g., landowners may donate rights-of-way across their properties to allow community members access to a river. See "conservation easement.")
ecological integrity	The integration of biological integrity, natural biological diversity, and environmental health; the replication of natural conditions. For communities, integrity is governed by demographics of component species, intactness of landscape-level ecological processes (e.g., natural fire regime), and intactness of internal community processes (e.g., pollination).
ecoregion	a territory defined by a combination of biological, social, and geographic criteria, rather than geopolitical considerations. Generally, a system of related, interconnected ecosystems.
ecosystem	a natural community of organisms interacting with its physical environment, regarded as a unit
ecosystem service	a benefit or service provided free by an ecosystem or by the environment, such as clean water, flood mitigation, or groundwater recharge
embayment	a bay or baylike formation
emergent wetland	wetlands dominated by erect, rooted, herbaceous plants

endangered species — a federally listed or State-listed protected species in danger of extinction throughout all or a significant portion of its range

environment — the sum total of all biological, chemical and physical factors to which organisms are exposed

environmental education — curriculum-based education aimed at producing a citizenry that is knowledgeable about the biophysical environment and its associated problems, aware of how to help solve those problems, and motivated to work toward solving them

environmental health — the composition, structure, and functioning of soil, water, air, and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment. See "abiotic."

Environmental Assessment — (EA) a public document that discusses the purpose and need for an action, its alternatives, and provides sufficient evidence and analysis of its impacts to determine whether to prepare an environmental impact statement or a finding of no significant impact (q.v.) [cf. 40 CFR 1508.9]

Environmental Impact Statement — (EIS) a detailed, written analysis of the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources [cf. 40 CFR 1508.11]

evaluation — examination of how an organization's plans and actions have turned out — and adjusting them for the future.

exacerbate — to make more severe or harsh

extinction — the termination of any lineage of organisms, from subspecies to species and higher taxonomic categories from genera to phyla. Extinction can be local, in which one or more populations of a species or other unit vanish but others survive elsewhere, or total (global), in which all the populations vanish (Wilson 1992)

extirpated — status of a species or population that has completely vanished from a given area but that continues to exist in some other location

exotic species — a species that is not native to an area and has been introduced intentionally or unintentionally by humans; not all exotics become successfully established. See "invasive species."

fauna — all animal life associated with a given habitat, country, area or period

Federal land — public land owned by the Federal Government, including national forests, national parks, and national wildlife refuges

Federal trust resource — a resource that the Federal Government holds in trust for the people through law or administrative act. A Federal trust resource is one for which responsibility is given wholly or in part to the Federal Government by law or administrative act. Generally, Federal trust resources are nationally or internationally important no matter where they occur, like endangered species or migratory birds and fish that regularly move across state lines. They also include cultural resources protected by Federal historic preservation laws, and nationally important or threatened habitats, notably wetlands, navigable waters, and public lands like state parks and national wildlife refuges.

Federal trust responsibility — In the Federal government, a special duty required of agencies to hold and manage lands, resources, and funds on behalf of Native American Tribes.

federally listed species — a species listed either as endangered, threatened, or a species at risk under the Endangered Species Act of 1973, as amended

fee-title acquisition — the acquisition of most or all of the rights to a tract of land; a total transfer of property rights with the formal conveyance of a title. While a fee-title acquisition involves most rights to a property, certain rights may be reserved or not purchased, including water rights, mineral rights, or use reservation (e.g., the ability to continue using the land for a specified time period, such as the remainder of the owner's life).

Finding of No Significant Impact — (FONSI) supported by an environmental assessment, a document that briefly presents why a Federal action will have no significant effect on the human environment, and for which an environmental impact statement, therefore, will not be prepared [40 CFR 1508.13]

fire management — All activities related to the management of wildfires

fish passage — providing a safe passage for fish around a barrier in the upstream or downstream direction

flora — all the plants found in a particular place

floodplain — flat or nearly flat land that may be submerged by floodwaters; a plain built up or in the process of being built up by stream deposition

flyway — any one of several established migration routes of birds

focal species — a species that is indicative of particular conditions in a system (ranging from natural to degraded) and used as a surrogate measure for other species of particular conditions. An element of biodiversity selected as a focus for conservation planning or action.

focus areas — see "special focus areas"

fragmentation — the disruption of extensive habitats into isolated and small patches. Fragmentation has two negative components for biota: the loss of total habitat area, and the creation of smaller, more isolated patches of habitat.

geographic information system	(GIS) a computerized system to compile, store, analyze, and display geographically referenced information. (e.g., GIS can overlay multiple sets of information on the distribution of a variety of biological and physical features).
geotextile fabric	a strong material made of synthetic fibers used to reinforce soil and stabilize trails and roads
habitat fragmentation	the breaking up of a specific habitat into smaller, unconnected areas. A habitat area that is too small may not provide enough space to maintain a breeding population of the species in question.
habitat conservation	protecting a habitat to ensure that the use of that habitat wildlife and plants is not changed or reduced
habitat	is a combination of environmental factors that provides food, water, cover and space that a living thing needs to survive and reproduce.
head-of-tide	the farthest point upstream where a river is affected by tidal fluctuations
herpetofauna	the species of reptiles and amphibians in a particular area
historic conditions	the composition, structure and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgement, were present prior to substantial human-related changes to the landscape
hydrologic or flow regime	characteristic fluctuations in river flows
hydrology	the science of waters of the earth, their occurrences, distributions, and circulations; their physical and chemical properties; and their reactions with the environment.
impoundment	a body of water, such as a pond, confined by a dam, dike, floodgate, or other barrier, which is used to collect and store water for future use
indigenous	native to an area; a species that historically occurred or currently occurs in a particular ecosystem
interjurisdictional fish	populations of fish that are managed by two or more states or national or tribal governments because of the scope of their geographic distributions or migrations
interpretive facilities	structures that provide information about an event, place, or thing by a variety of means, including printed, audiovisual, or multimedia materials (e.g., kiosks that offer printed materials and audiovisuals, signs, and trail heads).
interpretive materials	any tool used to provide or clarify information, explain events or things, or increase awareness and understanding of the events or things (e.g., printed materials like brochures, maps or curriculum materials; audio/visual materials like video and audio tapes, films, or slides; and, interactive multimedia materials, CD ROM or other computer technology).
introduced invasive species	non native species that have been introduced into an area and, because of their aggressive growth and lack of natural predators, displace native species

invasive species an alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health

invertebrate any animal lacking a backbone or bony segment that encloses the central nerve cord

issue any unsettled matter that requires a management decision (e.g., a Service initiative, an opportunity, a management problem, a threat to the resources of the unit, a conflict in uses, a public concern, or the presence of an undesirable resource condition.)

[N.b. A CCP should document, describe, and analyze issues even if they cannot be resolved during the planning process (FWS Manual 602 FW 1.4).]

landscape A heterogeneous land area composed of a cluster of interacting ecosystems that are repeated in similar form throughout.

late-successional species, assemblages, structures, and processes associated with mature natural communities that have not experienced significant disturbance for a long time

leachate a solution resulting from the downward movement of percolating groundwater

limiting factor an environmental limitation that prevents further population growth

living shorelines living shorelines are restored shorelines that use nature-based techniques such as marsh plantings, beach nurishment, and low profile oyster reefs, breakwaters, and sills. In addition to protecting property from erosion, living shorelines provide habitat for fish, birds, and other wildlife. Like undisturbed natural shorelines, they also protect water quality by trapping excess nutrients and sediment.

local agencies generally municipal governments, regional planning commissions, or conservation groups

longterm protection mechanisms like fee-title acquisition, conservation easements, or binding agreements with landowners that ensure land use and land management practices will remain compatible with maintaining species populations over the long term. See “fee-title acquisition.”

macroinvertebrates invertebrates large enough to be seen with the naked eye (e.g., most aquatic insects, snails, and amphipods)

management alternative a set of objectives and the strategies needed to accomplish each objective [FWS Manual 602 FW 1.4]

management concern see “issue”

management opportunity see “issue”

management plan — a plan that guides future land management practices on a tract

[N.b. In the context of an environmental impact statement, management plans may be designed to produce additional wildlife habitat along with primary products like timber or agricultural crops (see "cooperative agreement").]

management strategy — a general approach to meeting unit objectives

[N.b. A strategy may be broad, or it may be detailed enough to guide implementation through specific actions, tasks, and projects (FWS Manual 602 FW 1.4).]

marsh, marshlands — areas interspersed with open water, emergent and terrestrial vegetation

mission statement — a succinct statement of the purpose for which the refuge was established; its reason for being

mitigation — actions to compensate for the negative effects of a particular project (e.g., wetland mitigation usually restores or enhances a previously damaged wetland or creates a new wetland)

mosaic — an interconnected patchwork of distinct vegetation types.

National Environmental Policy Act of 1969 — (NEPA) requires all Federal agencies to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in planning and implementing environmental actions

[Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making (cf. 40 CFR 1500).]

National Wildlife Refuge System — (Refuge System) all lands and waters and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas managed to preserve a national network for the conservation and management of fish, wildlife, and plant resources of the United States, for the benefit of present and future generations (National Wildlife Refuge System Improvement Act, 16 U.S.C. § 668dd).

native — a species that historically occurred or currently occurs in a particular ecosystem

native plant — a plant that has grown in the region since the last glaciations and occurred before European settlement

natural processes — a complex mix of interactions among animals, plants, and their environment that ensures maintenance of an ecosystem's full range of biodiversity. Examples include population and predator-prey dynamics, pollination and seed dispersal, nutrient cycling, and migration.

neotropical migrant — birds, bats, or invertebrates that seasonally migrate between the Nearctic region (North America as far south as northern Mexico) and the Neotropical region (South America as far north as northern Mexico)

non-consumptive, wildlife-oriented recreation — wildlife observation and photography and environmental education and interpretation (see "wildlife-oriented recreation")

non-native species — see "exotic species" or "invasive species"

nonforested wetlands — wetlands dominated by shrubs or emergent vegetation

Notice of Intent — (NOI) an announcement we publish in the *Federal Register* that we will prepare and review an environmental impact statement [40 CFR 1508.22]

objective — a concise statement of what a refuge wants to achieve, how much a refuge wants to achieve, when and where the refuge wants to achieve it, and who is responsible for the work. Objectives derive from refuge goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies.

oligohaline — Low salinity; having a salinity of 0.5 to 5 parts per thousand

other-than-sight materials — Interpretive materials accessible by the visually impaired refuge visitor

palustrine forested wetlands — wetlands dominated by trees, include wooded swamps and low-lying hardwood forests near rivers.

palustrine wetlands — palustrine wetlands includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all tidal wetlands where salinity due to ocean-derived salts is below 0.5 parts per thousand

partnership — any time that a federal or non-federal individual or entity work together with the U.S. Fish and Wildlife Service to achieve a mutual goal

phenology — the study of cyclical and seasonal natural phenomena, especially in realtionship to climate and plant and animal life cycle events

physiographic — relating to physical geography

$PM_{2.5}$; PM_{10} — $\mathbf{PM}_{2.5}$ particles are air pollutants with a diameter of 2.5 micrometers or less, small enough to invade even the smallest airways; $\mathbf{PM}_{10}$ - Particles 10 micrometers or less in size (smaller than the diameter of a human hair).

population — an interbreeding group of plants or animals. The entire group of organisms of one species.

population monitoring — assessing the characteristics of populations to ascertain their status and establish trends on their abundance, condition, distribution, or other characteristics

prescribed fire — the application of fire to wildland fuels, either by natural or intentional ignition, to achieve identified land use objectives [FWS Manual 621 FW 1.7] Also refered to as prescribed burn and controlled burn.

priority public use — a compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation

private land	land owned by a private individual or group or non-government organization
private organization	any non-government organization
promotory	a high point of land or rock projecting into a body of water; a prominent mass of land overlooking or projecting into a lowland
proposed wilderness	an area of the Refuge System that the Secretary of the Interior has recommended to the President for inclusion in the National Wilderness Preservation System
public	individuals, organizations, and non-government groups; officials of Federal, state, and local government agencies; Native American Tribes, and foreign nations—includes anyone outside the core planning team, those who may or may not have indicated an interest in the issues, and those who do or do not realize that our decisions may affect them
public involvement	offering an opportunity to interested individuals and organizations whom our actions or policies may affect to become informed; soliciting their opinions. We thoroughly study public input, and give it thoughtful consideration in shaping decisions about managing refuges.
public land	land owned by the local, state, or Federal government
rare species	species identified for special management emphasis because of their uncommon occurrence within a given region
refuge goals	descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but do not define measurable units. See "desired future conditions."
refuge purposes	the purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit
refuge lands	lands in which the Service holds full interest in fee-title or partial interest, such as an easement
restoration	management of a disturbed or degraded habitat that results in the recovery of its original state (e.g., restoration may involve planting native grasses and forbs, removing shrubs, prescribed burning, or reestablishing habitat for native plants and animals on degraded grassland)
riparian	referring to habitat adjacent to rivers and streams
riparian habitat	habitat along the banks of a stream or river
riverine	within the active channel of a river or stream
riverine wetlands	all the wetlands and deepwater habitats occurring within a freshwater river channel not dominated by trees, shrubs, or persistent emergents

runoff water from rain, melted snow, or agricultural or landscape irrigation that flows over a land surface into a water body (see "urban runoff")

scale the magnitude of a region or process. Refers to both spatial size—for example, a (relatively small-scale) patch or a (relatively large-scale) landscape; and a temporal rate—for example, (relatively rapid) ecological succession or (relatively slow) evolutionary speciation

Service U.S. Fish and Wildlife Service

Service presence public awareness of the Service; programs and facilities directed by the Service or that the Service shares with other organizations

shrublands habitats dominated by various species of shrubs, often with many grasses and forbs

siltation to fill, cover, or obstruct with silt or mud

silviculture growing, cultivation, and management of tress and forests

site improvement any activity that changes the condition of an existing site to better interpret events, places, or things related to a refuge (e.g., improving safety and access, replacing non-native with native plants, refurbishing footbridges and trailways, and renovating or expanding exhibits)

small patch communities that form small, discrete areas of vegetation cover. Individual occurrences of this community type typically range in size from 1 to 50 hectares. Small patch communities occur in very specific ecological settings, such as on specialized landform types or in unusual

microhabitats. The specialized conditions of small patch communities, however, are often dependent on the maintenance of ecological processes in the surrounding matrix and large patch communities. In many ecoregions, small patch communities contain a is proportionately

large percentage of the total flora, and also support a specific and restricted set of associated fauna (e.g., invertebrates or herpetofauna) dependent on specialized conditions.

species the basic category of biological classification intended to designate a single kind of animal or plant. Any variation among the individuals may be regarded as not affecting the essential sameness which distinguishes them from all other organisms.

species of concern an informal term referring to a species that might be in need of conservation action. This may range from a need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered under the Endangered Species Act. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing (Source: *http://www.fws.gov/endangered/glossary.html).*

stand an area of trees (or other vegetation) with a common set of conditions (e.g., based on age, density, species composition, or other features) that allow a single management treatment throughout

state agencies	natural resource agencies of state governments
state land	state-owned public land
state-listed species	a species listed as endangered, threatened, or a species of conservation concern by a state
step-down management plan	a plan for dealing with specific refuge management subjects, strategies, and schedules (e.g., Habitat Mangement Plan, Fire Management Plan, Inventorying and Monitoring Plan) [FWS Manual 602 FW 1.4]
stopover habitat/sites/areas	habitat where birds rest and feed during migration
stormwater	A term used to describe water runoff generated when precipitation from rain and snowmelt events flows over land or impervious surfaces
strategy	a specific action, tool, technique, or combination of actions, tools, and techniques for meeting refuge objectives
strategic management	the continual process of inventorying, choosing, implementing, and evaluating what an organization should be doing.
structure	the horizontal and vertical arrangement of trees and other vegetation having different sizes, resulting in different degrees of canopy layering, tree heights, and diameters within a stand.
succession	the natural, sequential change of species composition of a community in a given area
surface water	all waters whose surface is naturally exposed to the atmosphere, or wells or other collectors directly influenced by surface water
terrestrial	living on land
territory	an area over which an animal or group of animals establishes jurisdiction
thinning	reducing the density of trees in a stand primarily to improve the growth and condition of the remaining trees and prevent mortality.
threatened species	a federally listed, protected species that is likely to become an endangered species in all or a significant portion of its range
tributary	a stream or river that flows into a larger stream, river, or lake, feeding it water
turbidity	refers to the extent to which light penetrates a body of water
understory	the lower layer of vegetation in a stand, which may include short trees, shrubs, and herbaceous plants
upland	dry ground (i.e., other than wetlands)

vernal pool

a type of seasonal wetland formed by isolated depressions in the landscape that hold water in the winter and spring and are usually dry by midsummer or fall. There are no permanent surface connections to flowing water. Water sources include rainfall, snowmelt and elevated water tables. Although fish are usually absent, vernal pools in riparian floodplains may contain fish periodically. Vernal pools are important breeding sites for amphibians.The woody debris and emergent grasses provide attachment sites for egg masses.

Source: *Mitchell, J.C., A.R. Breisch, and K.A. Buhlmann. 2006. Habitat Management Guidelines for Amphibians and Reptiles of the Northeastern U.S. Partners in Amphibian and Reptile Conservation, Technical Publication HMG-3, Montgomery, Alabama, 108 pp*

vision statement

a concise statement of what a refuge hopes to achieve over the next 15 years

watershed

the geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.

wetlands

lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. These areas are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted to life in saturated soil conditions.

wilderness area

an area designated by Congress as part of the National Wilderness Preservation System [FWS Manual 610 FW 1.5 (draft)]

wildfire

a free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands [FWS Manual 621 FW 1.7]. An unplanned ignition caused by lightning, volcanoes, unauthorized, and accidental human-caused actions and escaped prescribed fires.

wildland urban interface

The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

wildlife-dependent recreational use

a use of a national wildlife refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation (National Wildlife Refuge System Administration Act of 1966).

wildlife management

manipulating wildlife populations, either directly by regulating the numbers, ages, and sex ratios harvested, or indirectly by providing favorable habitat conditions and alleviating limiting factors

wildlife-oriented recreation

recreational activities in which wildlife is the focus of the experience

["The terms 'wildlife-dependent recreation' and 'wildlife-dependent recreational use' mean a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation."—National Wildlife Refuge System Improvement Act of 1997]

Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ACJV	Atlantic Coast Joint Venture
ADA	Americans with Disabilities Act
AHWP	Annual Habitat Work Plan
AP	Atlantic Population
APHIS	Animal and Plant Health Inspection Service
AQI	Air Quality Index
ARPA	Archaeological Resources Protection Act
ASMFC	Atlantic States Marine Fisheries Commission
ASNV	Audubon Society of Northern Virginia
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BLM	Bureau of Land Management
CARE	Cooperative Alliance for Refuge Enhancement
CCB	Center for Conservation Biology
CCP	Comprehensive Conservation Plan
CDP	Census-designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COMAR	Code of Maryland Regulations
CWD	Chronic Wasting Disease
DBH	Diameter at Breast Height
EA	Environmental Assessment
EDU	Ecological Drainage Unit
EIS	Environmental Impact Statement
EP	Eastern Population
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FIDS	Forest Interior Dwelling Species
FHWA	Federal Highway Administration
FMP	Fire Management Plan

FOPRR	Friends of Potomac River Refuges
FONSI	Finding of No Significant Impact
Friends Group	Friends of Potomac River Refuges
FTE	Full-time Equivalency
FWS	United States Fish and Wildlife Service
GIS	Geographic Information System
GPS	Global Positioning System
HMP	Habitat Management Plan
IBA	Important Bird Area
IBP	Institute for Bird Populations
IMP	Inventory and Monitoring Plan
IPM	Integrated Pest Management Plan
LEEDS	Leadership in Energy and Environmental Design
Managers Group	Mason Neck Land Managers Group
MANEM	Mid-Atlantic/New England/Maritime
MAPS	Monitoring Avian Production and Survivorship
MBTA	Migratory Bird Treaty Act
MDNR	Maryland Department of Natural Resources
MOA/MOU	Memorandum of Agreement/Understanding
NABCI	North American Bird Conservation Initiative
NAWCP	North American Waterbird Conservation Plan
NAWMP	North American Waterfowl Management Plan
NEPA	National Environmental Policy Act
NHCR	National State Agency Herpetological Conservation Report
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOI	Notice of Intent
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRO	Northern Regional Office of the Virginia Department of Environmental Quality
NVRC	Northern Virginia Regional Commission

NVRPA	Northern Virginia Regional Park Authority
NWPS	National Wilderness Preservation System
NWR	National Wildlife Refuge
NWRF	National Wildlife Refuge Fund
NWRS	National Wildlife Refuge System
PARC	Partners in Amphibian and Reptile Conservation
PIF	Partners in Flight
PHNST	Potomac Heritage National Scenic Trail
PRFC	Potomac River Fisheries Commission
RONS	Refuge Operation Needs System
RV	Recreational Vehicle
SAMMS	Service Asset Maintenance Management System
SAV	Submerged Aquatic Vegetation
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales (Mexico)
SHPO	State Historic Preservation Office
SLAMM	Sea Level Affecting Marshes Model
SRMA	Special Recreation Management Area
SUP	Special Use Permit
SWG	State Wildlife Grant
SWPD	Fairfax County Stormwater Planning Division
TMDL	Total Maximum Daily Load
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USDA-APHIS	United States Department of Agriculture - Animal and Plant Health Inspection Service
USDA-FS	United States Department of Agriculture Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VCN	Virginia Conservation Network
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation

VDEQ	Virginia Department of Environmental Quality
VDF	Virginia Department of Forestry
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
VNHP	Virginia Natural Heritage Program
VNPS	Virginia Native Plant Society
VRE	Virginia Railway Express
VSP	Visitor Services Plan
WAP	Virginia Wildlife Action Plan
WMP	Watershed Management Plan

Appendix A

Steve Maslowski/USFWS

Wood thrush

Species Known or Suspected on the Refuges and Their Conservation Status

Table A.1. Mason Neck Refuge Birds of Conservation Concern*

Common Name	Breeding[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	Partners in Flight 1999, Area 44[4]	Virginia Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
WATERFOWL										
American Black Duck	X		HH	Ib	II		u	u	c	a
American Wigeon			H				c	c	c	a
Bufflehead			M				c	c	c	c
Canada Goose - Atlantic Population	X		HH				c	u	c	c
Canvasback			M				c	-	u	c
Common Goldeneye			M				u	-	u	c
Gadwall			H				o	-	u	u
Greater Scaup			H		IV		o	-	o	o
Green-winged Teal			H				c	-	u	a
Hooded Merganser	X		H				c	-	c	c
Lesser Scaup			M				c	-	a	c
Mallard	X		M				u	-	u	u
Northern Pintail			M				o	-	o	u
Red-breasted Merganser			M				u	-	u	c
Redhead			M		III		o	-	o	u
Ruddy Duck			M				u	-	u	u
Tundra Swan			M				c	-	c	c
Wood Duck	X						-	-	r	r
WATERBIRDS										
American Bittern		✔	M	II	II		u	o	u	r
Black-crowned Night-Heron	X		M		III		o	o	o	-
Caspian Tern				V	SSC		o	o	o	o
Common Moorhen				V			-	r	-	-
Forster's Tern				V	IV		u	u	u	-
Great Blue Heron	X			V			c	a	a	c
Great Egret	X			V	SSC		u	u	u	r
Green Heron	X				IV		u	o	u	-
Horned Grebe		✔	H		IV		c	c	c	o
King Rail			M	Ib	II		o	o	o	o

Common Name	Breeding[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	Partners in Flight 1999, Area 44[4]	Virginia Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
Least Bittern	X	✔	M	II	III		o	o	o	o
Least Tern		✔	H	II	II		r	-	r	r
Little Blue Heron			M	V	II		c	o	c	u
Pied-billed Grebe		✔		V			o	o	o	o
Snowy Egret		✔	M				o	-	u	-
Sora			M				o	-	u	-
Tricolored Heron			M	V	III		r	-	r	-
Virginia Rail					IV		o	o	o	o
Yellow-crowned Night-heron			M				-	r	r	-
SHOREBIRDS										
American Woodcock	X		HH		IV		u	u	u	o
Common Snipe			M				c	u	c	-
Dunlin			H		IV		r	-	-	-
Greater Yellowlegs			H				u	-	u	o
Killdeer	X		M				-	-	-	r
Least Sandpiper			M				c	u	u	-
Lesser Yellowlegs		✔	M				u	-	u	-
Solitary Sandpiper		✔	H				c	u	u	o
Spotted Sandpiper			M				r	-	-	-
Willet			H	III			u	u	u	u
LANDBIRDS										
Acadian Flycatcher	X			Ib		§	a	a	a	-
American Kestrel	X			II			u	o	u	u
American Redstart	X					§	c	c	c	-
Bald Eagle	X	✔	M	V	I (ST)		c	c	c	c
Baltimore Oriole	X		H				u	u	u	-
Bank Swallow	X			V			u	u	u	-
Barn Owl	X			II	III		r	r	r	r
Barred Owl	X			V		§	c	c	c	c
Bay-breasted Warbler		✔	H				u	-	u	-

Common Name	Breeding[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	Partners in Flight 1999, Area 44[4]	Virginia Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
Black-and-white Warbler	X		H		IV	§	c	u	c	-
Blackburnian Warbler			M				u	-	u	-
Blue-winged Warbler		✔	HH	Ib	IV		o	-	u	-
Broad-winged Hawk	X		H			§	u	u	u	-
Brown Creeper	X				IV	§	u	-	u	c
Brown Thrasher	X		H	II	IV		c	c	c	o
Canada Warbler		✔	M		IV		u	-	u	-
Carolina Chickadee	X			II			a	a	a	a
Cerulean Warbler	X	✔	M	Ib	II	§	u	u	u	-
Chimney Swift	X		H	II	IV		c	c	a	-
Chuck-will's-widow				III	IV		r	-	-	-
Cliff Swallow	X			V			o	-	o	-
Cooper's Hawk				V			u	u	u	u
Eastern Kingbird	X		H		IV		c	c	c	-
Eastern Meadowlark	X				IV		o	o	o	o
Eastern Wood-Pewee	X			Ib	IV		c	c	c	-
Field Sparrow	X		H	II	IV		u	u	u	c
Golden-crowned Kinglet					SSC		c	-	c	c
Golden-winged Warbler		✔	M		I		o	-	u	-
Gray Catbird	X		M	II	IV		c	c	c	o
Great Crested Flycatcher	X		H				u	c	u	-
Hairy Woodpecker	X					§	u	u	u	u
Hermit Thrush					SSC		c	r	c	a
Hooded Warbler	X					§	o	o	o	-
Kentucky Warbler	X	✔	H	Ib	IV	§	u	u	u	-

Common Name	Breeding[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	Partners in Flight 1999, Area 44[4]	Virginia Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
Loggerhead Shrike		✔	M	V	I (ST)		-	-	r	r
Louisiana Waterthrush	X		H	Ib	IV	§	u	u	u	-
Magnolia Warbler					SSC		c	-	c	-
Marsh Wren	X		H		IV		u	u	u	r
Mourning Warbler					SSC		r	-	o	-
Northern Bobwhite	X		H	II	IV		r	r	r	r
Northern Flicker	X		H				c	c	c	c
Northern Harrier				V	III		u	-	u	u
Northern Parula	X				IV	§	c	a	c	-
Northern Rough-winged Swallow	X				IV		c	c	c	-
Osprey	X			V			c	c	u	-
Ovenbird	X				IV	§	a	c	a	-
Peregrine Falcon		✔		V	I (ST)		-	-	r	-
Pileated Woodpecker	X					§	u	u	u	u
Prairie Warbler	X	✔	HH	Ib	IV		c	c	c	-
Prothonotary Warbler	X		H	Ib	IV	§	u	u	u	-
Purple Finch					SSC		u	-	u	u
Red-breasted Nuthatch					SSC		o	-	o	o
Red-eyed Vireo	X					§	a	a	a	-
Red-headed Woodpecker	X	✔	M	II			u	u	u	u
Red-shouldered Hawk	X			V		§	u	u	u	u
Rose-breasted Grosbeak					IV		u	-	u	-
Rufous-sided (Eastern) Towhee	X		H	II	IV		c	c	c	u
Rusty Blackbird			H		IV		u	-	u	u
Savannah Sparrow				IV			u	-	-	o

Common Name	Breeding[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	Partners in Flight 1999, Area 44[4]	Virginia Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
Scarlet Tanager	X			II	IV	§	c	c	a	-
Veery						§	o	r	o	-
Whip-poor-will	X	✔	H		IV	§	r	r	r	-
White-eyed Vireo	X			Ib			u	c	c	-
Willow Flycatcher			H		IV		u	o	u	-
Wood Thrush	X	✔	HH	Ib	IV	§	a	a	a	-
Worm-eating Warbler	X	✔	H	Ib	IV	§	u	u	u	-
Yellow Warbler	X				IV		u	o	u	-
Yellow-bellied Flycatcher					SSC		o	-	o	-
Yellow-billed Cuckoo	X				IV		c	c	c	-
Yellow-breasted Chat	X			II	IV		u	u	u	-
Yellow-throated Vireo	X		H	Ib	IV	§	u	u	u	-

Sources: USFWS, 1995; ACJV, no date; PIF, 1999; USFWS, 2002; VDGIF, 2006; VDGIF, 2005; CACCA, 2000

**This is not a complete listing of all the birds that occur on Mason Neck Refuge. It only represents those species that are either known or suspected to occur on the refuge that are of conservation concern according to the plans referenced in the table.*

[1] X=species known to breed on refuge

[2] ✔ denotes species listed in the Service's Birds of Conservation Concern 2008 for the Northeast Region

[3] HH=Highest Concern; H=High Concern; M=Moderate Concern

[4] Tier I=High Continental Priority; Tier II=High Regional Priority; Tier III= Additional Watch List;
Tier IV=Additional federally listed under Endangered Species Act; Tier V=Additional State-listed species

[5] I=Critical Conservation Need; II=Very High Conservation Need; III=High Conservation Need; IV=Moderate Conservation Need;
SSC=State Species of Concern; ST=VA State-listed Threatened; SE=VA State-listed Endangered

[6] § denotes forest interior dwelling bird species in the Chesapeake Bay area

[7] Occurrence on refuge by season.
Seasons: Sp–Spring Su–Summer F–Fall W–Winter
Occurrence: a=abundant; c=common, o=occasional; u=uncommon, r=rare

Table A.2. Known or Suspected Reptiles and Amphibians of Mason Neck Refuge

Species	Scientific Name	VA Species of Concern[1]
SALAMANDERS AND NEWTS		
Eastern Red-backed Salamander	*Plethodon cinereus*	
Four-toed Salamander	*Hemidactylium sctatum*	
Marbled Salamander	*Ambystoma opacum*	
Northern Dusky Salamander	*Desmognathus fuscus*	
Northern Slimy Salamander	*Plethodon glutinosus*	
Northern Two-lined Salamander	*Eurycea bislineata*	
Red-spotted Newt	*Notophthalmus viridescens*	
Spotted Salamander	*Ambystoma maculatum*	
Three-lined Salamander	*Eurycea guttolineata*	
TOADS AND FROGS		
American Bullfrog	*Lithobates catesbeiana*	
American Toad	*Anaxyrus americanus*	
Cope's Gray Treefrog	*Hyla chrysoscelis*	
Eastern Spadefoot	*Scaphiopus holbrookii*	
Fowler's Toad	*Anaxyrus fowleri*	
Gray Treefrog	*Hyla versicolor*	
Green Frog	*Lithobates clamitans*	
Green Treefrog	*Hyla cinerea*	
Northern Cricket Frog	*Acris crepitans*	
Pickerel Frog	*Lithobates palustris*	
Southern Leopard Frog	*Lithobates sphenocephala*	
Spring Peeper	*Pseudacris crucifer*	
Squirrel Treefrog	*Hyla squirella*	
Upland Chorus Frog	*Pseudacris feriarum*	
Wood Frog	*Lithobates sylvaticus*	
TURTLES		
Eastern Box Turtle	*Terrapene carolina*	III
Eastern Mud Turtle	*Kinosternon subrubrum*	
Eastern Musk Turtle	*Sternotherus odoratus*	
Eastern Painted Turtle	Chrysemys picta	
Eastern Snapping Turtle	*Chelydra serpentina serpentina*	
Northern Red-bellied Cooter	*Pseudemys rubriventris*	
Red-eared Slider	*Trachemys scripta elegans*	
Spotted Turtle	*Clemmys muhlenbergii*	III

Species	Scientific Name	VA Species of Concern[1]
SKINKS AND LIZARDS		
Broad-headed Skink	*Plestiodon laticeps*	
Common Five-lined Skink	*Plestiodon fasciatus*	
Eastern Fence Lizard	*Sceloporus undulatus*	
Little Brown Skink	*Scincella lateralis*	
SNAKES		
Common Ribbonsnake	*Thamnophis sauritus sauritus*	IV
Cooperhead	*Agkistrodon contortrix*	
Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	
Eastern Hog-nose Snake	*Heterodon platirhinos*	IV
Eastern Kingsnake	*Lampropeltis getula getula*	
Eastern Milksnake	*Lampropeltis triangulum triangulum*	
Eastern Ratsnake	*Pantherophis alleghaniensis*	
Eastern Smooth Earthsnake	*Virginia valeriae valeriae*	
Eastern Wormsnake	*Carphophis amoenus*	
Mole Kingsnake	*Lampropeltis calligaster rhombomaculata*	
Northern Black Racer	*Coluber constrictor constrictor*	
Northern Brownsnake	*Storeria dekayi dekayi*	
Northern Red-bellied Snake	*Storeria occipitomaculata occipitomaculata*	
Northern Ring-necked Snake	*Diadophis punctatus edwardsii*	
Northern Watersnake	*Nerodia sipedon*	
Queen snake	*Regina septemvittata*	IV
Red Cornsnake	*Pantherophis guttatus*	
Rough Greensnake	*Opheodrys aestivus*	

Source: Ernst, C.H., S.C. Belfit, S.W. Sekscienski and A.F. Laemmerzahl. 1997. The amphibians and reptiles of Ft. Belvoir and Northern Virginia. Bulletin of the Maryland Herpetological Society 33(1):1-62.

[1]Virginia State Comprehensive Wildlife Conservation Plan – Priority Species

I – Tier I: Critical conservation need; II – Tier II: Very high conservation need; III – Tier III: High conservation need; IV – Tier IV: Moderate Conservation Need: SSC – Species of Special Concern; SE – State Endangered

Table A.3. Known or Suspected Mammals of Mason Neck Refuge

Species	Scientific Name	VA Species of Concern[1]
Beaver	*Castor canadensis*	
Big Brown Bat	*Eptesicus fuscus*	
Coyote	*Canis latrans*	
Eastern Chipmunk	*Tamias striatus*	
Eastern Cottontail	*Sylvilagus floridanus*	
Eastern Mole	*Scalopus aquaticus*	
Eastern Pipistrelle	*Pipistrellus subflavus*	
Gray Fox	*Urocyon cinereoargenteus*	
Gray Squirrel	*Sciurus carolinensis*	
House Mouse	*Mus musculus*	
Long-tailed Weasel	*Mustela frenata*	
Meadow Vole	*Microtus pennsylvanicus*	
Mink	*Neovison vison*	
Muskrat	*Ondatra zibethicus*	
Norway Rat	*Rattus norvegicus*	
Pine Vole	*Microtus pinetorum*	
Raccoon	*Procyon lotor*	
Red Fox	*Vulpes vulpes*	
Red Squirrel	*Tamiasciurus hudsonicus*	
Rice Rat	*Oryzomys palustris*	
River Otter	*Lontra canadensis*	SSC
Short-Tailed Shrew	*Blarina brevicauda*	
Southern Flying Squirrel	*Glaucomys volans*	
Striped Skunk	*Mephitis mephitis*	
Virginia Opossum	*Didelphis virginiana*	
White-footed Mouse	*Peromyscus leucopus*	
White-tailed Deer	*Odocoileus virginianus*	
Woodchuck	*Marmota monax*	

Source: Klimkiewicz et al, (Year Unknown)

[1]Virginia State Comprehensive Wildlife Conservation Plan – Priority Species; Ranking: SSC – Species of Special Concern

Table A.4. Fish Species of Conservation Concern in Mason Neck Refuge Area

Species Common Name	Scientific Name	USFWS Northeast Strategic Fisheries Plan – Potomac Watershed[1]	State Comprehensive Wildlife Conservation Plan Priorities[2]
Alewife	*Alosa pseudoharengus*	IJ; H	IV
American eel	*Anguillis rostrata*		IV
American shad	*Alosa sapidissima*		IV
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	IJ	II; SSC
Blueback herring	*Alosa aestivalis*		
Brook Trout	*Salvelinus fontinalis*	SS:H	
Bridle shiner	*Notropis bifrenatus*		I; SSC
Hickory shad	*Alosa mediocris*	M	
Ironcolor shiner	*Notropis chalybaeus*		IV
Least brook lamprey	*Lampetra aepyptera*		IV
Logperch	*Percina caprodes*		IV
Shortnose sturgeon	*Acipenser brevirostrum*	E; H	I; SE
Striped bass	*Morone saxatilis*	H	

[1] USFWS Northeast Strategic Fisheries Plan 2009-2013 – List of Species of Conservation and Management Concern. See: *http://www.fws.gov/northeast/fisheries/pdf/FisheriesStrategicPlan.pdf* (accessed August 2011) for individual rankings.

IJ – Interjusidictional Species of Conservation and Management Concern;

SOC – Species of Concern; SS – Special Species; E – federally listed endangered; H – High Priority; M – Medium Priority

[2] Virginia State Comprehensive Wildlife Conservation Plan – Priority Species

I – Tier I: Critical conservation need; II – Tier II: Very high conservation need; III – Tier III: High conservation need;
IV – Tier IV: Moderate Conservation Need: SSC – Species of Special Concern; SE – State-listed Endangered

Table A.5. Plants Found at Mason Neck Refuge*

Common Name	Scientific Name
Amaranth	*Amaranthus* sp.
American Beech	*Fagus grandifolia*
American Holly	*Ilex opaca*
Arrow Arum	*Peltandra virginica*
Arrow Vine	*Polygonum sagittatum*
Arrowwood	*Viburnum dentatum*
Barnyard Grass	*Echinochloa crusgalli*
Beefsteak plant	*Perilla frutescens*
Black Haw	*Viburnum pruniifolium*
Black Walnut	*Juglans nigra*
Black Willow	*Salix sericea*
Broad Leaf Uniola	*Uniola latifolia*
Broad Leaved Cattail	*Typha latifolia*
Bush Dogwood	*Cornus amomum*
Button Bush	*Cephalanthus occidentalis*
Cardinal Flower	*Lobelia cardinalis*
Catbriar, Common Greenbriar	*Smilax rotundifolia*
Chestnut Oak	*Quercus prinus*
Chickory	*Cichorium intybus*
Christmas Fern	*Polystichum acrostichoides*
Clearweed	*Pilea pumila*
Climbing Hempweed	*Mikania scandens*
Cocklebur	*Xanthium* sp.
Common Dodder	*Cuscuta gronovii*
Common Elderberry	*Sambuscus canadensis*
Common Elodea	*Elodea canadensis*
Coontail	*Ceratophyllum dermersum*
Cordgrass	*Phragmites communis*
Crimsoneyed Rosemallow	*Hibiscus moscheutos*
Deertongue Grass	*Dichanthelium clandestinum*
Devil's Walking Stick	*Aralia spinosa*
Dotted Smartweed	*Polygonum punctatum*
Duck Potato, Arrowhead	*Sagittaria latifolia*
Duckweed	*Lemna valdiviana*
Eastern Bladderwort	*Utricularia gibba*

Common Name	Scientific Name
Eastern Hemlock	*Tsuga canadensis*
Eastern Redcedar	*Juniperus virginiana*
Eurasian Watermilfoil	*Myriophyllum spicatum*
False Stinging Nettle	*Boehmeria cylindrica*
Fanwort	*Cabomba carolinana*
Floating Primrose Willow	*Ludwigia ducurrens*
Floating Water Primrose	*Jussiaea diffusa*
Flowering Dogwood	*Cornus florida*
Foxtail	*Setaria italica*
Fragrant Water Lily	*Nymphaea odorata*
Frogbit	*Limnobium spongia*
Frostweed Aster	*Aster pilosus*
Grape	*Vitis* sp.
Hackberry	*Celtis occidentalis*
Halberd Leaved Tearthumb	*Polygonum arifloium*
Hedge Hyssop	*Gratiola viscidula*
Highbush Blueberry	*Vaccinium corymbosum*
Hog Peanut	*Amphicarpa bracteata*
Horse Nettles	*Solanum carolinense*
Hydrilla	*Hydrilla verticillata*
Iris	*Iris* sp.
Jack in the Pulpit	*Arisaema triphyllum*
Japanese Barberry	*Berberis thunbergii*
Japanese Clematis	*Clematis terniflora*
Japanese Honeysuckle	*Lonicera japonica*
Japanese Stiltgrass	*Microstegium vimineum*
Large Bur Marigold	*Bidens laevis*
Lizard's Tail	*Saururus cernuus*
Loblolly Pine	*Pinus taeda*
Lowbush Blueberry	*Vaccinium angustifolium*
Marsh Dayflower	*Aneilema keisak*
Marsh Fern	*Thelypteris thelypterioides*
Marsh Purslane	*Ludwigia palustris*
Marsh St. Johnswort	*Hypericum virginicum*
Mile-a-minute	*Persicaria perfoliata*
Mokernut Hickory	*Carya alba*

Common Name	Scientific Name
Mountain Laurel	*Kalmia latifolia*
Mulberry	*Morus* sp.
Mustard	*Brassica* sp.
Narrow Fruited Primrose Willow	*Ludwigia leptocarpa*
Narrow Leaved Cattail	*Typha angustifolia*
New York Ironweed	*Vernoniia noveboracensis*
Nodding Bur Marigold	*Bidens cenua*
Partridgeberry	*Mitchella repens*
Pawpaw	*Asimina triloba*
Persimmon	*Diospyros virginiana*
Pickerel Weed	*Pontederia cordata*
Pinkweed	*Polygonum pensylvanicum*
Pipewort, Fireweed	*Erectites hieracifolia*
Poison Ivy	*Toxicodendron radicans*
Pumpkin Ash	*Fraxius profunda*
Rattlesnake Fern	*Botrychium virginianum*
Red Maple	*Acer rubrum*
Red Mulberry	*Morus rubra*
Red Oak	*Quercus rubra*
Redroot Flatsedge	*Cyperus erythrorhizos*
Rice Cutgrass	*Leersia oryzoides*
Rose of Sharon	*Hibiscus syriacus*
Royal Fern	*Osmunda regalis*
Saltreed Grass	*Spartina cynosuroides*
Sassafras Tree	*Sassafras albidum*
Shagbark Hickory	*Carya ovata*
Shortleaf Pine	*Pinus echinata*
Silky Lespedeza	*Lespedeza cuneata*
Silver Grass, Eulalia	*Miscanthus sinensis*
Softstem Bulrush	*Scirpus validus*
Solomon's Seal	*Polygonatum biflorum*
Spatterdock	*Nuphar luteum*
Spiny Cocklebur	*Xanthium spinosum*
Spotted Jewelweed	*Impatiens capensis*
Staghorn Sumac	*Rhus typhina*
Stripped Pipsissewa	*Chimaphila maculata*

Common Name	Scientific Name
Swamp Loosestrife	*Decodon verticillatus*
Swamp Milkweed	*Asclepias incarnata*
Swamp Rose	*Rosa palustris*
Swamp White Oak	*Quercus bicolor*
Sweet Flag, Calamus	*Acorus calamus*
Sweetgum	*Liquidambar styraciflua*
Sycamore	*Platanus occidentalis*
Tag Alder	*Alnus serrulata*
Tall Goldenrod	*Solidago altissima*
Three Square	*Schoenoplectus (Scirpus) americanus*
Tickseed Sunflower	*Bidens coronata*
Trailing Arbutus	*Epigaea repens*
Tree-of-heaven	*Ailanthus altissima*
Trumpet Vine	*Campsis radicans*
Tulip Poplar	*Liriodendron tulipifera*
Virgin's Bower	*Clematis virginiana*
Virginia Bugleweed	*Lycopus virginicus*
Virginia Creeper	*Parthenocissus quinquefolia*
Virginia Dayflower	*Commelina virginica*
Virginia Pine	*Pinus virginiana*
Virginia Willow	*Itea virginica*
Walter's Millet	*Echinochloa walteri*
Water Hemp	*Amaranthus cannabinus*
Water Willow	*Justicia americana*
Watermeal	*Wolffia* sp.
White Oak	*Quercus alba*
Wild Bean	*Phaseolus* spp.
Wild Celery	*Valisneria americana*
Wild Indigo Bush	*Amorpha fruticosa*
Wild Rice	*Zizania aquatica*
Wild Yam	*Dioscorea villosa*
Winged Monkey Flower	*Mimulus alatus*
Wingstem	*Verbesina alternifolia*
Winterberry	*Ilex verticillata*
Wintergreen	*Pyrola* sp.
Yerba de Tajo	*Eclipta alba*

**This is not a complete list of all plant species found on Mason Neck Refuge.*

Table A.6. Featherstone Refuge Birds of Conservation Concern*

Common Name	Known/ Suspected[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	PIF 1999, Area 44[4]	VA Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
WATERFOWL										
American Black Duck	K		HH	Ib	II		u	u	c	a
American Wigeon	S		H				c	c	c	a
Bufflehead	K		M				c	c	c	c
Canvasback	K		M				c	-	u	c
Canada Goose–Atlantic Population	K		HH				c	u	c	c
Common Goldeneye	S		H				u	-	u	c
Gadwall	K		H				o	-	u	u
Greater Scaup	S		H		IV		o	-	o	o
Green-winged Teal	K		H				c	-	u	a
Hooded Merganser	K		H				c	-	c	c
Lesser Scaup	K		M				c	-	a	c
Mallard	K		M				u	-	u	u
Northern Pintail	K		M				o	-	o	u
Red-breasted Merganser	K		M				u	-	u	c
Red-breasted Merganser	K		M				u	-	u	u
Redhead	K		M		III		o	-	o	u
Ruddy Duck	K		M				u	-	u	u
Tundra Swan	K		M				c	-	c	c
Wood Duck	K				III		-	-	r	r
WATERBIRDS										
American Bittern	S	✔	M	II	II		u	o	u	r
Black-crowned Night-heron	S		M		III		o	o	o	-
Bonaparte's Gull	K									
Caspian Tern	K			V	SSC		o	o	o	o
Common Moorhen	K			V			-	r	-	-

Common Name	Known/ Suspected[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	PIF 1999, Area 44[4]	VA Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
Forster's Tern	K			V	IV		u	u	u	-
Great Blue Heron	K			V			c	a	a	c
Great Egret	K			V	SSC		u	u	u	r
Greater Black-backed Gull	K						c	-	c	c
Green Heron	K				IV		u	o	u	-
King Rail	S		M	Ib	II		o	o	o	o
Least Bittern	S	✔	M	II	III		o	o	o	o
Pied-billed Grebe	K	✔		V			o	o	o	o
Royal tern	S	✔	M		II		r		r	
Sora	S		M				o	-	u	-
Tricolored Heron	K		M	V	III		r	-	r	-
Virginia Rail	S				IV		o	o	o	o
Yellow-crowned Night Heron	S		M				-	r	r	-
SHOREBIRDS										
American Woodcock	S		HH		IV		u	u	u	o
Common Snipe	K		M				c	u	c	-
Dunlin	K		H		IV		r	-	-	-
Greater Yellowlegs	K		H				u	-	u	o
Killdeer	K		M				-	-	-	r
Least Sandpiper	S		M				c	u	u	-
Lesser Yellowlegs	K	✔	M				u	-	u	-
Semipalmated Plover	S	✔	M				r	r	-	-
Semipalmated Sandpiper	S	✔	H				r	-	-	-
Solitary Sandpiper	K	✔	H				c	u	u	o
Spotted Sandpiper	K		M				r	-	-	-
Willet	K		H	III			u	u	u	u
Wilson's (Common) Snipe	S		M				u	-	u	u

Common Name	Known/ Suspected[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	PIF 1999, Area 44[4]	VA Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
LANDBIRDS										
Acadian Flycatcher	K			Ib		§	a	a	a	-
American Kestrel	S			II			u	o	u	u
American Redstart	K					§	c	c	c	-
Bald Eagle	K	✔	M	V	II(ST**)		c	c	c	c
Baltimore Oriole	K		H				u	u	u	-
Bank Swallow	K			V			u	u	u	-
Barn Owl	K			II	III		r	r	r	r
Barred Owl	S			V		§	c	c	c	c
Bay-breasted Warbler	K	✔	H				u	-	u	-
Black-and-white Warbler	K		H		IV	§	c	u	c	-
Blackburnian Warbler	S		M				u	-	u	-
Black-throated Green Warbler	K				I	§	r	-	r	-
Blue-winged Warbler	K	✔	HH	Ib			o	-	u	-
Broad-winged Hawk	K		H			§	u	u	u	-
Brown Creeper	K				IV	§	u	-	u	c
Brown Thrasher	K		H	II	IV		c	c	c	o
Canada Warbler	S	✔	M		IV		u	-	u	-
Carolina Chickadee	K			II			a	a	a	a
Cerulean Warbler	K	✔	M	Ib	II	§	u	u	u	-
Chimney Swift	K		H	II	IV		c	c	a	-
Chuck-will's-widow	K			III	IV		r	-	-	-
Cliff Swallow	S			V			o	-	o	-
Cooper's Hawk	K			V			u	u	u	u
Eastern Kingbird	K		H		IV		c	c	c	-
Eastern Meadowlark	K				IV		o	o	o	o

Common Name	Known/ Suspected[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	PIF 1999, Area 44[4]	VA Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
Eastern (Rufous-sided) Towhee	K		H	II a			c	c	c	u
Eastern Wood-Pewee	K			Ib	IV		c	c	c	-
Field Sparrow	K		H	II	IV		u	u	u	c
Golden-crowned Kinglet	K				SSC		c	-	c	c
Golden-winged Warbler	K	✔	M		I		o	-	u	-
Gray Catbird	K		M	II	IV		c	c	c	o
Great Crested Flycatcher	K		H				u	c	u	-
Hairy Woodpecker	K					§	u	u	u	u
Hermit Thrush	K				SSC		c	r	c	a
Hooded Warbler	S					§	o	o	o	-
Kentucky Warbler	S	✔	H	Ib	IV	§	u	u	u	-
Loggerhead Shrike	K	✔	M	V	I (ST)		-	-	r	r
Louisiana Waterthrush	K		H	Ib	IV	§	u	u	u	-
Magnolia Warbler	K				SSC		c	-	c	-
Marsh Wren	S		H		IV		u	u	u	r
Mourning Warbler	K				SSC		r	-	o	-
Northern Bobwhite	K		H	II	IV		r	r	r	r
Northern Flicker	K		H				c	c	c	c
Northern Harrier	S			V	III		u	-	u	u
Northern Parula	K				IV	§	c	a	c	-
Northern Rough-winged Swallow	K				IV		c	c	c	-
Osprey	K			V			c	c	u	-
Ovenbird	K				IV	§	a	c	a	-
Peregrine Falcon	S	✔		V	I (ST)		-	-	r	-

Common Name	Known/ Suspected[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	PIF 1999, Area 44[4]	VA Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
Pileated Woodpecker	K					§	u	u	u	u
Pine Warbler	K			IIb			u	r	u	-
Prairie Warbler	K	✔	HH	Ib	IV		c	c	c	-
Prothonotary Warbler	K		H	Ib	IV	§	u	u	u	-
Purple Finch	S				SSC		u	-	u	u
Red-breasted Nuthatch	S				SSC		o	-	o	o
Red-eyed Vireo	K					§	a	a	a	-
Red-headed Woodpecker	K	✔	M	II			u	u	u	u
Red-shouldered Hawk	K			V		§	u	u	u	u
Rose-breasted Grosbeak	K				IV		u	-	u	-
Rufous-sided (Eastern) Towhee	K		H	II	IV		c	c	c	u
Rusty Blackbird	K	✔	H		IV		u	-	u	u
Savannah Sparrow	K			IV			u	-	-	o
Scarlet Tanager	K			II	IV	§	c	c	a	-
Seaside Sparrow	S				IV		r	-	-	-
Sedge Wren	S	✔	M		III		-	-	r	-
Swainson's Thrush	K					§	u	-	r	-
Veery	S					§	o	r	o	-
Whip-poor-will	K	✔	H		IV	§	r	r	r	-
White-eyed Vireo	K			Ib			u	c	c	-
Willow Flycatcher	S		H		IV		u	o	u	-
Wood Thrush	K	✔	HH	Ib	IV	§	a	a	a	-
Worm-eating Warbler	S	✔	H	Ib	IV	§	u	u	u	-
Yellow-bellied Flycatcher	S				SSC		o	-	o	-

Common Name	Known/ Suspected[1]	USFWS BCC 2008, Region 5[2]	Atlantic Coast Joint Venture BCR 30[3]	PIF 1999, Area 44[4]	VA Species of Concern[5]	FIDS list for Chesapeake Area[6]	Occurrence by Season			
							Sp[7]	Su	F	W
Yellow-billed Cuckoo	K				IV		c	c	c	-
Yellow-breasted Chat	K			II	IV		u	u	u	-
Yellow-throated Vireo	S		H	Ib	IV	§	u	u	u	-
Yellow Warbler	K				IV		u	o	u	-

Sources: USFWS, 1995; ACJV, no date; PIF, 1999; USFWS, 2002; VDGIF, 2006; VDGIF, 2005; CACCA, 2000

*This is not a complete listing of all the birds that occur on Featherstone Refuge. It only represents those species that are either known or suspected to occur on the refuge that are of conservation concern according to the plans referenced in the table.

[1] K=species known to occur on refuge, S=species that possibly or probably occurs on refuge

[2] ✔ denotes species listed in the Service's Birds of Conservation Concern 2008 for the Northeast Region

[3] HH=Highest Concern; H=High Concern; M=Moderate Concern

[4] Tier I=High Continental Priority; Tier II=High Regional Priority; Tier III= Additional Watch List; Tier IV=Additional federally listed species under the Endangered Species Act; Tier V=Additional State-listed species

[5] I=Critical Conservation Need; II=Very High Conservation Need; III=High Conservation Need; IV=Moderate Conservation Need; SSC=State Species of Concern; ST=VA State-listed Threatened; SE=VA State-listed Endangered

[6] § denotes forest interior dwelling bird species in the Chesapeake Bay area

[7] Occurrence on refuge by season.
Seasons: Sp–Spring Su–Summer F–Fall W–Winter
Occurrence: a=abundant; c=common, o=occasional; u=uncommon, r=rare

Table A.7. Known or Suspected Reptiles and Amphibian on Featherstone Refuge

Common Name	Scientific Name	VA Species of Concern[1]
SALAMANDERS AND NEWTS		
Eastern Newt	*Notophthalmus viridescens*	
Eastern Red-backed Salamander	*Plethodon cinereus*	
Four-toed Salamander	*Hemidactylium scutatum*	
Jefferson's Salamander	*Ambystoma jeffersonianum*	
Marbled Salamander	*Ambystoma opacum*	
Mud Salamander	*Pseudotriton montanus*	IV
Northern Dusky Salamander	*Desmognathus fuscus*	
Red Salamander	*Pseudotriton ruber*	
Spotted Salamander	*Ambystoma maculatum*	
Three-lined Salamander	*Eurycea guttolineata*	
Two-lined Salamander	*Eurycea bislineata*	
TOADS AND FROGS		
American Bullfrog	*Lithobates catesbeiana*	
American Toad	*Anaxyrus americanus*	
Cope's Gray Treefrog	*Hyla chrysoscelis*	
Fowler's Toad	*Anaxyrus fowleri*	
Gray Treefrog	*Hyla versicolor*	
Green Frog	*Lithobates clamitans*	
Green Treefrog	*Hyla cinerea*	
Northern Cricket Frog	*Acris crepitans*	
Pickerel Frog	*Lithobates palustris*	
Southern Leopard Frog	*Lithobates sphenocephala*	
Spring Peeper	*Pseudacris crucifer*	
Upland Chorus Frog	*Pseudacris feriarum feriarum*	
Wood Frog	*Lithobates sylvatica*	ST
TURTLES		
Eastern Box Turtle	*Terrapene carolina*	III
Eastern Mud Turtle	*Kinosternon subrubrum*	
Eastern Musk Turtle	*Sternotherus odoratus*	
Eastern Painted Turtle	*Chrysemys picta picta*	
Eastern Snapping Turtle	*Chelydra serpentina serpentia*	
Notheren Red-bellied Cooter	*Pseudemys rubriventris*	
Spotted Turtle	*Clemmys guttata*	III
Wood Turtle	*Clemmys insculpta*	I, State Threatened

Common Name	Scientific Name	VA Species of Concern[1]
LIZARDS AND SKINKS		
Broad-headed Skink	*Plestiodon laticeps*	
Common Five-lined Skink	*Eumeces fasciatus*	
Eastern Fence Lizard	*Sceloporous undulatus*	
Ground Skink	*Scincella lateralis*	
Six-lined Racerunner	*Cnemidophorus sexlineatus*	
Southeastern Five-lined Skink	*Eumeces inexpectatus*	
SNAKES		
Copperhead	*Agkistrodon contortix mokasen*	
Corn Snake	*Elaphe guttata*	
Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	
Eastern Hog-nosed Snake	*Heterodon platyrhinos*	IV
Eastern Kingsnake	*Lampropeltis getula getula*	
Eastern Milksnake	*Lampropeltis triangulum triangulum*	
Eastern Ribbon Snake	*Thamnophis sauritus sauritus*	IV
Eastern Smooth Earthsnake	*Virginia valeriae*	
Eastern Wormsnake	*Carphophis amoenus amoenus*	
Mole Kingsnake	*Lampropeltis calligaster rhombomaculata*	
Northern Black Racer	*Coluber constrictor constrictor*	
Northern Brownsnake	*Storeria dekayi dekayi*	
Northern Ring-necked Snake	*Diadophis punctatus*	
Northern Watersnake	*Nerodia sipedon sipedon*	IV
Queen Snake	*Regina septemvittata*	
Rat Snake	*Elaphe obsoleta*	
Rough Greensnake	*Opheodrys aestivus*	
Scarlet Snake	*Lampropeltis triangulum elapsoides*	IV
Timber Rattlesnake	*Crotalus horridus*	

[1]Virginia State Comprehensive Wildlife Conservation Plan – Priority Species

Tier I: Critical conservation need; Tier II: Very high conservation need; Tier III: High conservation need; Tier IV: Moderate Conservation Need: SSC – Species of Special Concern; SE – State Endangered

Table A.8. Known or Suspected Mammals on Featherstone Refuge

Species	Scientific Name	VA Species of Concern[1]
Beaver	*Castor canadensis*	
Big Brown Bat	*Eptesicus fuscus*	
Black Rat	*Rattus rattus*	
Coyote	*Canis latrans*	
Deer Mouse	*Peromyscus maniculatus nubiterre*	
Eastern Chipmunk	*Tamias striatus*	
Eastern Cottontail	*Sylvilagus transitionalis*	
Eastern Harvest Mouse	*Reithrodontomys humulis*	
Eastern Mole	*Scalopus aquaticus*	
Eastern Pipistrelle	*Pipistrellus subflavus*	
Eastern Woodrat	*Neotoma floridana*	
Evening Bat	*Nycticeius humeralis*	
Fox Squirrel	*Sciurus niger vulpinus*	
Gray Fox	*Urocyon cinereoargenteus*	
Gray Squirrel	*Sciurus carolinensis*	
Hoary Bat	*Lasiurus cinereus*	
House Mouse	*Mus musculus*	
Least Shrew	*Cryptotis parva*	
Little Brown Myotis	*Myotis lucifugus*	
Longtail Weasel	*Mustela frenata*	
Marsh Rice Rat	*Oryzomys palustris*	
Masked Shrew	*Sorex cinereus*	
Meadow Jumping Mouse	*Zapus hudsonius*	
Meadow Vole	*Microtus pennsylvanicus*	
Mink	*Mustela vison*	
Muskrat	*Ondatra zibethicus*	
Northern Short-tailed Shrew	*Blarina brevicauda*	
Norway Rat	*Rattus norvegicus*	
Pygmy Shrew	*Sorex hoyi*	
Raccoon	*Procyon lotor*	
Red Bat	*Lasiurus borealis*	
Red Fox	*Vulpes vulpes*	
Red Squirrel	*Tamiasciurus hudsonicus loquax*	

Species	Scientific Name	VA Species of Concern[1]
River Otter	*Lontra canadensis*	SSC
Silver-haired Bat	*Lasionycteris noctivagans*	
Southeastern Shrew	*Sorex longirostris*	
Southern Bog Lemming	*Synaptomys cooperi*	IV
Southern Flying Squirrel	*Glaucomys volans*	
Star-nosed Mole	*Condylura cristata*	SSC
Striped Skunk	*Mephitis mephitis*	
Virginia Opossum	*Didelphis virginiana*	
White-footed Mouse	*Peromyscus leucopus*	
White-tailed Deer	*Odocoileus virginianus*	
Woodchuck	*Marmota monax*	
Woodland Vole	*Microtus pinetorum*	

[1]Virginia State Comprehensive Wildlife Conservation Plan – Priority Species

Tier I: Critical conservation need; Tier II: Very high conservation need; Tier III: High conservation need; Tier IV: Moderate Conservation Need: SSC – Species of Special Concern; SE – State Endangered

Table A.9. Fish Species of Conservation Concern in Featherstone Refuge Area

Species Common Name	Scientific Name	USFWS Northeast Strategic Fisheries Plan – Potomac Watershed[1]	State Comprehensive Wildlife Conservation Plan Priorities[2]
Alewife	*Alosa pseudoharengus*	IJ; H	IV
American eel	*Anguillis rostrata*		IV
American shad	*Alosa sapidissima*		IV
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	IJ	II; SSC
Blueback herring	*Alosa aestivalis*		
Brook Trout	*Salvelinus fontinalis*	SS:H	
Bridle shiner	*Notropis bifrenatus*		I; SSC
Hickory shad	*Alosa mediocris*	M	
Ironcolor shiner	*Notropis chalybaeus*		IV
Least brook lamprey	*Lampetra aepyptera*		IV
Logperch	*Percina caprodes*		IV
Shortnose sturgeon	*Acipenser brevirostrum*	E; H	I; SE
Striped bass	*Morone saxatilis*	H	

[1] USFWS Northeast Strategic Fisheries Plan 2009-2013 – List of Species of Conservation and Management Concern. See: *http://www.fws.gov/northeast/fisheries/pdf/FisheriesStrategicPlan.pdf* (accessed August 2011) for individual rankings.

IJ – Interjusidictional Species of Conservation and Management Concern;

SOC – Species of Concern; SS – Special Species; E – federally listed endangered; H – High Priority; M – Medium Priority

[2] Virginia State Comprehensive Wildlife Conservation Plan – Priority Species

I – Tier I: Critical conservation need; II – Tier II: Very high conservation need; III – Tier III: High conservation need;
IV – Tier IV: Moderate Conservation Need: SSC – Species of Special Concern; SE – State-listed Endangered

Table A.10. Plant Species of Conservation Concern for Featherstone Refuge Area

Common Name	Scientific Name
A Sedge	*Carex vestita*
Blue-hearts	*Buchnera americana*
Bog Fern	*Thelypteris simulata*
Brown Bog Sedge	*Carex buxbaumii*
Buffalo Clover	*Trifolium reflexum*
Carolina Fanwort	*Cabomba caroliniana*
Earleaf Foxglove	*Agalinis auriculata*
Engelmann's Quillwort	*Isoetes appalachiana*
Hardstemmed Bulrush	*Schoenoplectus acutus var. acutus*
Long-leaf Wedgescale	*Sphenopholis filiformis*
Marsh Hedgenettle	*Stachys pilosa var. arenicola*
Northern Bog Clubmoss	*Lycopodiella inundata*
One-sided Wintergreen	*Orthilia secunda*
Parker's Pipewort	*Eriocaulon pakeri*
Pear Hawthorn	*Crataegus calpodendron*
Prairie Rose	*Rosa setigera*
Purple Milkweed	*Asclepias purpurascens*
Red Milkweed	*Asclepias rubra*
River Bulrush	*Schoenoplectus fluviatilis*
Shinleaf	*Pyrola elliptica*
Small Whorled Pogonia*	*Isotria medeoloides*
Stiff Goldenrod	*Oligoneuron rigidum var. rigidum*
Torrey's Mountain-mint	*Pycnanthemum torrei*
Trailing Stitchwort	*Stellaria alsine*
White Water Crow-foot	*Ranunculus aquatilis var. diffusus*
Yellow Nodding Ladies'-tresses	*Spiranthes ochroleuca*

* Federally listed threatened; State-listed endangered; not currently known to occur on the refuge

Table A.11. Butterfly species Known or Likely to Occur on the Potomac River National Wildlife Refuge Complex

	Mason Neck Refuge	Occoquan Bay Refuge	Featherstone Refuge
Swallowtails (Papilionoideae)			
Pipevine Swallowtail	M	O	F
Zebra Swallowtail	M	O	F
Black Swallowtail	M	O	F
Eastern Tiger Swallowtail	M	O	F
Spicebush Swallowtail	M	O	F
Whites and Sulphurs (Pieridae)			
Checkered White		O	
Cabbage White	M	O	F
Falcate Orangetip	M	O	F
Clouded Sulphur	M	O	F
Orange Sulphur	M	O	F
Cloudless Sulphur	M	O	F
Little Yellow	M	O	F
Sleepy Orange	M	O	F
Gossamer Wings (Lycaenidae)			
Bronze Copper		O	
Coral Hairstreak		O	
Banded Hairstreak		O	
Henry's Elfin	M		
Eastern Pine Elfin	M		
Olive (Juniper) Hairstreak	M		
White "M" Hairstreak	M	O	
Gray Hairstreak	M	O	F
Red-banded Hairstreak	M	O	F
Eastern Tailed-Blue	M	O	F
Spring Azure	M	O	F
Summer Azure	M	O	F
Brush-footed Sepecies (Nymphalidae)			
American Snout		O	
Variegated Fritillary	M	O	F
Great Spangled Fritillary	M	O	F
Meadow Fritillary	M	O	

	Mason Neck Refuge	Occoquan Bay Refuge	Featherstone Refuge
Silvery Checkerspot	M	O	F
Pearl Crescent	M	O	F
Question Mark	M	O	F
Eastern Comma	M	O	F
Mourning Cloak	M	O	F
American Lady	M	O	F
Painted Lady	M	O	F
Red Admiral	M	O	F
Common Buckeye	M	O	F
Red-spotted Purple	M	O	F
Viceroy	M	O	F
Hackberry Emperor	M	O	F
Tawny Emperor		O	
Northern Pearly-Eye	M	O	F
Appalachian Brown	M	O	F
Carolina Satyr		O	F
Little Wood Satyr	M	O	F
Common Wood-Nymph	M	O	F
Monarch	M	O	F
Skippers (Hesperioidae)			
Silver-spotted Skipper	M	O	F
Long-tailed Skipper		O	
Hoary Edge	M		F
Southern Cloudywing	M	O	
Northern Cloudywing	M	O	
Hayhurst's Scallopwing	M		
Dreamy Duskywing	M	O	
Sleepy Duskywing		O	
Juvenal's Duskywing	M	O	F
Horace's Duskywing	M	O	F
Wild Indigo Duskywing	M	O	F
Common Checkered Skipper	M	O	F
Common Sootywing	M	O	F
Swarthy Skipper	M	O	
Clouded Skipper	M	O	F

	Mason Neck Refuge	Occoquan Bay Refuge	Featherstone Refuge
Least Skipper	M	O	F
Fiery Skipper	M	O	F
Leonard's Skipper		O	
Peck's Skipper	M	O	F
Tawny-edged Skipper	M	O	
Crossline Skipper	M	O	
Southern Broken-dash	M	O	F
Northern Broken-dash	M	O	F
Little Glassywing	M	O	F
Sachem	M	O	F
Delaware Skipper	M	O	
Zabulon Skipper	M	O	F
Broad-winged Skipper		O	
Dion Skipper	M	O	F
Dun Skipper	M	O	F
Pepper and Salt Skipper	M		
Ocola Skipper		O	F

Source: Waggener, J. 2011. Audubon Society of Northern Virginia.

Table A.12. Dragonfly and Damselfly Species Known or Likely to Occur on the Potomac River National Wildlife Refuge Complex

	Mason Neck Refuge	Occoquan Bay Refuge	Featherstone Refuge
DRAGONFLIES			
Petaltails			
Gray Petaltail	M	O	
Darners			
Common Green Darner	M	O	F
Comet Darner	M		
Swamp Darner	M	O	F
Cyrano Darner		O	
Harlequin Darner	M	O	
Shadow Darner			F
Clubtails			
Unicorn Clubtail	M	O	F
Black-shouldered Spinylegs		O	
Lancet Clubtail	M	O	
Ashy Clubtail	M		
Dragonhunter		O	
Russet-tipped Clubtail	M	O	
Spiketails			
Tiger Spiketail	M		
Twin-spotted Spiketail	M		
Arrowhead Spiketail	M		
Cruisers			
Swift River Cruiser	M		
Royal River Cruiser	M		
Emeralds			
Prince Baskettail	M	O	F
Common Baskettail	M	O	F
Uhler's Sundragon	M		
Mocha Emerald	M	O	
Fine-lined Emerald		O	
Clamp-tipped Emerald	M	O	
Skimmers			
Bar-winged Skimmer	M	O	F
Widow Skimmer	M	O	F

	Mason Neck Refuge	Occoquan Bay Refuge	Featherstone Refuge
Common Whitetail	M	O	F
Twelve-spotted Skimmer	M	O	F
Painted Skimmer	M	O	F
Four-spotted Skimmer	M		
Blue Corporal	M	O	
Spangled Skimmer	M	O	F
Golden-winged Skimmer	M	O	F
Needham's Skimmer	M	O	F
Great Blue Skimmer	M	O	F
Slaty Skimmer	M	O	F
Blue-faced Meadowhawk		O	F
White-faced Meadowhawk		O	
Ruby Meadowhawk	M	O	F
Autumn Meadowhawk	M	O	F
Little Blue Dragonlet	M	O	
Eastern Amberwing	M	O	F
Blue Dasher	M	O	F
Common Pondhawk	M	O	F
Wandering Glider	M	O	F
Spot-winged Glider	M	O	F
Black Saddlebags	M	O	F
Carolina Saddlebags	M	O	
Four-spotted Pennant		O	
Halloween Pennant	M	O	F
Calico Pennant	M	O	
Banded Pennant	M	O	
Dot -tailed Whiteface		O	
DAMSELFLIES			
Broad-winged			
Ebony Jewelwing	M		F
Smoky Rubyspot		O	
Spreadwings			
Common Spreadwing	M	O	F
Slender Spreadwing	M	O	F
Swamp Spreadwing		O	
Great Spreadwing	M	O	

	Mason Neck Refuge	Occoquan Bay Refuge	Featherstone Refuge
Pond			
Eastern Red Damsel			F
Blue-fronted Dancer	M	O	F
Variable Dancer	M	O	F
Powdered Dancer	M	O	F
Blue-ringed Dancer		O	
Blue-tipped Dancer	M	O	F
Dusky Dancer	M		
Azure Dancer	M		
Familiar Bluet	M	O	F
Double-striped Bluet		O	
Turquoise Bluet		O	
Atlantic Bluet	M	O	
Burgundy Binet	M	O	
Big Bluet	M	O	F
Stream Bluet	M	O	F
Skimming Bluet	M	O	
Orange Bluet	M	O	F
Slender Bluet	M	O	
Citrine Forktail	M	O	F
Fragile Forktail	M	O	F
Rambur's Forktail	M	O	F
Eastern Forktail	M	O	F
Sedge Sprite	M	O	

Source: Waggener, J. 2011. Audubon Society of Northern Virginia.

Appendix B

Bill Wallen

Sunrise over Painted Turtle Pond on Occoquan Bay Refuge

Findings of Appropriateness and Compatibility Determinations

- Introduction
- Findings of Appropriateness
- Compatibility Determinations

Findings of Appropriateness and Compatibility Determinations

Introduction

This appendix presents the findings of appropriateness and compatibility determinations we have developed for this Comprehensive Conservation Plan (CCP). Both findings of appropriateness and compatibility determinations are required by law (The National Wildlife Refuge System Administration Act of 1966 [Administration Act], as amended by The National Wildlife Refuge System Improvement Act of 1997 [Refuge Improvement Act] and Service policy [603 FW 1 for findings of appropriateness; 603 FW 2 for compatibility determinations]).

The findings of appropriateness document our process for determining whether a proposed or existing non-wildlife dependent use, or any non-priority public use, is appropriate for a refuge. The Refuge Improvement Act defined six wildlife-dependent recreational uses as appropriate for all refuges. These uses are: hunting, fishing, wildlife observation, nature photography, environmental education, and interpretation. However, the refuge manager must still determine if these uses are compatible for a particular refuge.

The compatibility determinations document our process for determining whether a proposed or existing wildlife-dependent recreational use, or any other use determined appropriate, is a compatible activity for a refuge. In evaluating compatibility, we must use professional judgment to determine that the use will not materially interfere with or detract from the fulfillment of the Refuge System mission or the purposes of the refuge. All refuge uses, including recreational uses, refuge management economic activities, or other uses of a refuge by the public or other non-Service entity require compatibility determinations. Economic uses must also contribute to achieving refuge purposes and the mission of the National Wildlife Refuge System (Refuge System).

Compatibility determinations are not required for refuge management activities conducted by the U.S. Fish and Wildlife Service (Service) or a Service-authorized agent to fulfill one or more purposes of the refuge or the Refuge System mission. Examples of activities which do not require a compatibility determination include: prescribed burning; water level management; invasive species control; routine scientific monitoring, studies surveys and censuses; historic preservation activities; law enforcement activities; or the maintenance of existing refuge facilities, structures, and improvements.

Compatibility determinations for existing wildlife-dependent recreational uses are reevaluated every 15 years, or when we prepare or revise the refuge's CCP, whichever is sooner. We reevaluate compatibility determinations for all other uses every 10 years, or when conditions change or significant new information about the use or its effects becomes available, whichever is sooner.

As you read through this appendix, you will notice that Occoquan Bay National Wildlife Refuge is included in most of the finding of appropriateness and compatibility determinations. Occoquan Bay National Wildlife Refuge's (Refuge; NWR) CCP was previously completed in 1997 and preceded current Service policy for findings of appropriateness and compatibility determinations. We determined that it was most effective and efficient to address some activities for the entire Potomac River National Wildlife Refuge Complex (Refuge Complex), including Occoquan Bay, Elizabeth Hartwell Mason Neck (Mason Neck), and Featherstone Refuges, since staff, funding, and other management resources are shared among those refuges. In addition, we felt it made the most sense to establish a consistent timeline for the mandatory reevaluations required by Service policy. There are some uses of Occoquan Bay not covered in the findings of appropriateness and compatibility determinations in this CCP. Our previous decisions about those activities are still applicable.

These documents were all released in draft for public review and comment as part of the Mason Neck and Featherstone Refuges' CCP process. The 49-day comment period was from January 5 to February 22, 2011. An announcement that these documents were available for review was also published in the *Federal Register* (76 FR 582) on January 5, 2011, in a newsletter we distributed to individuals on our project mailing list and posted on our Web site, and announced at three public meetings we held on February 2 and 3, 2011. Seventy-nine individuals, organizations, or agencies submitted comments. All of these comments were reviewed and considered before finalizing the individual findings of appropriateness and compatibility determinations in this appendix.

603 FW 1
Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Berry Picking/Mushroom Harvesting/Flower Picking/Medicinal Harvesting

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?		✔
(c) Is the use consistent with applicable Executive orders and Department and Service policies?		✔
(d) Is the use consistent with public safety?		✔
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		✔
(g) Is the use manageable within available budget and staff?		✔
(h) Will this be manageable in the future within existing resources?		✔
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		✔
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?		✔

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes _____ No ✔.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✔ **Appropriate** _____

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Berry Picking/ Mushroom Harvesting/Flower Picking/Medicinal Harvesting

NARRATIVE:

Berry picking, mushroom harvesting, flower picking, and medicinal harvesting have been found to be not appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex). These activities do not support a refuge purpose, objective, or goal and would not benefit the natural or cultural resources present within the Refuge Complex. These uses have not been historical or traditional uses of the Refuge Complex.

Berry picking, mushroom harvesting, flower picking, and medicinal harvesting are not priority public uses of the National Wildlife Refuge System Improvement Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). These uses would encourage visitors to stray from designated public use trails creating habitat damage and increased instances of refuge violations.

Impacts such as trampling vegetation and temporarily disturbing wildlife would occur. Many of the berry bushes, mushrooms, flowers, or medicinal plants found on the Refuge Complex are not located right next to trails and would require wandering off of designated trails. Visitors walking off of established trails to collect any of these items may impact plants indirectly by compacting soils and walking on young plants, reducing survival and regeneration. Wildlife may avoid using suitable habitat due to the temporary disturbance created by visitors off-trail.

Documented trespassing cases have occurred in the past by visitors engaged in these unauthorized uses. Participating in any of these activities would be interpreted by refuge law enforcement as "Disturbing, injuring, … destroying, collecting or attempting to disturb, injure, … destroy or collect any plant …" (50 CFR 27.51).

603 FW 1
Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Biking Off of Designated Routes

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?		✔
(c) Is the use consistent with applicable Executive orders and Department and Service policies?		✔
(d) Is the use consistent with public safety?		✔
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		✔
(g) Is the use manageable within available budget and staff?		✔
(h) Will this be manageable in the future within existing resources?		✔
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		✔
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?		✔

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✔ No _____.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✔ **Appropriate** _____

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

603 FW 1
Exhibit 1
Page 2

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Biking Off of Designated Routes

NARRATIVE:

Biking off of designated trails has been found to be not appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex). This activity does not support a refuge purpose, objective, or goal and would not benefit the natural or cultural resources present within the Refuge Complex.

Biking off of designated routes is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Biking in this manner causes conflicts with existing uses and requires increased maintenance duties.

Biking is not allowed on Woodmarsh Trail and Great Marsh Trail on Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge); on Lake Drive, Deephole Point Road, Fox Road, Easy Road, Bayview Road, Delta Road, a portion of Charlie Road (section that is not included in the Wildlife Drive), and a portion of Taylor Point Road (section that is not included in the Wildlife Drive) on the Occoquan Bay National Wildlife Refuge (Occoquan Bay Refuge); and biking will not be allowed on any of the spur trails (planned) off of the proposed Potomac Heritage National Scenic Trail on Featherstone National Wildlife Refuge (Featherstone Refuge). Visitors experience the priority public uses of wildlife observation, photography, environmental education, and interpretation traveling by foot on these trails and roads. Biking on these trails and roads are not required to experience these uses. In addition, the existing trails and roads mentioned above are not wide enough to support the two-way traffic of multiple uses. Conflicts between bike groups, mountain bikes, and wildlife would occur as fast moving bikers flush or disturb wildlife adjacent to trails.

Trail and road maintenance is another issue. The Refuge Complex currently deals with maintenance of refuge trails and roads based on staff availability. These areas are monitored by volunteers (when available) and deficiencies are noted and reported to Refuge Complex staff. Instances of downed trees and erosion due to inclement weather occur occasionally and refuge response may take days, weeks, and in some cases months before repairs can be initiated.

Finally, biking in additional areas on the refuges was not an activity in which the public expressed interest during the public scoping meetings. Currently, biking is allowed on the following designated trails within the Refuge Complex: Mason Neck Refuge–High Point Trail; Occoquan Bay Refuge–Wildlife Drive; and Featherstone Refuge—proposed Potomac Heritage National Scenic Trail. Opportunities for biking are available at other public lands and parks within a mile of each refuge within the Refuge Complex.

603 FW 1
Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Geocaching

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)? Abandonment of Property 50CFR Ch. 1 27.93		✔
(c) Is the use consistent with applicable Executive orders and Department and Service policies?		✔
(d) Is the use consistent with public safety?		✔
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		✔
(g) Is the use manageable within available budget and staff?		✔
(h) Will this be manageable in the future within existing resources?		✔
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		✔
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?		✔

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✔ No _____.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✔ **Appropriate** _____

Refuge Manager: S. Weeks Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

603 FW 1
Exhibit 1
Page 2

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Geocaching

NARRATIVE:

Geocaching has been found to be not appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex). The activity does not support a refuge purpose, objective, or goal and would not benefit the natural or cultural resources present within the Refuge Complex. The activity is also not a historical or traditional use of the Refuge Complex.

Geocaching is not a priority public uses of the National Wildlife Refuge System Improvement Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). This activity encourages visitors to stray from designated public use trails creating habitat damage and increased instances of refuge violations.

This use would encourage visitors to stray from designated public use trails. Impacts such as trampling vegetation and temporarily disturbing wildlife would occur. Visitors walking off established trails to locate a GPS point may impact plants indirectly by compacting soils and walking on young plants, reducing survival and regeneration. Wildlife may avoid using suitable habitat due to the temporary disturbance created by visitors off trail.

603 FW 1
Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Horseback Riding

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	✔	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?		✔
(d) Is the use consistent with public safety?		✔
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		✔
(g) Is the use manageable within available budget and staff?		✔
(h) Will this be manageable in the future within existing resources?		✔
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		✔
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?		✔

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✔ No _____.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✔ **Appropriate** _____

Refuge Manager: S J Weiler Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

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JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Horseback Riding

NARRATIVE:

Horseback riding has been found to be not appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex). This activity does not support a refuge purpose, objective, or goal and would not benefit the natural or cultural resources present within the Refuge Complex.

The Refuge Complex does not have parking space to support trailers in our designated parking areas. Trails and roads are unable to safely accommodate cars, horses, hikers, and bikers. The Refuge Complex does not have the staff resources to manage the use properly. Horseback riding would add significantly to the workload of law enforcement, visitor services, and maintenance staff because of the need to highly manage and monitor activities; trails would need continual maintenance (see below impacts). In addition, the use is accommodated at the Bureau of Land Management (BLM)–Meadowood Division, which is less than a mile from the Refuge Complex.

Potential Impacts of Horseback Travel include: soil compaction and erosion, downstream sedimentation, trampling and mortality of fragile plant communities, habitat loss/deterioration, wildlife disturbance, hydrologic changes, and a shift in plant communities along trails. These potential impacts are reported in literature and through in-field investigations and observations at another refuge in the Northeast Region (Canaan Valley National Wildlife Refuge–West Virginia). A summary of those impacts are listed below:

Impacts to Plants: Horse travel can impact plants on trails by directly crushing them. Indirectly, horses can impact plants by compacting soils diminishing soil porosity, aeration and nutrient availability (Kuss, 1986). Hammitt and Cole (1998) note compaction limits the ability of plants to re-vegetate affected areas. Plants growing in wet or moist soils are the most sensitive to disturbance from trampling effects (Kuss, 1986). Moist and wet soil conditions are common in Canaan Valley particularly during spring and early summer and can occur on upland trails that have been incised and are channeling water.

Horse use may cause local impacts to plants and soils when confined. West Virginia Conservation Officer Harold Spencer observed that tying horses to trees damaged plants and soils. Confined horses in Canaan Valley ate the bark of nearby trees. This occurred at upland camps where horses were left for extended periods (Spencer, 2002). According to Cole (1983), bark damage from tethering horses to trees can result in insect invasions and girdling that can ultimately kill the tree. Soil compaction and erosion at these sites was also cited as a problem, especially where it exposed tree roots (Cole, 1983). Erosion from horse hooves may increase root exposure.

Soil Impacts: Horses cause soil compaction, particularly when soils are wet which can directly affect plant growth and survival (Kuss, 1986). Horseback riding has been found to cause braided trails in excessively muddy trail sections (Summer, 1986). Weaver and Dale (1978) found horse use caused a greater loss of vegetation cover, wider and deeper trails, and greater soil compaction when compared to hiker use on meadow and forest trail conditions. Horses may cause trail erosion by loosening the soil and increasing soil particle detachment under both wet and dry trail conditions (Deluca et al., 1998).

Field investigations of trails in Canaan Valley have documented extensive damage displaying classic examples of the erosive nature of Mauch Chunk-derived soils after years of unregulated use. In addition, many trails are now trapping and channeling water creating more erosive conditions.

Kuss (1986) found that increasing moisture content of soils reduces the ability of the soil to support traffic. Summer (1986) recommended that horse trails be established on dry, well-drained sites. Routine maintenance to remove water and repair existing erosion is required to sustain horseback travel on most routes on the Main Tract (Rizzo, 2002; Zeedyk, 2002).

Invasive Species: Exposed soil and an abundance of sunlight along roads and trails provide ideal conditions for the establishment of invasive plant species. Invasive plant species may be transported through the presence of exotic plant seeds in feed hay. This concern has initiated strict requirements for weed-free hay in some natural areas. At Yellowstone National Park, Green Mountain National Forest, and Finger Lakes National Forest only processed feed (pelletized or cubed hay) or certified "weed seed free" hay is allowed in the back country (Oliff, 2001; Zimmer, 2001).

Hydrologic Impacts: Roads and trails used for horseback travel can affect the hydrology of an area, primarily through alteration of drainage patterns. Bartgis and Berdine (1991) note that roads and trails can divert water from their original drainage patterns. This causes some drainages becoming dry while others accelerate erosion by being forced to carrying more water. Zeedyk (2002) documented many instances in Canaan Valley where existing trails were channeling water away from historic wetlands and in some cases causing erosion and sedimentation of bog and other wetland communities. These problems have profoundly, if not irreversibly, altered the extent, depths, characteristics, and function of the wetlands on the Main Tract (Zeedyk, 2002).

Wildlife Impacts: Horseback travel can cause disturbances to wildlife. Disturbances vary with the wildlife species involved and the type, level, frequency, duration, and the time of year such activities occur. Whittaker and Knight (1998) note that wildlife response can include attraction, habituation, and avoidance. These responses can have negative impacts to wildlife, such as mammals, becoming habituated to humans making them easier targets for hunters. Human induced avoidance by wildlife can prevent animals from using otherwise suitable habitat.

Trails can disturb wildlife outside the immediate trail corridor (Trails and Wildlife Task Force, 1998, Miller et al., 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where American robins were found near trails and specialist species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et al., 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat, and increase energy demands on affected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Knight and Cole (1991) suggest recreational activities occurring simultaneously may have a combined negative impact on wildlife. Hammitt and Cole (1998) conclude that the frequent presence of humans in wildland areas can dramatically change the normal behavior of wildlife mostly through unintentional harassment.

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young. Some uses, such as bird observation, are directly focused on viewing certain wildlife species and can cause more significant impacts during breeding season and winter months.

Wildlife disturbance from horse use has been cited for trail closures in West Virginia. A trail was closed at the Bluestone Wildlife Management Area due to anticipated impacts of disturbance to wild turkey populations (Silvester, 2001).

Impacts to wildlife may be indirectly caused through erosion and subsequent sedimentation of streams and vernal pools. Increased sediment loads can reduce aquatic vegetation and dissolved oxygen concentrations (Sadoway, 1986). Sedimentation can directly kill aquatic invertebrates, which in turn impacts the success of amphibian larvae and adults (Sadoway, 1986). Observations by refuge staff in 2002 document numerous occurrences of amphibian egg masses that failed after becoming coated in sediment from eroding trails and

roads nearby. Bartgis and Berdine (1991) report that sedimentation was damaging habitat in Canaan Valley and could cause impacts to the rare plants, water quality, and possibly affect habitat of the southern water shrew *(Sorex palustris punctulatus)*, a State Species of Concern.

User Conflicts: Conflicts between trail users are commonly reported in the literature (Knight and Gutzwiller, 1995, Ramthun, 1995, Watson et al., 1994, Chavez et al., 1993). Conflicts range from concerns over personal safety to certain user groups feeling that they should be given priority over other groups based on a past history or other reasons. Providing safe routes for wildlife-oriented activities is an important consideration for wildlife observation trails on the refuge. Safety considerations include ability of multiple modes of access to use a trail without creating dangerous conditions, ability to maintain a trail to allow safe use, and timing of various uses, such as wildlife observation.

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Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Jogging (Except as Allowed under "Non-motorized Modes of Access on Designated Trails")

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?		✔
(c) Is the use consistent with applicable Executive orders and Department and Service policies?		✔
(d) Is the use consistent with public safety?		✔
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		✔
(g) Is the use manageable within available budget and staff?		✔
(h) Will this be manageable in the future within existing resources?		✔
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		✔
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?		✔

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes _____ No ✔.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✔ **Appropriate** _____

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Jogging (Except as Allowed under "Non-motorized Modes of Access on Designated Trails")

NARRATIVE:

Jogging has been found to be not appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex), except on the following trails specifically engineered for multiple-use: the High Point Trail on Elizabeth Hartwell Mason Neck Refuge and the proposed Potomac Heritage National Scenic Trail on Featherstone Refuge. See the finding of appropriateness and the compatibility determination for "Non-motorized modes of access on designated trails" for the Refuge Complex for more details on these exceptions.

Jogging does not support a refuge purpose, objective, or goal and would not benefit the natural or cultural resources present within the Refuge Complex. It is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

Foot travel is allowed on all established refuge trails so that visitors may experience the priority public uses of wildlife observation, photography, interpretation, and environmental education. Jogging is not required to experience these uses. Jogging may inconvenience visitors engaged in priority public uses by potentially disturbing wildlife that others are observing or photographing. Another potential conflict is that the typical trail width on the Refuge Complex may require joggers or the wildlife observers to step off trail in order to allow room to safely pass. This activity not only causes inconvenience to visitors engaged in priority public uses, but may also disturb vegetation and wildlife adjacent to the trails. Opportunities for jogging are available at other public lands and parks within a mile of each refuge within the Refuge Complex.

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Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Non-wildlife-dependent Group Gatherings

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?		✔
(c) Is the use consistent with applicable Executive orders and Department and Service policies?		✔
(d) Is the use consistent with public safety?	✔	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		✔
(g) Is the use manageable within available budget and staff?		✔
(h) Will this be manageable in the future within existing resources?		✔
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		✔
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?		✔

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes _____ No ✔.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✔ **Appropriate** _____

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

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Exhibit 1
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JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Non-wildlife-dependent Group Gatherings

NARRATIVE:

Non-wildlife dependent group gatherings have been found to be not appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex). These types of uses do not support a refuge purpose, objective, or goal and would not benefit the natural or cultural resources present within the Refuge Complex.

Non-wildlife dependent group gatherings such as, but not limited to, ceremonies, weddings, memorial services, family reunions, etc., are not priority public uses of the National Wildlife Refuge System Improvement Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

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Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Organized or Facility-supported Picnicking

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	✔	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?		✔
(d) Is the use consistent with public safety?	✔	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		✔
(g) Is the use manageable within available budget and staff?		✔
(h) Will this be manageable in the future within existing resources?		✔
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		✔
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?		✔

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes _____ No ✔.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✔ **Appropriate** _____

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

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Page 2

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Organized or Facility-supported Picnicking

NARRATIVE:

Organized or facility-supported picnicking has been found to be not appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex).These activities do not support a refuge purpose, objective, or goal and would not benefit the natural or cultural resources present within the Refuge Complex.

Picnicking is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

The Refuge Complex does not provide the amenities for picnicking activities, such as picnic tables, shelters, excessive trash containers, grills, etc. In addition, we do not have the resources to manage a large picnic area or program. Although organized picnicking is prohibited, this does not preclude visitors from bringing food with them for nutrition or safety reasons while they participate in other appropriate and compatible activities on the Refuge Complex.

Prohibiting picnicking may positively impact wildlife and wildlife habitat; if only by reducing the amount of soil compaction, vegetation trampling, and trash and food waste that might occur on and off trails and the frequency and extent of wildlife disturbance.

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Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Swimming and Sunbathing on Refuge Shore

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	✔	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?		✔
(d) Is the use consistent with public safety?		✔
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		✔
(g) Is the use manageable within available budget and staff?		✔
(h) Will this be manageable in the future within existing resources?		✔
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		✔
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?		✔

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes _____ No ✔.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✔ **Appropriate** _____

Refuge Manager: S Wesler Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

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Exhibit 1
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JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Swimming and Sunbathing on Refuge Shore

NARRATIVE:

Swimming and sunbathing have been found to be not appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex). Neither activity supports a refuge purpose, goal, or objective and would not benefit the natural or cultural resources present within the Refuge Complex.

Swimming and sunbathing are not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

The Refuge Complex has a total of 8.5 miles of shoreline and virtually all is closed to public access to prevent resource damage and further shoreline erosion, minimize wildlife disturbance, and avoid safety concerns. During the summer months, sections of the shoreline during low tide become exposed and are attractive to swimmers and sunbathers. This attraction creates safety concerns and increases the instances where law enforcement response is necessary. The Refuge Complex also does not have the facilities or staff to manage these uses.

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Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Elizabeth Hartwell Mason Neck and Featherstone NWRs

Use: Dog Walking

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	✔	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	✔	
(d) Is the use consistent with public safety?	✔	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✔	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	✔	
(g) Is the use manageable within available budget and staff?	✔	
(h) Will this be manageable in the future within existing resources?	✔	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	✔	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	✔	

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes _____ No ✔.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate _____ **Appropriate** ✔

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: 9/01/11

A compatibility determination is required before the use may be allowed.

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JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Elizabeth Hartwell Mason Neck and Featherstone NWRs

Use: Dog Walking

NARRATIVE:

Dog walking has been found to be appropriate for Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge) and Featherstone National Wildlife Refuge (Featherstone Refuge) on designated trails and with dogs on a leash.

Mason Neck Refuge trails and the proposed trails for Featherstone Refuge are ideal for walking dogs. Although dogs can increase disturbance to wildlife, the refuge will strictly enforce regulations requiring the dogs to be on leash no longer than 10 feet and for owners to immediately pick up dog waste. Dog walking is an existing use on Mason Neck Refuge and has occurred without incident. This use will be restricted to the current and planned trails on both refuges that are designated as open to the public.

COMPATIBILITY DETERMINATION

USE:

Dog Walking

REFUGE NAME:

Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Date Established: 1 February 1969

Establishing Authorities: Endangered Species Act (16 U.S.C. § 1534), the Refuge Recreation Act (16 U.S.C. § 460[k] – 460[k][4]), an Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b), and the Migratory Bird Conservation Act (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Date Established: 23 February 1970

Establishing Authorities: Public Law 91-499 (1970).

REFUGE PURPOSE(S):

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Lands acquired under the Endangered Species Act are "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species …. Or (B) plants …" (16 U.S.C. § 1534); lands acquired under the Refuge Recreation Act were found to be "… suitable for– (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 U.S.C. § 460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" (16 U.S.C. § 460[k] – 460[k][4]); lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife , or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b); and lands acquired under the Migratory Bird Conservation Act were "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Lands acquired under Public Law 91-499 (1970) were established to "... to protect the natural features of a contiguous wetland area." Public Law 91-499, dated Oct. 22, 1970.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57).

DESCRIPTION OF USE:

(a) What is this use? Is it a priority public use?
The use is dog walking. Dog walking is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would the use be conducted?
Dog walking would be allowed in the following areas:

1. On all current and future public trails located on the Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge), including, but not limited to, the Joseph V. Gartlan Jr. Great Marsh Trail, the Woodmarsh Trail, and the High Point Trail.

2. We also propose to allow dog walking along any newly created trails on Featherstone National Wildlife Refuge (Featherstone Refuge).

(c) When would the use be conducted?
Elizabeth Hartwell Mason Neck National Wildlife Refuge: Year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

Featherstone National Wildlife Refuge: Assuming trails have been developed and public access is available, year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

(d) How would the use be conducted?
Dog owners enter the refuge, park in the visitor parking lots, and proceed to the open trails. Dogs must be kept on a leash no longer than 10 feet in length. This leash regulation will be strictly enforced to minimize wildlife and visitor disturbance. Owners will be required to immediately clean up after their dogs.

A refuge brochure/flyer will be developed for visitor information and education, specifically informing them about regulations and ethics while engaging in this activity on the refuge. Refuge signs regarding dog walking will be developed and placed when and where necessary to help regulate this activity. Refuge staff patrols by foot and vehicle will be conducted to advise visitors of regulations, monitor visitor activity, and, as necessary, to enforce the regulations.

(e) Why is this use being proposed?
Visitors can participate in wildlife-dependent recreation while walking a dog. There is a current demand for this use on the refuge, therefore, we plan to continue with our existing policy on dog walking to better meet the needs of our public and minimize wildlife disturbances.

AVAILABILITY OF RESOURCES:

Permitting this use is within the resources available to administer our visitor services program. There is no additional staff or material costs incurred to the refuge. Compliance with the leash law is within the regular duties of the law enforcement officer.

ANTICIPATED IMPACTS OF THE USE:

Potential Impacts to Birds: The presence of dogs and pedestrians on the refuge, either on trails or off trails, is likely to cause temporary disturbance to birds. A study done in Colorado (Miller et al. 2001) found that robins,

representing forest species, and western meadowlarks and vesper sparrows, representing grassland species, flushed when approached by dogs on and off leash. Dogs alone generally resulted in less disturbance than when pedestrians were present, either alone or holding a leashed dog. The authors surmised that because dogs resemble coyotes and foxes, which are not considered significant predators of songbirds (Leach and Frazier 1953, Andelt et al. 1987), they may not have been perceived as an important threat. Disturbance was generally greater off trails than on trails. Dogs alone are not likely to cause significant disturbance beyond that caused by foxes and coyotes. Any disturbance would be temporary and should not lead to loss of migratory birds or their habitats.

Potential Impacts to Threatened and Endangered Species: Bald eagles were delisted as a threatened species in 2007, but remain a management focus for the refuge. We have no evidence to suggest that the temporary presence of dogs on the refuge will have negative effects on bald eagle nesting or roosting. If necessary to prevent disturbance, we will post sensitive bald eagle areas, such as nests and known roosts, as closed areas for dog walking.

Potential Impacts to Wetlands: It is unlikely that dogs will enter refuge wetlands due to trail location and refuge regulations. All dogs must be on leash and regulations state that visitors must remain on trails during visits to either refuge.

Potential Impacts to Other Fish and Wildlife Resources: There can be an increase in wildlife disturbance from dog walking simply due to normal dog behavior (i.e. jumping, barking, running off a leash). At some level, domestic dogs maintain instincts to hunt and/or chase. Given the appropriate stimulus, those instincts can be triggered in many different settings. Even if the chase instinct is not triggered, dog presence in and of itself has been shown to disrupt many wildlife species (Sime, 1999). Sime presents some effects of disturbance, harassment, and displacement on wildlife attributable to domestic dogs that accompany recreationists. Sime states that authors of many wildlife disturbance studies concluded that dogs with people, dogs on-leash, or loose dogs provoked the most pronounced disturbance reactions from their study animals. Dogs extend the zone of human influence when off-leash. Many ungulate species demonstrated more pronounced reactions to unanticipated disturbances, as a dog off-leash would be until within very close range. In addition, dogs can force movement by ungulates (avoidance or evasion during pursuit), which is in direct conflict with overwinter survival strategies which promote energy conservation. Sime continues to highlight that dogs are noted predators for various wildlife species in all seasons. Domestic dogs can potentially introduce diseases (distemper, parvovirus, and rabies) and transport parasites into wildlife habitats. While dog impacts to wildlife likely occur at the individual scale, the results may still have important implications for wildlife populations. For most wildlife species, if a "red flag" is raised by pedestrian-based recreational disturbance, there could also be problems associated with the presence of domestic dogs. Lastly, dog waste can create sanitation issues and an unsightly environment to other refuge visitors.

We do not expect a substantial increase in the cumulative effects of visitor use over the 15-year timeframe of this plan. Staff, in collaboration with volunteers, will monitor and evaluate the effects of these priority public uses to discern and respond to any unacceptable impacts on wildlife or habitats. To mitigate those impacts, the Refuge Complex will continue to close areas to the public to protect wildlife during critical life periods.

PUBLIC REVIEW AND COMMENT:

As part of the Mason Neck and Featherstone Refuges Comprehensive Conservation Plan process, this compatibility determination was released for a 49-day public review and comment period following the release of the draft Comprehensive Conservation Plan and Environmental Assessment.

DETERMINATION (CHECK ONE BELOW):

____ Use is not compatible

__X__ Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Dogs must be on a leash, no longer than 10 feet in length, and must refrain from entering closed areas. Dog owners must also pick up after their pets and properly dispose of wastes.

JUSTIFICATION:

Although dogs can increase disturbance to wildlife, the refuge will strictly enforce a leash law to keep dogs and disturbances localized with the pedestrian. This is an existing use at the Mason Neck Refuge and expectations for the proposed Potomac Heritage National Scenic Trial to support this use on Featherstone Refuge are high.

We have not had significant negative impacts from this use. There are no documented incidences of domestic dog-wildlife disturbances, nor of dog-human conflicts.

We believe most dog walkers are local residents who regularly visit the Mason Neck Refuge for wildlife-dependent recreation and who understand our policy. We will have an increase in dog walking activity on the Featherstone Refuge because we do not offer that use now; however, the increase is not expected to be substantial because of the lack of access points available to the general public.

SIGNATURE:

Refuge Manager: _____ (Signature) 8-26-11 (Date)

CONCURRENCE:

Regional Chief: _____ (Signature) 9/1/201 (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/1/2021

LITERATURE CITED:

Andelt, W.F., J.G. Kie, F.F. Knowlton, and K. Cardwell. 1987. Variation in coyote diets associated with season and successional changes in vegetation. Journal of Wildlife Management 51:273-277.

Leach, H.R., and W.H. Fraizer. 1953. A study of the possible extent of predation on heavy concentrations of valley quail with special reference to the bobcat. California Fish and Game 39:527-538.

Miller, S.G., R.L. Knight and C.K. Miller. 2001. Wildlife responses to pedestrians and dogs. Wildlife Society Bulletin 29(1):124-132.

Sime, C. A. 1999. Domestic Dogs in Wildlife Habitats. Pages 8.1-8.17 *in* G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: A Review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307pp.

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Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Outdoor Events

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	✔	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	✔	
(d) Is the use consistent with public safety?	✔	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✔
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	✔	
(g) Is the use manageable within available budget and staff?	✔	
(h) Will this be manageable in the future within existing resources?	✔	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	✔	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	✔	

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✔ No _____.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate _____ **Appropriate** ✔

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: 9/01/11

A compatibility determination is required before the use may be allowed.

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Exhibit 1
Page 2

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Outdoor Events

NARRATIVE:

Outdoor events have been found to be appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex).

Competitive or non-competitive outdoor events that are appropriate on the Refuge Complex include those that incorporate compatible uses such as wildlife observation and interpretation. These events would not be hosted by the Refuge Complex, but rather the Refuge Complex would participate as a partner in the event (e.g.,Volksmarches, bicycle rides on Wildlife Drive at Occoquan Bay Refuge, or a run associated with a community conservation event). Each request has different logistics and, therefore, would be evaluated for impacts on the respective refuge's purposes, and a special use permit (SUP) is issued unless found to be detrimental to that refuge's purposes.

COMPATIBILITY DETERMINATION

USE:

Outdoor Events

REFUGE NAME:

Elizabeth Hartwell Mason Neck, Featherstone and Occoquan Bay National Wildlife Refuges (Potomac River National Wildlife Refuge Complex)

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

The Potomac River National Wildlife Refuge Complex (Refuge Complex) is composed of three nationally significant wildlife areas: Elizabeth Hartwell Mason Neck (Mason Neck), Featherstone, and Occoquan Bay National Wildlife Refuges (Refuge).

Each national wildlife refuge is established under specific legislation or administrative authority. Similarly, each refuge has one or more specific legal purposes for which it was established. The establishing legislation or authority and the purposes for each refuge in the Refuge Complex are provided below:

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Date Established: 1 February 1969

Establishing Authorities: Mason Neck Refuge was established under the Endangered Species Act (16 U.S.C. § 1534), the Refuge Recreation Act (16 U.S.C. § 460[k] – 460[k][4]), an Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b), and the Migratory Bird Conservation Act (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Date Established: 23 February 1970

Establishing Authorities: Featherstone Refuge was established under Public Law 91-499 (1970).

Occoquan Bay National Wildlife Refuge
Date Established: 28 June 1998

Establishing Authorities: Occoquan Bay Refuge was established under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b).

REFUGE PURPOSE(S):

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under the Endangered Species Act are "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species…. Or (B) plants …" (16 U.S.C. § 1534); lands acquired under the Refuge Recreation Act were found to be "… suitable for– (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 U.S.C. § 460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" (16 U.S.C. § 460[k] – 460[k][4]); lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "…

particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b); and lands acquired under the Migratory Bird Conservation Act were "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under Public Law 91-499 (1970) were established to "... to protect the natural features of a contiguous wetland area." Public Law 91-499 (1970), dated Oct. 22, 1970.

Occoquan Bay National Wildlife Refuge
Purpose(s) for which Refuge was established: Lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b)

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

"To administer a national network of land and waters for the conservation, management, and where appropriate, the restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)."

DESCRIPTION OF USE:

(a) What is this use? Is it a priority public use?
This use is for competitive and non-competitive outdoor events, such as foot and/or wellness and physical fitness events, fishing derbies, clean-ups, or youth scavenger hunts, sponsored by private, charitable, and other non-profit clubs or groups, that provide for an interpretive, wildlife observation, and/or environmental education opportunity, and contribute to the public's understanding and appreciation of the refuge's natural resources. These events are not considered priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Such activities do, however, assist in pursuing the recent national initiative supported by the Service, in terms of "Connecting People with Nature" through healthy outdoor experiences in natural settings provided by public lands. These events primarily include walks, such as the Volksmarch on open trails, but may also include bicycle rides on the Wildlife Drive at Occoquan Bay Refuge or on the High Point Trail at Mason Neck Refuge. Or, the event may be a run associated with a community conservation event. Other regularly occurring events include shoreline clean-up days. Events are held one to five times, annually, and occur at different times throughout the year. Events may have up to 250 participants, although generally less than 100. Participants use established roads and trails that are already open to the public. Clean-up events may include all portions of the refuge. Participants in clean-ups generally work on shoreline areas or seasonally flooded bottomlands where debris is deposited.

(b) Where would the use be conducted?
Outdoor events would be allowed on any public use trail or area deemed as open to public access within the Refuge Complex. This includes the trails on all refuges and at the proposed new headquarters/visitor contact station and any additional planned trails. This use would not be permitted in areas managed for habitat conservation or wildlife protection.

(c) When would the use be conducted?
Elizabeth Hartwell Mason Neck National Wildlife Refuge: Year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

Occoquan Bay National Wildlife Refuge: Year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

Featherstone National Wildlife Refuge: Assuming trails have been developed and public access is available, year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

(d) How would the use be conducted?
Each request must be presented in writing with details of who, what, where, when, why, and how the event will be conducted. Each request has different logistics and, therefore, would be evaluated for impacts on the refuge mission. Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of refuge regulations, a special use permit will be issued outlining the framework in which this use can be conducted. Refuge staff will ensure compliance with the permit.

(e) Why is this use being proposed?
Each year the Refuge Complex receives requests to conduct outdoor events. Every time the request is made, we initially evaluate the impacts of the request and, if found to be minimal, issue a special use permit. Allowing special outdoor events will provide a controlled arena for introducing the public to the wildlife values of the refuge. In some instances, pre-event orientations designed to promote resource conservation and natural resource stewardship will be provided to the event organizer, allowing event participants to receive interpretive and environmental education messages.

AVAILABILITY OF RESOURCES:

Permitting this use is within the resources available to administer our visitor services program. Additional staff costs are incurred to review each request, coordinate with the outside entity and process a special use permit, if necessary. Compliance with the terms of the permit is within the regular duties of the law enforcement officer.

Anticipated costs are:

- Senior Refuge Biologist (GS-12) and/or GS-09 Refuge Biologist (review request)—1 day/yr. = **$325**
- Visitor Services Manager (GS-12) and/or GS-09 Refuge Operations Specialist (coordinate with entity)—1 day/yr. = **$348**
- Refuge Manager (GS-14) (review and approval)—1 day/yr. = **$416**
- Deputy Refuge Manager (GS-11) (review request, process and issue SUP)—3 days/yr. = **$870**
- Law Enforcement Officer (GS-09) (enforcement patrols) 1 day/yr. = **$208**

ANTICIPATED IMPACTS OF THE USE:

Conflicts may occur when humans and wildlife are both present in close proximity. Standard and special permit stipulations would strictly limit any adverse conditions that may affect wildlife, thereby mitigating such risk. Outdoor events will occur in areas of the refuge that are already identified more for their public use value than for habitat. Therefore, no significant adverse impacts from this use are anticipated.

Direct impacts have an immediate effect on wildlife. We expect those impacts to include the presence of humans disturbing wildlife, which typically results in a temporary displacement without long-term effects on wildlife individuals or populations. Some species will avoid the areas people frequent, such as the developed trails and the buildings, while others seem unaffected by or even drawn to the presence of humans. Overall, human effects should not be significant because most of the refuge will experience minimal public use.

Potential Impacts to Birds: An indirect benefit to upland habitats and associated species would derive from careful, strategic placement of trails and event locales. Public awareness and appreciation of the refuge, its habitats, and resources would inspire some to volunteer or in other ways support the refuge needs and conservation of resources on the landscape in general. Increases in annual visitor numbers from constructing new trails along Treestand and Sycamore Roads and improvements to the existing public trails at Mason Neck,

trails at Occoquan Bay, and new trails at Featherstone, and other planned activities described herein have the potential to cause disturbance to nesting, migrating, and wintering birds. However, the potential impacts vary due to each refuge's respective habitat management scenario and the types of visitor use. Direct impacts on wildlife in the form of disturbance can be expected wherever humans have access to an area, and the degree may vary depending on the habitat type. In general, human presence disturbs most wildlife, which typically results in a temporary displacement without long-term effects on individuals or populations.

Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson, 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Korschgen et al., 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al., 1985, Morton et al., 1989, Ward and Stehn 1989, Havera et al., 1992, Klein 1993), and increase in energy expenditure (Morton et al., 1989, Belanger and Bedard 1990). McNeil et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. The location of recreational activities impacts species in different ways. Miller et al. (1998) found that nesting success was lower near recreational trails, where human activity was common, than at greater distances from the trails. A number of species have shown greater reactions when pedestrian use occurred off trail (Miller, 1998). In addition, Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern U.S. In regard to waterfowl, Klein (1993) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived, in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et al. (1997) found that singing behavior of some species was altered by low levels of human intrusion. Pedestrian travel can impact normal behavioral activities, including feeding, reproductive, and social behavior. Studies have shown that ducks and shorebirds are sensitive to pedestrian activity (Burger, 1981; 1986). Resident waterbirds tend to be less sensitive to human disturbance than migrants, and migrant ducks are particularly sensitive when they first arrive (Klein, 1993). In areas where human activity is common, birds tolerated closer approaches than in areas receiving less activity. Some species, such as wood thrush, will avoid areas frequented by people, such as developed trails and buildings, while other species, particularly highly social species such as eastern tufted titmouse, Carolina chickadee, or Carolina wren, seem unaffected or even drawn to a human presence. When visitors approach too closely to nests, they may cause the adult bird to flush exposing the eggs to weather events or predators. Provided that visitor use is confined to trails, disturbance during the breeding season will be limited to the trail area. The extent of this disturbance on either side of the trail also depends on visibility, the density of vegetation through which the trail is laid. Overall, direct impacts from non-consumptive uses should be greatly reduced if trails and other high-use facilities avoid area-sensitive habitats (interiors of grasslands).

Laskowski et al. (1993), studied behavior of snowy egrets, female mallards, and greater yellowlegs on Back Bay Refuge in Virginia Beach, VA. The study location was within 91.4 meters of impoundment dikes used by the general public. Behavior of snowy egrets was recorded during August and September 1992 to represent post-breeding marsh and wading birds. Mallards were monitored during migration (November 1992) and during the winter (January 1993). Greater yellowlegs' behavior was observed during the northward shorebird migration (May 1993). Behavior was monitored during the typical public activities of walking, bicycling, and driving a vehicle past the sample sites.

The study found that snowy egret resting behavior decreased and alert behavior increased in the presence of humans. Preening decreased when humans were present, but this change was not significant. Feeding, walk/swim, and flight behaviors were not related to human presence. Female mallards in November increased feeding, preening, and alert behaviors in the presence of humans. Resting, walk/swim, and flight behavior were not influenced by human presence. In January, female mallard resting and preening behavior were not influenced by the presence of humans. However, feeding, alert, walk/swim, and flight behaviors were related to human presence. Greater yellowlegs increased alert behavior in the presence of humans. No other behaviors were affected. Maintenance behavior (combined feeding, resting, and preening) decreased when humans were present for all study species. In addition, this decrease was accompanied by an increase in escape behavior by each species. Maintenance behavior of mallards in January decreased in the presence of vehicles and combined disturbance. Escape behavior increased when vehicles were present. Maintenance behavior of greater yellowlegs declined when bicycles and vehicles were present but was not influenced by pedestrian presence.

The presence of bicycles and vehicles increased escape behavior. Snowy egrets and female mallards increased movement between subplots and to areas within the study area but further from the disturbance.

During a 5-year study, which involved nine different species of birds, they found only minimal evidence that intrusion affected bird distributions (Gutzwiller and Anderson, 1999). This study also found that the species affected by intrusion were not consistent from year to year or within study areas and could be due to habituation of intrusion (Gutzwiller and Anderson, 1999).

Potential Impacts to Threatened and Endangered Species: We included bald eagles in this section due to the fact that they were a focal species during refuge establishment at Mason Neck and because of the extra protection they are afforded under the Bald and Golden Eagle Protection Act. Permitting public access to any waterfront or marsh managed by the refuge holds the possibility of impacting bald eagles. Impacts may either be displacement or temporary disturbance, depending on the extent of use of a given site by visitors and eagles. We plan to continue to allow use public trails and areas open to the general public for events, which include but are not limited to: Woodmarsh and Joseph V. Gartlan, Jr. Great Marsh Trail, the proposed Sycamore Trail and Treestand Trail at Mason Neck Refuge; along the open public areas and trails/roads at Occoquan Bay Refuge; and along the proposed open areas or trails at Featherstone Refuge. All of these areas are adjacent to water bodies used by bald eagles for nesting, some in high concentrations. As trees mature and forest riparian buffers are improved, sites with currently low eagle concentrations will likely increase in importance to bald eagles. We will avoid potential adverse impacts to bald eagles by strictly following the management guidelines developed by State and Federal agencies. These include sight and distance setbacks from nests and concentration areas and time-of-year restrictions.

Potential Impacts to Wetlands: Potential adverse impacts to wetlands could arise if public use were allowed to occur directly in wetlands, or if erosion of sediments into wetlands was allowed to occur during facility of an event. We will manage events to ensure that minimal to no impacts will occur in this manner.

Potential Impacts to Other Fish and Wildlife: Mammals in Virginia occupy a diverse array of habitat types, ecological niches, and food webs and play an important role in the ecosystems in the refuge boundary. As a taxonomic group, mammals will also benefit from the refuge land protection and management actions relative to riparian habitats, forests, grasslands, shrub, and wetlands proposed for listed species, waterfowl, and migratory birds. Likewise, the refuge will benefit from careful attention to the impacts to mammals resulting from any of its activities. We evaluated the management actions and public uses proposed for the refuge for their potential to benefit or adversely affect large and small, aerial, terrestrial, and wetland mammals. The activities described in this determination should have no long-term impact on mammal use of the refuge.

Protection and good stewardship of the area's herpetofauna is another priority of the refuge, and fits into nearly all the goals for wetlands, uplands, and riparian habitats. We evaluated the public uses described herein for their potential to benefit or adversely affect amphibians and reptiles or their habitats used for mating, reproduction, over-wintering, and foraging. Although most species that occur on the refuge are very common and widespread, there is concern for two species of turtle: eastern box and spotted, and amphibians everywhere are considered to be experiencing a general decline. Some areas are experiencing loss of mixed mature forest due to development or high rates of conversion to timber farms. This impacts vernal pools needed by amphibians for over-wintering and reproduction. No vernal pools will be impacted by these proposed activities. Public outreach and education efforts by the refuge that emphasize buffering of wetlands; connectivity and easy access between forest, grassland, and wetlands; protection of vernal pools; and augmentation of patch size will benefit amphibians and reptiles on an even larger scale where embraced by other landowners.

Sometimes maintenance actions for public use may involve preparations or outcomes that have direct negative impacts to amphibians and reptiles. Mowing of grassy access roads and public use trails occasionally destroys turtles, snakes, or frogs if conducted during times of movement (warm months). The best way to minimize this direct type of negative impact is to keep public use and access roads mowed short so that they do not become attractive habitat. However, in many cases it will be impossible to find a perfect time to carry out maintenance actions that will completely avoid conflict for wildlife. Opening a limited amount of habitat for the public to experience and appreciate through a network of interpretive trail systems and outdoor classroom sites should heighten an awareness of the habitat needs and plight of declining reptiles and amphibians in the minds of children and adults. There is limited opportunity outside the refuge boundary area for adults to be exposed to the more reticent, uncommon, or interior species of reptiles and amphibians in natural habitats. Adults are homeowners, landowners, land managers, and land-use decisionmakers, and they have considerable influence on the value systems of children. Opportunities to learn and marvel about the habits, appearance, and needs of reptiles and amphibians and their role in the ecosystem will indirectly benefit this group of animals if these learning experiences translate into beneficial changes in landscaping, yard maintenance, pesticide use, and management of towns and communities.

Enhancement and expansion of the trail systems for public use poses the potential threat of blocking access between different habitat types, depending on the placement, length, width, and substrate material of the trails. Some salamander species will not cross openings that are too wide or dry, bare ground (Vinson 1998), thus earthen trails, if exposed to sunlight, could become dry enough to form a barrier. Gravel roads or trails, even though thought to be permeable, also act as a barrier to salamander movement (Marsh et al. 2005). The trails will therefore be located on level terrain, avoiding ravines, which are home to amphibians and reptiles. At most, these trails will be 5 miles in length on Mason Neck and Occoquan Bay Refuges, no more than 4 miles in length at Featherstone Refuge, and their widths no more than 6 feet. Disturbance to basking or nesting turtles may occur where public use is concentrated at points where land and water interface. Basking turtles can usually find alternate resting surfaces. Nesting turtles, once engaged in the act of digging, usually will not allow their attention to be drawn to anything else, and at such time are vulnerable to predators. A turtle wanting to make landfall to attempt egg-laying, however, may be dissuaded by the presence of humans at the site. Because there will be ample wetland-forest-grassland interface elsewhere, we expect that the cumulative impact of roads and trails to amphibians and reptiles at the landscape scale will be insignificant. Artificial illumination may have both positive and negative impacts on the nocturnal behavior and ecology of frogs (Buchanan 2002) and salamanders (Wise and Buchanan 2002). While it may enhance prey detection, it may also hurt predator avoidance, cause aggression between individuals of the same species, cause temporary blindness in frogs (sudden bright light), disrupt or confuse migration to or from ponds for salamanders (Wise and Buchanan 2002), or inhibit reproduction by frogs adapted to low illumination (Buchanan 2002).

Potential Impacts to Habitat: People can be vectors for invasive plants by moving seeds or other propagules from one area to another. Once established, invasive plants can out-compete native plants, thereby altering habitats and indirectly impacting wildlife. The threat of invasive plant establishment will always be an issue requiring annual monitoring and treatment when necessary. Our staff will work at eradicating invasive plants and educating the visiting public. Also, opening the lands within the Refuge Complex to public use can often result in littering, vandalism, or other illegal activities.

Cumulative Impacts: In summary, our research, observations, and knowledge of the area provide no evidence that the visitor activities we propose to allow will have an unacceptable cumulative effect on wildlife resources or their habitats.

Impacts may be minor when we consider them alone, but may become important when we consider them collectively. Our principal concern is repeated disruptions of nesting, resting, or foraging birds. Our knowledge and observations of the affected areas show no evidence that these four priority wildlife-dependent uses cumulatively will adversely affect the wildlife resource. Although we do not expect substantial cumulative impact from this use in the near term, it will be important for refuge staff to monitor this use and, if necessary, respond to conserve high-quality wildlife resources.

We do not expect a substantial increase in the cumulative effects of visitor use over the 15-year timeframe of this plan. Staff, in collaboration with volunteers, will monitor and evaluate the effects of this use to discern and respond to any unacceptable impacts on wildlife or habitats. To mitigate those impacts, the Refuge Complex will continue to close areas to the public to protect wildlife during critical life periods.

PUBLIC REVIEW AND COMMENT:

As part of the Mason Neck and Featherstone Refuges' Comprehensive Conservation Plan process, this compatibility determination was released for a 49-day public review and comment period following the release of the draft Comprehensive Conservation Plan and Environmental Assessment.

DETERMINATION (CHECK ONE BELOW):

____ Use is not compatible

__X__ Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Each request must be presented in writing with details of who, what, where, when, why, and how the event will be conducted. Each request will then be evaluated for impacts to the refuge. All current refuge regulations and standard special use permit stipulations will apply, along with special stipulations, depending on the nature and scope of the event to be permitted.

- See section A above for a detailed description of use and initial boundaries.
- A refundable bond may be taken to ensure that any facility or resource damage is repaired or restored.
- Event permit holders will be invoiced for any necessary refuge staff overtime associated with managing the permit and coordinating the special event with other refuge activities.
- Group size may not exceed 250 individuals and may be further limited, depending upon the nature and scope of the event, and a management evaluation of public safety and resource protection risk.
- Based upon professional judgment, and as long as there is no significant negative impact to natural resources or visitor services, or violation of refuge regulations, a special use permit can be issued outlining the framework within which this use can be conducted.

JUSTIFICATION

We currently allow hunting, wildlife observation, photography, environmental education, and interpretation. Events that are not considered priority public uses, such as races or competitions, are conducted as a means to support a compatible use. Although these uses do not directly contribute to the achievement of refuge purposes or the National Wildlife Refuge System mission, they do provide for an interpretive, wildlife observation, and/or environmental education opportunity, thereby contributing to the public's understanding and appreciation of the refuge's natural resources. Therefore, a group event can be compatible as long as it is appropriate, conducted safely, and does not conflict with priority uses on the refuge.

SIGNATURE:

Refuge Manager: Gregory J. Wailes (Signature) 8-26-11 (Date)

CONCURRENCE:

Regional Chief: Scott B. Kerr (Signature) 9/1/2011 (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/1/2021

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603 FW 1
Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Research

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	✔	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	✔	
(d) Is the use consistent with public safety?	✔	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✔	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	✔	
(g) Is the use manageable within available budget and staff?	✔	
(h) Will this be manageable in the future within existing resources?	✔	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	✔	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	✔	

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✔ No _____.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate _____ **Appropriate** ✔

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: 9/01/11

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Research

NARRATIVE:

Research has been found to be appropriate for the Potomac River National Wildlife Refuge Complex (Refuge Complex).

The use is research conducted by non-Service personnel on the Refuge Complex. It is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

The Refuge Complex does not have the resources to conduct all the necessary surveys and studies to manage all resources or to conduct studies that benefit natural resources in general. Therefore, we encourage research by outside entities to assist us in collecting and providing data for our wise use. All research proposals are evaluated for their benefits to the refuge mission and issued a special use permit if found beneficial. All research projects require the principal investigator to provide summary reports of findings and acknowledge the Refuge Complex for their participation.

COMPATIBILITY DETERMINATION

USE:

Research

REFUGE NAME:

Elizabeth Hartwell Mason Neck, Featherstone and Occoquan Bay National Wildlife Refuges (Potomac River National Wildlife Refuge Complex)

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

The Potomac River National Wildlife Refuge Complex (Refuge Complex) is composed of three nationally significant wildlife areas: Mason Neck, Featherstone, and Occoquan Bay National Wildlife Refuges.

Each national wildlife refuge is established under specific legislation or administrative authority. Similarly, each refuge has one or more specific legal purposes for which it was established. The establishing legislation or authority and the purposes for each refuge in the Refuge Complex are provided below:

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Date Established: 1 February 1969

Establishing Authorities: Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge) was established under the Endangered Species Act (16 U.S.C. § 1534), the Refuge Recreation Act (16 U.S.C. § 460[k] – 460[k][4]), an Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b), and the Migratory Bird Conservation Act (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Date Established: 23 February 1970

Establishing Authorities: Featherstone National Wildlife Refuge (Featherstone Refuge) was established under Public Law 91-499 (1970).

Occoquan Bay National Wildlife Refuge
Date Established: 28 June 1998

Establishing Authorities: Occoquan Bay National Wildlife Refuge (Occoquan Bay Refuge) was established under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b).

REFUGE PURPOSE(S):

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under the Endangered Species Act are "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species…. Or (B) plants …" (16 U.S.C. § 1534); lands acquired under the Refuge Recreation Act were found to be "… suitable for– (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 U.S.C. § 460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" (16 U.S.C. § 460[k] – 460[k][4]); lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "…

particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b); and lands acquired under the Migratory Bird Conservation Act were "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under Public Law 91-499 (1970) were established "... to protect the natural features of a contiguous wetland area." Public Law 91-499 (1970), dated Oct. 22, 1970.

Occoquan Bay National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b)

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

"To administer a national network of land and waters for the conservation, management, and where appropriate, the restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)."

DESCRIPTION OF USE:

(a) What is this use? Is it a priority public use?
The use is research conducted by non-Service personnel on the Refuge Complex. It is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

There is much that can be learned from field research within the refuge. Baseline information in the biological, geophysical, hydrological, and other fields is still in need of being collected. There are many opportunities for consultants, colleges and universities, and other agencies to obtain permission to conduct critical and noteworthy research on the refuge.

Two provisions of the National Wildlife Refuge Improvement Act are to "maintain biological integrity, diversity and environmental health" and to conduct "inventory and monitoring." Monitoring and research are an integral part of National Wildlife Refuge management. Plans and actions based on thorough research and consistent monitoring provide an informed approach to management effects on wildlife and habitat.

Currently, research applicants are required to submit a proposal that outlines: (1) objectives of the study; (2) justification for the study; (3) detailed methodology and schedule; (4) potential impacts on refuge wildlife or habitat, including disturbance (short- and long-term), injury, or mortality (this includes a description of measures the researcher will take to reduce disturbance or impacts); (5) research personnel required; (6) costs to refuge, if any; and (7) progress reports and end products (i.e., reports, thesis, dissertations, publications). Research proposals are reviewed by refuge staff and conservation partners, as appropriate, for approval. Evaluation criteria currently include, but are not limited to, the following:

- Research that will contribute to specific refuge management issues will be given higher priority over other research requests.
- Research that will conflict with other ongoing research, monitoring, or management programs will not be granted.
- Research projects that can be accomplished off-refuge are less likely to be approved.
- Research that causes undue disturbance or is intrusive will likely not be granted. Level and type of disturbance will be carefully evaluated when considering a request.

- Refuge evaluation will determine if any effort has been made to minimize disturbance through study design, including considering adjusting location, timing, scope, number of permittees, study methods, number of study sites, etc.

- If staffing or logistics make it impossible for the refuge to monitor researcher activity in a sensitive area, the research request may be denied, depending on the specific circumstances.

- The length of the project will be considered and agreed upon before approval. Projects will be reviewed annually.

(b) Where would the use be conducted?
The locations of the research will vary, depending on the research project being conducted. The entire Refuge Complex is open and available for scientific research. A research project is usually limited to a particular habitat type, plant, or wildlife species. On occasion, research projects will encompass an assemblage of habitat types, plants, or wildlife. The locations will be limited to those areas of the refuge that are absolutely necessary for conducting the research and that do not create a significant negative impact to refuge operations and wildlife use.

(c) When would the use be conducted?
The timing of the research will depend entirely on the research project needs. We will allow scientific research on the Refuge Complex throughout the year, as long as that use does not present a significant negative impact to wildlife use and management operations. Some projects could be short-term in design, requiring one or several visits over the course of a few days or weeks. Others could be multiple year studies that require more frequent visits to the location. The timing of each use will be limited to the minimum required for completion. If a research project occurs during any refuge hunting program, special precautions will be required and enforced to ensure public health and safety.

(d) How would the use be conducted?
The mechanics of the research work will depend entirely on the individual research project. We will carefully scrutinize the objectives, methods, and approach of each research project before allowing it to occur on the Refuge Complex. We will not permit a research project that lacks an approved study plan and protocol, compromises public health and safety, or presents a significant negative impact to wildlife resources within the Refuge Complex. This permitted research use must be regulated and governed by the conditions and other terms of a refuge special use permit. The special use permit will provide any needed protection to individual refuge policies, mission, wildlife populations, and natural habitats. In addition, all research projects require the primary investigator to submit written summary reports of all findings, and acknowledge the Refuge Complex's participation.

(e) Why is this use being proposed?
Research by non-Service personnel is conducted by colleges, universities, Federal, State, and local agencies, non-governmental organizations, and qualified members of the public. Such studies further our understanding of the natural environment that we are responsible for managing. Research is therefore an important part of the adaptive management process that often results in improved management of refuge habitats and wildlife populations. Much of the information that research generates can be applied to management practices both on and adjacent to the Refuge Complex.

The Service encourages and supports research and management studies on refuge lands that will improve and strengthen decisions for managing natural resources. The refuge manager encourages and seeks research that clearly relates to approved refuge objectives, improves habitat management, and promotes adaptive management. Priority research addresses information on better managing the Nation's biological resources that generally are important to agencies of the Department of Interior, the National Wildlife Refuge System, and State Fish and Game Agencies, and that address important management issues, or demonstrate techniques for managing species or habitats.

The Refuge Complex will also consider research for other purposes that may not relate directly to refuge-specific objectives, but contribute to the broader enhancement, protection, use, preservation, or management of native populations of fish, wildlife and plants, and their natural diversity in the Northeast Region and/or the Atlantic Flyway. All proposals must comply with Service policy on compatibility.

AVAILABILITY OF RESOURCES:

The costs for administering and managing research opportunities at the Refuge Complex involves personnel time required to review research proposals submitted. The research incumbent will then be responsible to develop, operate, and maintain the research project as specified in the special use permit, the Cooperative Agreement, or Memorandum of Understanding.

Anticipated costs are:

- Senior Refuge Biologist (GS-12) and/or GS-09 Refuge Biologist (review request)—1 day/yr. = **$325**
- Visitor Services Manager (GS-12) and/or GS-09 Refuge Operations Specialist (coordinate with entity)—1 day/yr. = **$348**
- Refuge Manager (GS-14) (review and approval)—1 day/yr. = **$416**
- Deputy Refuge Manager (GS-11) (review request, process and issue SUP)—3 days/yr. = **$870**
- Law Enforcement Officer (GS-09) (enforcement patrols) 1 day/yr. = **$208**

ANTICIPATED IMPACTS OF THE USE:

The service encourages approved research projects to further the understanding of natural resource problems, which will, in turn, increase our ability to manage our trust resources. Properly conducted studies will have little negative impact on refuge flora, fauna, or wildlife species.

Ideally, any research project conducted on the refuge would positively contribute to one or more of our interim objectives. There may be short-term disturbance to plants and wildlife during field investigations, but this is unavoidable in most cases. We will conduct Intra-Service Section 7 Biological Evaluations for any proposal that could be anticipated to have an impact on any federally threatened or endangered species. We will ensure that the refuge or any non-Service researchers obtain any special permits, including collection and banding permits, required by State or Federal law prior to issuing a special use.

PUBLIC REVIEW AND COMMENT:

As part of the Elizabeth Hartwell Mason Neck and Featherstone Comprehensive Conservation Plan process, this compatibility determination was released for a 49-day public review and comment period following the release of the draft Comprehensive Conservation Plan and Environmental Assessment.

DETERMINATION (CHECK ONE BELOW):

____ Use is not compatible

__X__ Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The criteria for evaluating a research proposal, outlined in the Description of Use section above, will be used when determining whether a proposed study will be approved on the refuge. If proposed research methods are evaluated and determined to have potential adverse impacts on refuge wildlife or habitat, then the refuge would determine the utility and need of such research to conservation and management of refuge wildlife and

habitat. If the need was demonstrated by the research permittee and accepted by the refuge, then measures to minimize potential impacts (e.g., reduce the numbers of researchers entering an area, restrict research in specified areas) would be developed and included as part of the study design and on the special use permit. Special use permits will contain specific terms and conditions that the researcher(s) must follow relative to activity, location, duration, seasonality, etc., to ensure continued compatibility. All refuge rules and regulations must be followed unless alternatives are otherwise accepted in writing by refuge management.

All information, reports, data, collections, or documented sightings and observations that are obtained as a result of this permit are the property of the Service and can be accessed by the Service at any time from the permittee at no cost, unless specific written arrangements are made to the contrary. The refuge also requires the submission of annual or final reports and any/all publications associated with the work done on the refuge. Each special use permit may have additional criteria. Each special use permit will also be evaluated individually to determine if a fee will be charged and for the length of the permit.

Extremely sensitive wildlife habitat areas would be avoided unless sufficient protection from research activities (i.e., disturbance, collection, capture, and handling) is implemented to limit the area and/or wildlife potentially impacted by the proposed research. Where appropriate, some areas may be temporarily/seasonally closed so that research would be permitted when impacts to wildlife and habitat are less of a concern. Research activities will be modified to avoid harm to sensitive wildlife and habitat when unforeseen impacts arise.

Refuge staff will monitor researcher activities for potential impacts to the refuge and for compliance with conditions on the SUP. The refuge manager may determine that previously approved research and special use permits be terminated due to observed impacts. The refuge manager will also have the ability to cancel a special use permit if the researcher is not in compliance with the stated conditions.

JUSTIFICATION:

This program as described is determined to be compatible. Any potential negative impacts of research activities on the resources of the Refuge Complex will be minimized by the restrictions included in the special use permit special conditions. In addition, the research study design and researcher activities will be regulated and monitored by refuge staff.

The Service encourages approved research to further our understanding of refuge natural resources and management. Research by non-Service personnel adds greatly to the information base for refuge managers to make proper decisions and practice adaptive management. Research conducted by non-Service personnel will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established. In most cases it should supplement them.

SIGNATURE:

Refuge Manager: Gregory J Weiler (Signature) 8-26-11 (Date)

CONCURRENCE:

Regional Chief: Scott B. Kahn (Signature) 9/1/2011 (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/1/2021

603 FW 1
Exhibit 1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Non-motorized Modes of Access on Designated Trails

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a) Do we have jurisdiction over the use?	✔	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	✔	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	✔	
(d) Is the use consistent with public safety?	✔	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✔	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	✔	
(g) Is the use manageable within available budget and staff?	✔	
(h) Will this be manageable in the future within existing resources?	✔	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	✔	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	✔	

Where we do not have jurisdiction over the use ("no" to [a]), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to [b], [c], or [d]) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✔ No _____.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate _____ **Appropriate** ✔

Refuge Manager: _____ Date: 8-26-11

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: 9/01/11

A compatibility determination is required before the use may be allowed.

603 FW 1
Exhibit 1
Page 2

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Potomac River NWR Complex (Elizabeth Hartwell Mason Neck, Occoquan Bay, and Featherstone NWRs)

Use: Non-motorized Modes of Access on Designated Trails

NARRATIVE:

This finding of appropriateness covers certain modes of non-motorized access on two specifically designated trails on the Potomac River National Wildlife Refuge Complex (Refuge Complex): the High Point Trail on Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge) and the proposed Potomac Heritage National Scenic Trail on Featherstone National Wildlife Refuge (Featherstone Refuge). Specifically under consideration are jogging and non-motorized wheeled transport such as bicycles, inline-skates, scooters, and skateboards.[1] Both of these multi-use trails are part of regional transportation corridors.

These forms of non-motorized access have therefore been found appropriate on designated trails because it is consistent with the goals of the visitor service's program for the Refuge Complex, facilitates alternative modes of transportation, and contributes to the public's understanding, appreciation, and enjoyment of the refuge's natural and cultural resources.

Both of these trails are part of regional transportation corridors and these modes of transport provide alternative means of access to refuge lands for visitors, including those whose origin or destination may be off-refuge land (to or from Mason Neck State Park or through Featherstone Refuge on the proposed route of the Potomac Heritage National Scenic Trail). In addition to the convenience of these activities, they also allow exposure to the elements that afford visitors the opportunity to immerse themselves in nature. They also facilitate access to interpretation infrastructure and activities designed to increase the public's understanding and appreciation of the Refuge Complex's natural and cultural resources.

These uses are limited to only two specifically designated trails with hardened surfaces, where road width allows safe passage of other users. Designated trails also have sufficient viewing distance for users to detect the approach of other visitors on the refuges and maneuver to accommodate them. This minimizes conflicts with other public uses, including priority public uses. In addition, the High Point Trail is recognizable as a high-volume multi-purpose trail by virtue of its construction (e.g. asphalt with painted center line) and its proximity to a main access road. Most visitors, therefore, would not have the expectation for quiet nature viewing along this trail. There have been no complaints received about any of these non-motorized modes of access impacting Refuge Complex visitors engaged in priority public uses.

[1] Wheelchair use is another form of non-motorized access accommodated on the Refuge Complex. In addition to being permitted on the High Point Trail on Elizabeth Hartwell Mason Neck Refuge and the proposed Potomac Heritage National Scenic Trail on Featherstone Refuge, it is also permitted any where it can be safely accommodated on refuge roads and trails.

COMPATIBILITY DETERMINATION

USE:

Non-motorized Modes of Access on Designated Trails

REFUGE NAME:

Elizabeth Hartwell Mason Neck, Featherstone, and Occoquan Bay National Wildlife Refuges (Potomac River National Wildlife Refuge Complex)

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

The Potomac River National Wildlife Refuge Complex (Refuge Complex) is composed of three nationally significant wildlife areas: Mason Neck, Featherstone, and Occoquan Bay National Wildlife Refuges.

Each national wildlife refuge is established under specific legislation or administrative authority. Similarly, each refuge has one or more specific legal purposes for which it was established. The establishing legislation or authority and the purposes for each refuge in the Refuge Complex are provided below:

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Date Established: 1 February 1969

Establishing Authorities: Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge) was established under the Endangered Species Act (16 U.S.C. § 1534), the Refuge Recreation Act (16 U.S.C. § 460[k] – 460[k][4]), an Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b), and the Migratory Bird Conservation Act (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Date Established: 23 February 1970

Establishing Authorities: Featherstone National Wildlife Refuge (Featherstone Refuge) was established under Public Law 91-499 (1970).

Occoquan Bay National Wildlife Refuge
Date Established: 28 June 1998

Establishing Authorities: Occoquan Bay National Wildlife Refuge (Occoquan Bay Refuge) was established under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b).

REFUGE PURPOSE(S):

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Purpose(s) for which Refuge was established: Lands acquired under the Endangered Species Act are "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species…. Or (B) plants …" (16 U.S.C. § 1534); lands acquired under the Refuge Recreation Act were found to be "… suitable for– (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 U.S.C. § 460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" (16 U.S.C. § 460[k] – 460[k][4]); lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "…

particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b); and lands acquired under the Migratory Bird Conservation Act were "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Purpose(s) for which Refuge was established: Lands acquired under Public Law 91-499 (1970) were established to "... to protect the natural features of a contiguous wetland area." Public Law 91-499 (1970), dated Oct. 22, 1970.

Occoquan Bay National Wildlife Refuge
Purpose(s) for which Refuge was established: Lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b)

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

"To administer a national network of land and waters for the conservation, management, and where appropriate, the restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)."

DESCRIPTION OF USE:

(a) What is the use? Is it a priority public use?
The use is certain modes of non-motorized access on two specifically designated trails on the Refuge Complex: the High Point Trail on Mason Neck Refuge and the proposed Potomac Heritage National Scenic Trail on Featherstone Refuge. Specifically evaluated are jogging and non-motorized wheeled transport such as bicycles, inline-skates, scooters, and skateboards. This use is not a priority public use within the National Wildlife Refuge System, but facilitates alternative modes of transportation on the Refuge Complex.

(b) Where would the use be conducted?
This use is allowed on two specifically designated trails on the Refuge Complex: the High Point Trail on Mason Neck Refuge (which passes through the refuge and terminates at Mason Neck State Park) and the proposed segment of the Potomac Heritage National Scenic Trail through Featherstone Refuge. Both of these trails are considered regional transportation corridors. Currently, Occoquan Bay Refuge does not have any trails appropriate to accommodate this use.

This use is not allowed on any other Refuge Complex trails, nor is it allowed off-trail.

(c) When would the use be conducted?
This use is authorized according to the following:

Elizabeth Hartwell Mason Neck National Wildlife Refuge: Year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

Featherstone National Wildlife Refuge: Assuming trails have been developed and public access is available, year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

(d) How would the use be conducted?
Some refuge visitors will arrive to the refuge by vehicle and then engage in this use on the designated trails (e.g. transport bike by car and unload at trailhead), while others will arrive by non-motorized transportation (e.g. jog to Mason Neck Refuge from Mason Neck State Park).

This use is limited to designated trails with hardened surfaces that are wide enough to accommodate the safe passage of other trail users. Designated trails also have sufficient viewing distance for users engaged in this use to detect the approach of other users with enough space to maneuver to accommodate them. Similarly, pedestrian users on the trail can see the users from a reasonably safe distance.

This use occurs on both an individual and group basis. Generally, the groups are smaller than 10 people, which, in our observations, do not detract from a positive wildlife-dependent recreational experience for other visitors in proximity. We have also received no complaints about any user conflicts.

Information kiosks identify the roads and trails open for travel and explain permitted public uses, including where this use is allowed. Refuge staff will continue to monitor for potential safety concerns and environmental impacts. Safety and information signs are in place and maintained as necessary. Designated trails will be maintained to minimize environmental effects such as erosion and sedimentation and to provide safe conditions for public access. The existing designated trail is on asphalt and there has been no evident of erosion from current use; however, refuge staff will continue to monitor for any degradation of conditions.

Additional trails may also be considered in the future consistent with the final Comprehensive Conservation Plan or other appropriate regulatory process. Refuge staff will conduct regular monitoring of these non-motorized activities and would respond accordingly to minimize any safety or environmental impacts. Responses may include temporary closures, modifications to trail routes, or adding additional infrastructure to minimize short-term, localized, or predicted long-term impacts to soils and other resources, or to minimize safety concerns.

WHY IS THIS USE BEING PROPOSED?

These means of non-motorized access provide visitors with additional modes of transportation to access or travel through the refuges. The use also provides visitors with a way to view and enjoy the refuges' diverse natural and cultural resources. This exposure may lead to a better understanding of the importance and value of the Refuge System to the environment and the American people. This use has occurred with little to no impacts and some of these modes of access (e.g. bicycling) are extremely popular activities on the refuges.

AVAILABILITY OF RESOURCES:

The resources necessary to provide and administer this use are available within current and anticipated Refuge Complex budgets. Staff time associated with administration of this use is related to maintaining trails, insuring signs are posted, conducting outreach to visitors about refuge uses, and monitoring the effects of public uses on refuge resources and visitors. These staff activities will be conducted in conjunction with those outlined in the "Wildlife Observation, Photography, Environmental Education, and Interpretation" compatibility determination, and this use will not require any additional staffing or resources beyond what is necessary for those activities. Therefore, the costs listed below are identical to those listed in the compatibility determination for "Wildlife Observation, Photography, Environmental Education, and Interpretation."

Costs associated with administering this use include:

- Visitor Services Park Ranger GS-09—38 weeks/yr. = **$39,155**
- Deputy Refuge Manager (GS-11)—3 weeks/yr. = **$3,740**
- Refuge Manager (GS-14)—1 week/yr. = **$1,969**
- Law Enforcement Officer (GS-09)—10 weeks/yr. = **$10,304**
- Maintenance Worker (WG-10)—10 weeks/yr = **$11,416**
- Administrative Support Assistant (GS-7)—1 week/yr. = **$980**
- *In addition volunteer hours ranging from 400 to 650 hours contributing approximately $10,400.00.*

Additional staff needs and costs are anticipated with the addition of trails and activities within the Refuge Complex. It will be necessary to hire a Visitor Services Manager (GS-11/12), Park Ranger (GS-5), Maintenance Worker (WG-9) and Maintenance Worker (WG-6) to compliment current staffing. The Visitor Services Manager will be available for public outreach and to facilitate the visitor services program on the Refuge Complex. The Park Ranger will monitor visitor use and aide in facilitating visitor services opportunities. Maintenance staff will perform the regular maintenance duties and repairs that relate to visitor services.

Costs associated with administering additional uses include:

- Visitor Services Manager (GS-12)—38 weeks/yr. = **$53,245**
- Maintenance Worker (WG-9)—10 weeks/yr. = **$9,584**
- Maintenance Worker (WG-6)—10 weeks/yr = **$7,796**
- Park Ranger (GS-5)—38 weeks/yr. = **$24,229**

ANTICIPATED IMPACTS OF THE USE:

The use has the potential to affect a variety of migratory and resident wildlife and their habitats. Possible negative effects include disturbing wildlife, removing or trampling soils and vegetation, littering, vandalism, and entering closed areas. Refuge staff will conduct regular monitoring of the use and would respond accordingly to minimize any safety or environmental impacts.

Effects on Hydrology, Water Quality, and Soils: Designated routes will only occur on hardened surfaces designed to avoid impacts to streams, marshes, or other wetlands, and minimize the introduction of soil sediment and alternation of hydrology in those areas. Rarely, if ever, trail maintenance may cause short-term erosion and sedimentation in area waters. The locations of the trails and placement of culverts minimize changes to drainage patterns. The implications of poorly situated culverts is they could cause some drainages to receive less water and become drier, while forcing other drainages to carry more water resulting in accelerated erosion and increased water levels. However, these impacts have not been observed on the refuges.

If the use occurs off designated trails on native surfaces, it has the potential to effect soils and hydrology. Extensive tire or wheel ruts could cause soil compaction and create channeling or pooling of water during wet conditions. None of these conditions have been observed.

In addition, refuge staff will monitor designated trails for damage and remediate problem areas as needed. Outreach and law enforcement activities will continue to insure use off designated trails is kept to a rare occurrence.

Effects on Vegetation: Unauthorized use off of designated trails can also damage vegetation. Plants can physically be crushed by off-trail use. In addition, the use can cause compaction of soils, particularly when soils are wet, which can degrade plant communities associated with fragile organic soils. Soil compaction can also diminish the soil porosity, aeration, and nutrient availability, directly affecting plant growth and survival (Kuss 1986). Compaction can also limit re-vegetation of areas due to increased difficulty for root growth and penetration in the affected soils (Hammitt and Cole 1998). Kuss (1986) found plant species adapted to wet or moist habitats are the most sensitive, and increased moisture content reduces the ability of the soil to support recreational traffic.

Another potential affect on vegetation is the introduction of invasive plants. If native vegetation is impacted to the point that bare soil conditions are created, then invasive plants could invade. It is also possible that this use could transport and introduce invasive plant seeds from off-refuge (e.g. in bicycle tires), but there is no evidence that this is a major source of introduction. Refuge staff will continue to monitor for invasive species and control or eliminate them in conjunction with our existing annual invasive plant control program.

No impacts to vegetation have been observed, nor are they predicted, with these types of uses on the designated trails. In addition, as noted above, outreach and law enforcement activities will continue to insure unauthorized use is kept to a rare occurrence.

Effects on Wildlife: Disturbances to wildlife caused by human activities outdoors in natural settings, including the use described, vary with the wildlife species involved and the type, level, frequency, duration, and the time of year that the human activities occur. The responses of wildlife to human activities include avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Henson and Grant 1991, Kahl 1991, Klein 1993, Whittaker and Knight 1998), the use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993, Whittaker and Knight 1998), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). Mammals may become habituated to humans making them easier targets for hunters. Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole 1991).

The effects of trails on wildlife are complex and not limited to the trail footprint. Trail use can disturb areas outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). Miller et al. (1998) describe a 75-meter zone of influence where bird abundance and nesting activities (including nest success) were found to increase as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational roads and trails, where common species (e.g., American robins) were found near trails and rare species (e.g., grasshopper sparrows) were found farther from trails. Songbird nest failure was also greater near trails (Miller et al. 1998).

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981, Burger 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). Overall, the existing research demonstrates that disturbances from recreation activities have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, Burger 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981, Klein et al. 1995, Burger and Gochfeld 1998). Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern United States. However, the designated trails for this use are not located near any sensitive waterbird concentration areas. Klein (1993) found that, as the intensity of human disturbance increased, avoidance response by waterbirds increased. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). McNeil et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at the J.N. "Ding" Darling National Wildlife Refuge, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants were; the study also found that sensitivity varied according to species and individuals within species. In general, Klein found that herons and cranes were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and little blue herons were disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding might disrupt inter-specific and intra-specific relationships. Gutzwiller et al. (1994) found that singing behavior of some songbird species was altered by low levels of human intrusion. Some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980).

Distance: Disturbance increased with decreased distance between visitors and birds (Burger 1986), though exact measurements were not reported and likely differ based on species and activity.

Reproduction and Nesting Success: Flight in response to disturbance can lower nesting productivity and cause disease and death (Knight and Cole 1991). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested

habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where common species (i.e., American robins) were found near trails and more specialized species (i.e., grasshopper sparrows) were found farther from trails. Nest predation also was found to be greater near trails (Miller et al., 1998). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductive functions of song (Arrese 1987). Disturbance, which leads to reduced singing activity, makes males rely more heavily on physical deterrents in defending territories, which are time- and energy-consuming (Ewald and Carpenter 1978).

Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986, Klein 1993, Burger and Gochfeld 1998), though noise was not correlated with visitor group size (Burger and Gochfeld 1998).

Knight and Cole (1991) suggest recreational activities occurring simultaneously may have a combined negative impact on wildlife. Hammitt and Cole (1998) conclude that the frequent presence of humans in 'wildland' areas can dramatically change the normal behavior of wildlife mostly through 'unintentional harassment.'

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young. Some uses, such as bird observation, are directly focused on viewing certain wildlife species and can cause more significant impacts during breeding season.

Wildlife associated with aquatic habitats may also be affected by the use. Impacts that cause erosion and subsequent sedimentation of streams and vernal pools can reduce aquatic vegetation and dissolved oxygen concentrations (Sadoway 1986) and possibly kill aquatic invertebrates, fish, and affect the success of amphibian larvae and adults (Sadoway 1986). Because designated trails are on hardened surfaces and primarily in upland sites or located to minimize impacts to water and wetlands, the use as authorized on designated trails is not expected to increase erosion or sedimentation problems.

Anticipated impacts of the use on wildlife include temporary disturbances to species using habitats directly adjacent to the trails. This use generally occurs from spring through fall, which may result in occasional direct impacts to wildlife. These direct impacts may include nest abandonment of bird species nesting adjacent to trails and mortality of amphibians, reptiles, and small mammals struck by a user while crossing the road or trails. Direct mortality is more likely to occur due to cars than the other modes of access included in this use, and there are no recorded incidents of wildlife deaths due to this use on the refuges. Long-term impacts may include certain wildlife species avoiding trail corridors as a result of this use over time. The designated trails are located primarily in continuous tracts of hardwood forest on the refuges where forest cover may help reduce disturbance.

Refuge staff will take appropriate measures to avoid or minimize negative effects to wildlife from this use. Trails will continue to be periodically assessed to prevent habitat degradation. If there is evidence of unacceptable adverse impacts on wildlife, we will re-route, curtail, or close trails to this use as deemed appropriate. We will post and enforce Refuge Complex regulations and establish, post, and enforce closed areas as needed. Based on the information provided above, this use is not anticipated to significantly increase wildlife habitat fragmentation or cause significant impacts on wildlife through disturbance.

PUBLIC REVIEW AND COMMENT:

As part of the Elizabeth Hartwell Mason Neck and Featherstone Comprehensive Conservation Plan process, this compatibility determination was released for a 49-day public review and comment period following the release of the draft Comprehensive Conservation Plan and Environmental Assessment.

DETERMINATION (CHECK ONE BELOW):

____ Use is not compatible

__X__ Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The following actions will occur to ensure compatibility:

—Refuge regulations will be posted and enforced to help insure compliance and confine users to designated routes only. Closed areas will be established as needed, posted, and enforced. Signs necessary for visitor information, safety, and traffic control will be kept up to date.

—The use is restricted to Refuge Complex open hours (see details under "Description of Use," part (c) "When will the use be conducted?").

—Trails designated for the use is annually inspected for maintenance needs. Prompt action is taken to correct any conditions that risk public safety. Trails are maintained at a level that reasonably insures safe travel.

—The designated trails will continue to be monitored periodically to determine if they continue to meet the compatibility criteria established by the refuge. Should monitoring and evaluation of the use indicate that the compatibility criteria are or will be exceeded, appropriate action will be taken to ensure continued compatibility, including modifying or discontinuing the use.

—Routine law enforcement patrols will continue to be conducted throughout the year and will continue to check for unauthorized uses. The patrols also serve as education and outreach to visitors to promote compliance with refuge regulations. They also will continue to monitor public use patterns and public safety, and document visitor interactions.

—Potential conflicts with other public uses, such as hunting, will be minimized by using trailhead signs and other media to inform the visitors about current public use activities as well as which activities are authorized in specific locations throughout the refuge.

JUSTIFICATION:

The modes of transport described above are extremely popular and established activities on the Refuge Complex and, based on staff observations, have occurred with little to no environmental impact. This use is only authorized on designated trails that are on well-maintained hardened surfaces, thereby limiting any increased physical impact from this activity to soils, hydrology, and vegetation. In addition, this use is not predicted to increase resource impacts over and above other existing allowed public uses. In fact, these modes of access offer an alternative to cars, and thereby can reduce the amount of carbon emissions attributed to Refuge Complex visitors.

The two designated trails occur primarily in extensive closed canopy forest habitat. Disturbance that may occur along these routes potentially impacts only a fraction of the habitat available for wildlife in the Refuge Complex and occurs within the most abundant habitat types on each refuge. By limiting use to designated trails on a small percentage of the refuges and within the most common habitat types on each refuge, disturbance will be limited and manageable.

For these reasons, disturbance effects will not prevent achieving refuge purposes or the mission of the Refuge System for conserving, restoring, and protecting wildlife resources.

We will post and enforce refuge regulations at information kiosks, and establish, post, and enforce closed areas as needed. We also evaluate the trails periodically to assess their condition to prevent degradation. If evidence of unacceptable adverse impacts appears, we will repair the trail through scheduled maintenance programs, or re-route, curtail, or close trails as deemed appropriate.

Conflicts between this use and other refuge uses are very rare. Most trails on the Refuge Complex are closed to this use to prevent user conflicts and to reduce the overall impact on priority public uses. Given the size of the refuges and limited amount of trail open to this use, conflicts are expected to continue to be very minor or non-existent.

Because of the criteria established for permitting this use, the modes of access discussed are considered to be acceptable and manageable methods for facilitating alternative transportation to the Refuge Complex. For the reasons discussed above, this access will not affect the ability to conserve wetlands or protect, manage, and restore the wildlife and plant resources, as mandated through the refuges' establishing purposes, or the mission of the Refuge System. We therefore conclude that non-motorized modes of access on designated trails will not materially interfere with or detract from the mission of the Refuge System or the purposes for which Mason Neck, Occoquan Bay, or Featherstone Refuges were established.

SIGNATURE:

Refuge Manager: Gregory J. Miller (Signature) 8-26-11 (Date)

CONCURRENCE:

Regional Chief: Sarah B. Kuh (Signature) 9/1/2011 (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/1/2021

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COMPATIBILITY DETERMINATION

USE:

Wildlife Observation, Photography, Environmental Education, and Interpretation

REFUGE NAME:

Elizabeth Hartwell Mason Neck, Featherstone and Occoquan Bay National Wildlife Refuges (Potomac River National Wildlife Refuge Complex)

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

The Potomac River National Wildlife Refuge Complex (Refuge Complex) is composed of three nationally significant wildlife areas: Mason Neck, Featherstone, and Occoquan Bay National Wildlife Refuges.

Each national wildlife refuge is established under specific legislation or administrative authority. Similarly, each refuge has one or more specific legal purposes for which it was established. The establishing legislation or authority and the purposes for each refuge in the Refuge Complex are provided below:

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Date Established: 1 February 1969

Establishing Authorities: Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge) was established under the Endangered Species Act (16 U.S.C. § 1534), the Refuge Recreation Act (16 U.S.C. § 460[k] – 460[k][4]), an Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b), and the Migratory Bird Conservation Act (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Date Established: 23 February 1970

Establishing Authorities: Featherstone National Wildlife Refuge (Featherstone Refuge) was established under Public Law 91-499 (1970).

Occoquan Bay National Wildlife Refuge
Date Established: 28 June 1998

Establishing Authorities: Occoquan Bay National Wildlife Refuge (Occoquan Bay Refuge) was established under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b).

REFUGE PURPOSE(S):

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under the Endangered Species Act are "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species…. Or (B) plants …" (16 U.S.C. § 1534); lands acquired under the Refuge Recreation Act were found to be "… suitable for– (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 U.S.C. § 460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" (16 U.S.C. § 460[k] – 460[k][4]); lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "…

particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b); and lands acquired under the Migratory Bird Conservation Act were "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d).

Featherstone National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under Public Law 91-499 (1970) were established to "... to protect the natural features of a contiguous wetland area." Public Law 91-499 (1970), dated Oct. 22, 1970.

Occoquan Bay National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b)

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

"To administer a national network of land and waters for the conservation, management, and where appropriate, the restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)."

DESCRIPTION OF USE:

(a) What is this use? Is it a priority public use?
The uses are wildlife-oriented recreational activities including: wildlife observation, photography, environmental education, and interpretation, including special self-led groups participating in these activities. These are priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would the use be conducted?
Elizabeth Hartwell Mason Neck National Wildlife Refuge
Priority public uses will normally occur along access roads and the Woodmarsh and Joseph V. Gartlan Jr. Great Marsh Trails. Parking areas are available at both trailheads. In addition, several parking locations are available throughout the Mason Neck Refuge for activities occurring under special conditions.

Wildlife observation and photography will occur generally on designated trails and access roads or at developments such as photography blinds and observation platforms (see map B.1 and B.2 for existing and planned infrastructure). Currently, several trails are available for wildlife observation and photography. Woodmarsh Trail, which is 2.5 miles long, is located off of High Point Road and features gravel and earthen paths, boardwalks, and an overlook onto the Great Marsh. The Joseph V. Gartlan Jr. Great Marsh Trail (Great Marsh Trail) is .75 miles one-way and is located off of Gunston Road. The Great Marsh Trail is accessible and features an observation platform.

Habitats along Woodmarsh and Great Marsh Trails include a mature deciduous forest and the Great Marsh, one of the largest marshes in Fairfax County. These habitats provide great opportunities to see wildlife such as bald eagles, many species of birds, animals that live in and frequent the water's edge, and several types of flora and fauna. Future plans include making improvements to existing trails and adding additional trails for added opportunities. Opportunities to improve existing trails will be accommodated to provide a safe trail system for wildlife and visitors when changes occur adjacent to or on the trail that require action. These changes may include, but are not limited to, changes in habitat due to downed trees or flooding, sensitive habitat occurrences due to nesting species, or recognition of a better or safer path to direct the trail.

One new trail project would connect the Woodmarsh Trail to the Great Marsh Trail. Another project would provide visitors additional opportunities along Sycamore Road from the Woodmarsh Trail kiosk adjacent to Sycamore Road through to the end of Sycamore Road at Sycamore Point during trail closures of sensitive

habitat. Developing a trail out to Sycamore Point will provide opportunities for observation platforms along the Potomac River.

High Point Trail, a multi-purpose trail, of which only ½-mile of the 3-mile trail traverses the refuge, is located along High Point Road. It features accessible paths and boardwalks, and its function is to provide safe access for pedestrians to the Mason Neck State Park. This is the only trail that allows bicycling and other pedestrian uses along with foot traffic on the refuge. The trail was developed to provide a safe alternative to pedestrians that were using High Point Road to access Mason Neck State Park. Future plans also include interpretive waysides and interpretive media to be provided adjacent to the trail.

On-refuge environmental education activities will occur year-round during refuge hours of operation; however, most of the field programs will be associated with the fall and spring school year terms, usually mid-morning through the afternoon. The environmental education activities will primarily include teacher-guided field trips exploring topics requested by teachers, teacher workshops, and more structured curriculum-based topics. Opportunities to partner with the adjacent Mason Neck State Park in some aspects of the environmental education activities will be sought. The environmental education site currently includes a pavilion, two portalets, and a ½-mile environmental education trail. The site will be improved to facilitate possible increased visitation. Repairs include, but are not limited to, replacing the pavilion, installing improved restroom facilities, and rehabilitating the environmental education trail.

On-refuge interpretation activities will occur generally on designated trails and access roads or at developments such as kiosks and observation platforms. Currently the interpretive sites located on Woodmarsh Trail are located at a kiosk at the parking lot, a wayside interpretive panel at the beginning of the trail, and a kiosk at the back end of the trail adjacent to Sycamore Road. The interpretive sites located along the Joseph V. Gartlan Jr. Great Marsh Trail include a kiosk near the parking lot and a wayside interpretive panel at the end of the trail on the Great Marsh Overlook. Each kiosk at the head of both trails provides interpretive information, brochures, and bulletin boards highlighting information on refuge happenings. Future plans include updating and adding interpretive materials, waysides, kiosks, and/or other interpretive media formats where possible along these trails to facilitate the explanation of refuge resources, management, and to enhance self-guided opportunities. Woodmarsh Trail will also be renovated to feature a paved parking lot and improved kiosk facilities.

Off and onsite opportunities to support multi-agency interpretive efforts will be supported by the refuge. Future plans include, but are not limited to, an interpretive multi-agency kiosk that provides information about each agency located on the Mason Neck Peninsula and a Traveler's Information System that would provide information about the refuge on an AM frequency.

Certain areas on the refuge may be closed to public access at the refuge manager's discretion to protect sensitive habitats or species of concern, minimize conflicts with other refuge activities, or due to human health and safety concerns.

Occoquan Bay National Wildlife Refuge:
Priority public uses will normally occur along access roads, the Wildlife Drive, and the observation platform on Marumsco Creek. Parking currently occurs in the center of the refuge in the designated public parking lot. In addition, several parking locations are available throughout the Occoquan Bay Refuge for activities occurring under special conditions. Electronic lures/calls for birds and wildlife are not allowed for use on the refuge unless under educational or research permit.

Wildlife observation and photography will occur generally on access roads that have been designated as trails, the Wildlife Drive, or at developments such as photography blinds and observation platforms (see map B.4 for existing infrastructure). Currently, several access roads/trails are available for wildlife observation and photography. The following access roads/trails are open to foot traffic only, unless special conditions apply: Lake Drive (.39 miles), Deephole Point Road (2.14 miles), Fox Road (.43 miles), Bayview Road (.31 miles), Easy Road (.61 miles), Delta Road (.17 miles), and portions of Charlie Road (.36 miles) and Taylor Point Road (.35 miles). Each road features gravel paths and offers slightly different habitat types and viewing opportunities, including but not limited to, grasslands, wet meadows, shrubland, bottomland hardwoods, open water marsh, and the Belmont and Occoquan Bays. Lake Drive features the Painted Turtle Pond with a ramp and dock

that can be used for observation. Deephole Point Road features a wildlife observation blind, a migratory bird banding station that operates in the spring, and a gazebo with a spotting scope that overlooks Occoquan Bay. Wildlife Drive (1.69 miles) travels through several different habitats and allows the visitor an opportunity to see the refuge from personal vehicles or bicycles. Parking on Wildlife Drive is not allowed. Bicycles are only allowed on the entry road, Wildlife Drive, and the proposed road to the Visitor Contact Station. Future plans include, but are not limited to, adding additional trails for increased opportunities. A connector trail featuring a boardwalk and an observation platform along a marsh edge will be constructed between Easy Road and Deephole Point Road. A trail will also be constructed in an area alongside Wildlife Drive to divert pedestrian traffic off of the road. Depending on the location of the Visitor Contact Station, trails may be included adjacent or near the Station to provide opportunities for visitors interested in short walks through refuge habitat.

On-refuge environmental education activities will occur year-round during daylight hours when the refuge is open; however, most of the field programs will be associated with the fall and spring school year terms. The environmental education activities will primarily include teacher-guided field trips exploring topics requested by teachers, teacher workshops, and more structured curriculum-based topics. Opportunities to partner with Prince William County Schools will be sought. The environmental education site currently includes a pavilion, one unisex portalet, a small marsh with boardwalk, and a pond with a dock and ramp. The site will be improved to facilitate possible increased visitation. Improvements include, but are not limited to, increasing quality sampling sites for environmental education activities and stabilizing access routes to each educational site.

On-refuge interpretation activities will occur generally on designated trails and access roads or at developments such as kiosks and viewing platforms. Currently, interpretive sites include a kiosk site outside the gate, the Main Parking Lot Pavilion featuring 6 interpretive panels, an interpretive trail featuring 10 small signs developed by the Friends of the Potomac River Refuges, and several locations scattered throughout the refuge discussing topics such as butterflies, the marsh/beaver lodge, the Harry Diamond Lab, birds, bird banding, and habitat management. As additional trails are added, the interpretive value of the area will be determined and developed as such. Future plans include updating and adding interpretive materials, waysides, kiosks, and/or other interpretive media formats where possible along these trails to facilitate the explanation of refuge resources, management, and to enhance self-guided opportunities.

Off and onsite opportunities to support multi-agency interpretive efforts will be supported by the refuge.

Certain areas on the refuge may be closed to public access at the refuge manager's discretion to protect sensitive habitats or species of concern, minimize conflicts with other refuge activities, or due to human health and safety concerns.

Featherstone National Wildlife Refuge:
Currently Featherstone Refuge is closed to the general public for and does not currently have the facilities to support priority public uses. An exception to this closure will occur upon Comprehensive Conservation Plan approval, which is described below.

Discussions to provide safe over land access and parking to Featherstone Refuge are in progress. The construction of two new trails on the refuge is dependent on the success of securing public access to the refuge. The Riverside Station Residential Development has proposed building a trail through their property to provide public access to the refuge's western boundary, and the Potomac Heritage National Scenic Trail (PHNST) is proposed as an access route for the east side of the refuge. The PHNST is a partnership to develop a network of locally managed trails in a 425-mile corridor between the Chesapeake Bay and the Allegheny Highlands. The route for the trail is proposed to travel along a portion of the old railroad path that traverses the entire refuge from north to south. Provided these trails are built as proposed through Featherstone Refuge, activities associated with wildlife observation, photography, environmental education, and interpretation could be facilitated. Additional trails will be added to facilitate access to Farm Creek, Neabsco Creek, and /or Occoquan Bay.

Upon approval of the Comprehensive Conservation Plan, however, we will allow non-motorized boat landings (i.e. canoes and kayaks) at one designated area of Featherstone Refuge's shoreline to facilitate access for wildlife observation and nature photography from the Potomac River. The designated landing site is on tidal beach on Farm Creek and corresponds with the proposed location of the southernmost observation deck and fishing platform. Visitors accessing the refuge at this location by non-motorized boat would be allowed to walk

approximately 0.4 miles along an existing footpath. Boaters would be confined to this section of footpath until the rest of the refuge is officially open to public use, as previously discussed. No special infrastructure would be constructed to facilitate non-motorized boat access.

Wildlife observation, interpretation, and photography will occur along designated trails. Electronic lures/calls for birds and wildlife are not allowed for use on the refuge unless under educational or research permit.

On-refuge environmental education activities will occur year-round during daylight hours when the refuge is open; however most of the field programs will be associated with the fall and spring school year terms. The environmental education activities will primarily include teacher-guided field trips exploring topics requested by teachers, teacher workshops, and more structured curriculum-based topics.

Off and onsite opportunities to support multi-agency interpretive efforts will be supported by the refuge. Future plans include updating and adding interpretive materials, waysides, kiosks, and/or other interpretive media formats where possible along these trails to facilitate the explanation of refuge resources, management, and to enhance self-guided opportunities.

Certain areas on the refuge may be closed to public access at the refuge manager's discretion to protect sensitive habitats or species of concern, minimize conflicts with other refuge activities, or due to human health and safety concerns.

(c) When would the use be conducted?
Elizabeth Hartwell Mason Neck National Wildlife Refuge: Year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during scheduled refuge hunt dates.

Occoquan Bay National Wildlife Refuge: Year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

Featherstone National Wildlife Refuge: Assuming trails have been developed and public access is available, use will occur year-round, during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). Upon Comprehensive Conservation Planapproval, non-motorized boat landings will be allowed during this same timeframe. In the event that a future hunt program is developed for this refuge, a temporary closure to all of these activities would be implemented during scheduled refuge hunt dates.

(d) How would the use be conducted?
These four priority uses will be conducted much as they are conducted presently. Such activities would be allowed on established roads, trails, and in buildings that have been designed to accommodate such uses, in areas that are the least sensitive to human intrusion. Self-guided groups of 10 or more will be required to have permission to visit the refuge for these activities.

Self-guided groups are those who wish to host their own wildlife-dependent activities. As stated above, groups of 10 or more are required to have permission for these activities. Each request must be presented in writing with details of who, what, where, when, why, and how the activity will be conducted. Each request has different logistics and, therefore, would be evaluated for impacts on the refuge mission. Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of refuge regulations, a special use permit will be issued outlining the framework in which this use can be conducted. Refuge staff will ensure compliance with the special use permit.

There will be a mix of personal and non-personal program delivery, including interpretive signage, audio-visual presentations, brochures, special events, guided walks and talks, exhibits, Web site information, and informal visitor information contacts. Electronic lures/calls for birds and wildlife are not allowed for use on the refuge unless under educational or research permit.

Elizabeth Hartwell Mason Neck National Wildlife Refuge: Only foot travel is allowed on refuge trails (i.e., Woodmarsh and Joseph V. Gartlan Jr. Great Marsh Trails, and the proposed Treestand Trail and Sycamore

Trail). During snow events on the refuge, cross-country skiing and snowshoeing will be allowed on all refuge trails that allow foot travel. Bicycling and other non-motorized pedestrian use will be allowed on the High Point Trail only. Motorized use and horseback riding are prohibited on the refuge. These uses would be conducted by the general public, as well as by organized groups, including schools, birding groups, and scout groups.

Occoquan Bay National Wildlife Refuge: An entrance fee will be charged to all with the exception of school groups, scouts on merit badge projects assignments, or children under 16 years of age at Occoquan Bay Refuge. Only foot travel is allowed on Lake Drive, Deephole Point Road, Fox Road, Easy Road, Bayview Road, Delta Road, and portions of Charlie and Taylor Point Road. During snow events on the refuge, cross-country skiing and snowshoeing will be allowed on all refuge trails that allow foot travel. Vehicles and bicycles can utilize the Wildlife Drive (Dawson Beach Road, Locust Road, a small portion of Charlie Road, Bravo Road, and the portion of Taylor Point Road that is outside the gate as visitors exit the refuge). Horseback riding is prohibited on all trails. These uses would be conducted by the general public, as well as by organized groups, including schools, birding groups, and scout groups.

Featherstone National Wildlife Refuge: Once the segment of the PHNST through Featherstone Refuge is completed and officially opened to the public, bicycles and other pedestrians will be allowed. Only foot travel will be allowed on trails that spur off of the PHNST for additional access to other parts of the Featherstone Refuge. During snow events on the refuge, cross-country skiing, and snowshoeing will be allowed on all refuge trails that allow foot travel.

Upon approval of the Comprehensive Conservation Plan, non-motorized boats would be allowed to land at one designated site along Farm Creek. Visitors arriving by boat will be allowed to walk along an existing approximately 0.4 mile footpath.

(e) Why is the use being proposed?
Wildlife observation and photography, and environmental education and interpretation are four of the six priority public uses of the National Wildlife Refuge System. If compatible, they are to receive enhanced consideration over other secondary public uses.

AVAILABILITY OF RESOURCES:

The resources necessary to provide and administer these uses, at current use levels, are available within current and anticipated refuge budgets. Staff time associated with administering these uses relate to assessing and conducting maintenance, including kiosks and other facilities, gates, trails, parking areas, and signs; monitoring potential impacts of the use on refuge resources and visitors; and providing information and visitor service use opportunities to the public. Facilitating the special use permit process for wildlife dependent self-guided groups will be addressed within available resources. Staff costs are incurred in the review of each request, the coordination of groups or event coordinators, and the actual writing of the writing of the permit. Enforcement of compliance with rules and regulations and special use permit terms will incur costs.

Costs associated with administering this use include:

- Visitor Services Park Ranger (GS-09)—38 weeks/yr. = **$39,155**
- Deputy Refuge Manager (GS-11)—3 weeks/yr. = **$3,740**
- Refuge Manager (GS-14)—1 week/yr. = **$1,969**
- Law Enforcement Officer (GS-09)—10 weeks/yr. = **$10,304**
- Maintenance Worker (WG-10)—10 weeks/yr = **$11,416**
- Administrative Support Assistant (GS-7)—1 week/yr. = **$980**
- *In addition volunteer hours ranging from 400 to 650 hours contributing approximately $10,400.00.*

Additional staff needs and costs are anticipated with the addition of trails and activities within the Refuge Complex. It will be necessary to hire a Visitor Services Manager (GS-11/12), Park Ranger (GS-5), Maintenance Worker (WG-9), and Maintenance Worker (WG-6) to complement current staffing. The Visitor Services Manager will be available for public outreach and to facilitate the visitor services program on the Refuge Complex. The Park Ranger will monitor visitor use and aide in facilitating visitor services opportunities. Maintenance staff will perform the regular maintenance duties and repairs that relate to visitor services.

Costs associated with administering additional uses include:

- Visitor Services Manager (GS-12)—38 weeks/yr. = **$53,245**
- Maintenance Worker (WG-9)—10 weeks/yr. = **$9,584**
- Maintenance Worker (WG-6)—10 weeks/yr = **$7,796**
- Park Ranger (GS-5)—38 weeks/yr. = **$24,229**

ANTICIPATED IMPACTS OF THE USE:

Wildlife observation, photography, environmental education, and interpretation can affect the wildlife resource positively or negatively. A positive effect of public involvement in these priority public uses will be a better appreciation and more complete understanding of refuge wildlife and habitats. That can translate into more widespread, stronger support for the refuge, the Refuge System, and the Service.

Wildlife observation and photography have the potential of impacting shorebird, waterfowl, marshbirds, and other migratory bird populations feeding and resting near the trails during certain times of the year. Use of upland trails is more likely to impact songbirds than other migratory birds. Human disturbance to migratory birds has been documented in many studies in different locations.

Direct Impacts
Direct impacts have an immediate effect on wildlife. We expect those impacts to include the presence of humans disturbing wildlife, which typically results in a temporary displacement without long-term effects on wildlife individuals or populations. Some species will avoid the areas people frequent, such as the developed trails and the buildings, while others seem unaffected by or even drawn to the presence of humans. Overall, those effects should not be significant, because most of the refuge will experience minimal public use.

Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Korschgen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeil et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. The location of recreational activities impacts species in different ways. Miller et al. (1998) found that nesting success was lower near recreational trails, where human activity was common, than at greater distances from the trails. A number of species have shown greater reactions when pedestrian use occurred off-trail (Miller, 1998). In addition, Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern U.S. In regard to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived, in the late fall, than later in winter.

For songbirds, Gutzwiller et al. (1997) found that singing behavior of some species was altered by low levels of human intrusion. Pedestrian travel can impact normal behavioral activities, including feeding, reproductive, and social behavior. Studies have shown that ducks and shorebirds are sensitive to pedestrian activity (Burger 1981, 1986). Resident waterbirds tend to be less sensitive to human disturbance than migrants, and migrant ducks are particularly sensitive when they first arrive (Klein 1993). In areas where human activity is common, birds tolerated closer approaches than in areas receiving less activity.

With regard to impacts associated with the proposed non-motorized boat access, we predict no short- or long-term impacts to resources given

- no special infrastructure would be constructed to facilitate this access;
- our expectation that less than 200 boat landings per year would occur;
- the landing site location is primarily on tidal sandy beach which is a dynamic, shifting substrate and has very little vegetation or soils that would be impacted;
- none of the vegetation in the area is of conservation concern and people would be required to stay on the existing footpath to minimize additional off-trail impacts; and
- our current knowledge of wildlife inhabiting the area indicates no disturbances to nesting or breeding wildlife would occur.

We would monitor to see if any of these conditions change, or unanticipated impacts are occurring, and would adapt management as warranted. We would also conduct regular outreach and enforcement of refuge regulations to insure minimal to no impacts results.

Indirect Impacts
Laskowski et al. (1993), studied behavior of snowy egrets, female mallards, and greater yellowlegs. Behavior of snowy egrets was recorded during August and September 1992 to represent post-breeding marsh and wading birds. Mallards were monitored during migration (November 1992) and during the winter January (1993). Greater yellowlegs' behavior was observed during the northward shorebird migration (May 1993). Behavior was monitored during the typical public activities of walking, bicycling, and driving a vehicle past the sample sites.

The study found that snowy egret resting behavior decreased and alert behavior increased in the presence of humans. Preening decreased when humans were present, but this change was not significant. Feeding, walk/swim, and flight behaviors were not related to human presence. Female mallards in November increased feeding, preening, and alert behaviors in the presence of humans. Resting, walk/swim, and flight behavior were not influenced by human presence. In January, female mallard resting and preening behavior were not influenced by the presence of humans. However, feeding, alert, walk/swim, and flight behaviors were related to human presence. Greater yellowlegs increased alert behavior in the presence of humans. No other behaviors were affected. Maintenance behavior (combined feeding, resting, and preening) decreased when humans were present for all study species. In addition, this decrease was accompanied by an increase in escape behavior by each species. Maintenance behavior of mallards in January decreased in the presence of vehicles and combined disturbance. Escape behavior increased when vehicles were present. Maintenance behavior of greater yellowlegs declined when bicycles and vehicles were present but was not influenced by pedestrian presence.

The presence of bicycles and vehicles increased escape behavior. Snowy egrets and female mallards increased movement between subplots and to areas within the study area but further from the disturbance.

During a 5-year study, which involved nine different species of birds, researchers found only minimal evidence that intrusion affected bird distributions (Gutzwiller and Anderson 1999). This study also found that the species affected by intrusion were not consistent from year to year or within study areas and could be due to habituation to intrusion (Gutzwiller and Anderson 1999).

People can be vectors for invasive plants by moving seeds or other propagules from one area to another. Once established, invasive plants can out-compete native plants, thereby altering habitats and indirectly impacting wildlife. The threat of invasive plant establishment will always be an issue requiring annual monitoring and treatment when necessary. Our staff will work at eradicating invasive plants and educating the visiting public. Also, opening refuge lands to public use can often result in littering, vandalism, or other illegal activities on the refuge.

Cumulative Impacts
Impacts may be minor when we consider them alone, but may become important when we consider them collectively. Our principal concern is repeated disruptions of nesting, resting, or foraging birds. Our knowledge and observations of the affected areas show no evidence that these four priority wildlife-dependent uses cumulatively will adversely affect the wildlife resource. Although we do not expect substantial cumulative impact from these four priority uses in the near term, it will be important for refuge staff to monitor those uses and, if necessary, respond to conserve high-quality wildlife resources.

Refuge staff, in collaboration with volunteers, will monitor and evaluate the effects of these priority public uses to discern and respond to any unacceptable impacts on wildlife or habitats. To mitigate those impacts, the refuge will continue to close areas to the public to protect wildlife during critical life periods.

PUBLIC REVIEW AND COMMENT:

As part of the Mason Neck and Featherstone Refuges Comprehensive Conservation Plan process, this compatibility determination was released for a 49-day public review and comment period following the release of the draft Comprehensive Conservation Plan and Environmental Assessment.

DETERMINATION (CHECK ONE BELOW):

____ Use is not compatible

__X__ Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

No off-road or off-trail access will be permitted, except for emergency or administrative purposes, management actions, and for those who have obtained a special use permit for a specific purpose that requires off-road/off-trail access.

Electronic lures/calls for birds and wildlife are not allowed for use on the refuge unless under educational or research permit.

For self-guided groups of 10 or more, each request must be presented in writing with details of who, what, where, when, why, and how the group activity will be conducted. Each request will then be evaluated for impacts to the refuge. Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of refuge regulations, a special use permit will be issued outlining the framework in which this use can be conducted.

Elizabeth Harwell Mason Neck National Wildlife Refuge
Only foot travel is allowed on refuge trails (i.e., Woodmarsh and Joseph V. Gartlan Jr. Great Marsh Trails, and the proposed Treestand Trail and Sycamore Trail). During snow events on the refuge, cross-country skiing and snowshoeing will be allowed on all refuge trails that allow foot travel. Bicycling and other non-motorized pedestrian use will be allowed on the High Point Trail only.

Occoquan Bay National Wildlife Refuge
Only foot travel is allowed on Lake Drive, Deephole Point Road, Fox Road, Easy Road, Bayview Road, Delta Road, and portions of Charlie and Taylor Point Road. During snow events on the refuge, cross-country skiing and snowshoeing will be allowed on all refuge trails that allow foot travel. Vehicles and bicycles can utilize the Wildlife Drive (Dawson Beach Road, Locust Road, a small portion of Charlie Road, Bravo Road, and the portion of Taylor Point Road that is outside the gate as visitors exit the refuge).

Featherstone National Wildlife Refuge
Once the segment of the PHNST through Featherstone Refuge is completed and officially opened to the public, bicycles and other pedestrians will be allowed. Only foot travel will be allowed on trails that spur off of the PHNST for additional access to other parts of the Featherstone Refuge. During snow events on the refuge, cross-country skiing, and snowshoeing will be allowed on all refuge trails that allow foot travel. Upon approval of the Comprehensive Conservation Plan, non-motorized boats (i.e. canoes and kayaks) will be allowed to land at one designated site along Farm Creek. Visitors arriving by boat will be allowed to walk along an existing approximately 0.4 mile footpath; only foot travel is allowed.

JUSTIFICATION:

These four priority public uses will provide compatible educational and recreational opportunities for visitors to enjoy the Refuge Complex resources, and improve their understanding and appreciation of fish and wildlife, ecology, refuge management practices, and the relationship of plant and animal populations in the ecosystem. Visitors will better understand the Service role in conservation and opportunities, issues, and concerns faced in management of our natural resources. Further, they will understand the impact that human presence, disturbance, and/or consumption can cause to these resources. Likewise, these four priority uses will provide opportunities for visitors to observe wildlife habitats firsthand, and learn about wildlife and wild lands at their own pace in an unstructured environment. Authorization of these uses will result in a wider constituency for achieving individual refuge goals and, ultimately, the Service mission. These activities will not materially interfere with or detract from the mission of the National Wildlife Refuge System or purposes for which Mason Neck, Occoquan Bay, and Featherstone Refuges were established.

SIGNATURE:

Refuge Manager: _____ 8-26-11
(Signature) (Date)

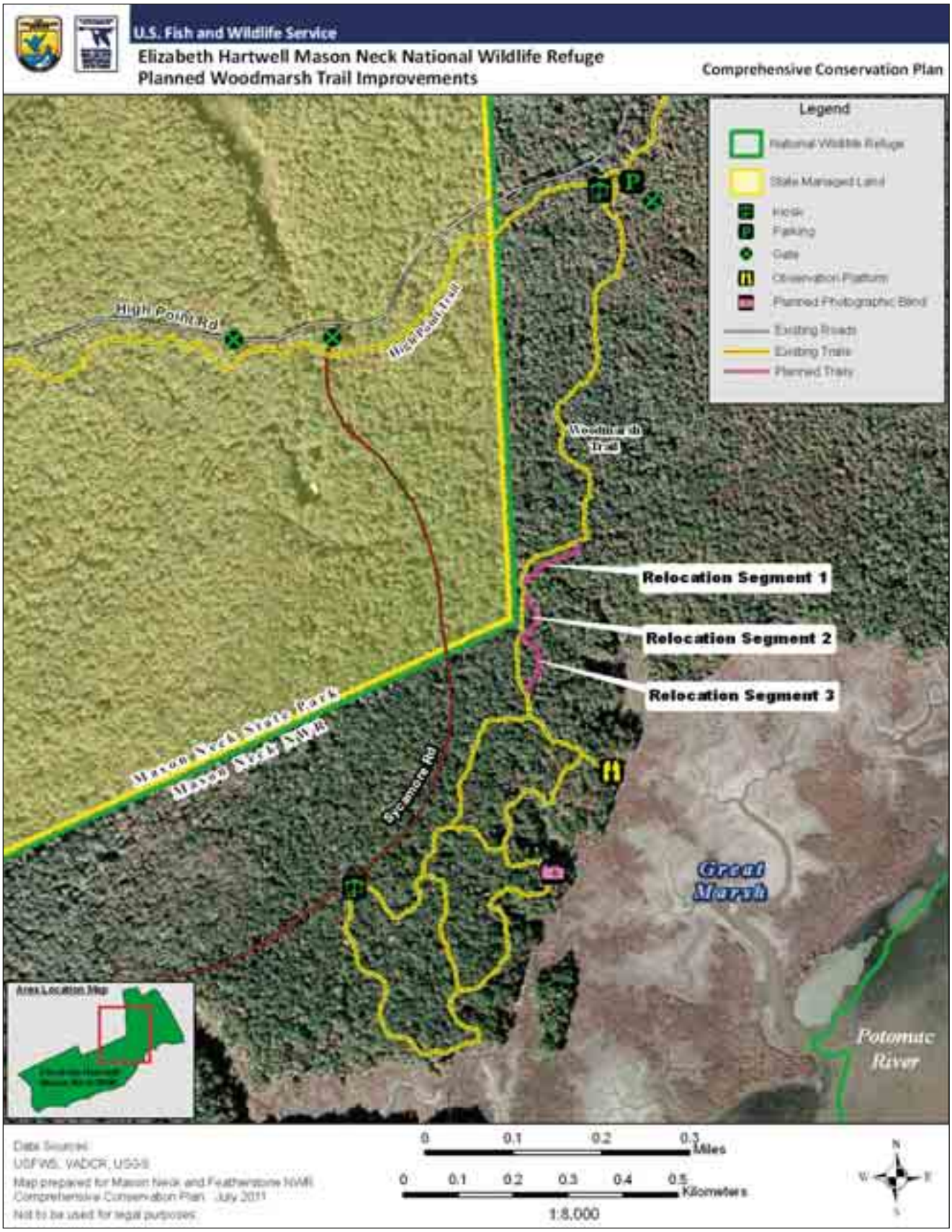
CONCURRENCE:

Regional Chief: _____ 9/1/2011
(Signature) (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE: 9/1/2026

Map B.1. Mason Neck Refuge Existing and Planned Public Use Features

Map B.2. Mason Neck Refuge Planned Woodmarsh Trail Improvements



Map B.3. Featherstone Refuge Planned Public Use Features

Map B.4. Occoquan Bay Refuge Public Use Features

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COMPATIBILITY DETERMINATION

USE:

Hunting

REFUGE NAME:

Elizabeth Hartwell Mason Neck and Occoquan Bay National Wildlife Refuges (Potomac River National Wildlife Refuge Complex)

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

The Potomac River National Wildlife Refuge Complex (Refuge Complex) is composed of three nationally significant wildlife areas: Mason Neck, Featherstone, and Occoquan Bay National Wildlife Refuges.

Each national wildlife refuge is established under specific legislation or administrative authority. Similarly, each refuge has one or more specific legal purposes for which it was established. The establishing legislation or authority and the purposes for each refuge in the Refuge Complex are provided below:

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Date Established: 1 February 1969

Establishing Authorities: Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge) was established under the Endangered Species Act (16 U.S.C. § 1534), the Refuge Recreation Act (16 U.S.C. § 460[k] – 460[k][4]), an Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b), and the Migratory Bird Conservation Act (16 U.S.C. § 715d).

Occoquan Bay National Wildlife Refuge
Date Established: 28 June 1998

Establishing Authorities: Occoquan Bay National Wildlife Refuge (Occoquan Bay Refuge) was established under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b).

REFUGE PURPOSE(S):

Elizabeth Hartwell Mason Neck National Wildlife Refuge
Purpose(s) for which Refuge was established: Lands acquired under the Endangered Species Act are "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species…. Or (B) plants …" (16 U.S.C. § 1534); lands acquired under the Refuge Recreation Act were found to be "… suitable for– (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 U.S.C. § 460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" (16 U.S.C. § 460[k] – 460[k][4]); lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b); and lands acquired under the Migratory Bird Conservation Act were "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. § 715d).

Occoquan Bay National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b)

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

"To administer a national network of land and waters for the conservation, management, and where appropriate, the restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)."

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?
The use is the hunting of white-tailed deer and turkey on the Refuge Complex. The National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), identifies hunting as one of the six priority wildlife-dependent recreational uses to be facilitated within the National Wildlife Refuge System. The Act encourages the Service to provide opportunities for these uses when compatible with the purposes for which the refuge was established.

(b) Where would the use be conducted?
Elizabeth Hartwell Mason Neck National Wildlife Refuge
The Mason Neck Refuge will be open for public hunting.

Deer hunting will take place within the refuge boundary. Buffer zones are included for all roads and refuge facilities. The refuge will be closed to all other public uses during scheduled deer (archery and shotgun) hunt days.

Youth turkey hunting will take place within the refuge boundary to the west of Sycamore Road. No public use trails will be closed during the turkey hunt.

Occoquan Bay National Wildlife Refuge
The Occoquan Bay Refuge will be open for public hunting.

Deer hunting will take place within the refuge boundary only from stationary hunt stands. The number of hunters permitted to occupy stands and the specific stand locations will be assessed after each hunting season and adjusted as necessary to meet deer management objectives.

(c) When would the use be conducted?
Dates would fall with Virginia's regulated seasons for the species mentioned. Specific dates in a given year would be coordinated with Virginia Department of Game and Inland Fisheries.

Elizabeth Hartwell Mason Neck National Wildlife Refuge
The deer hunt (shotgun) is currently conducted over the course of two consecutive days in late November and a third day in early December. Hunting days will only occur during Virginia's regulated seasons and hunt dates may vary annually based on management needs.

We plan to establish an archery deer hunt, which would be conducted during Virginia's regulated archery hunting season.

We plan to establish a youth turkey hunt, which would be conducted in partnership with Virginia Department of Game and Inland Fisheries and the National Wild Turkey Federation and occur on 3 days during the State's spring shotgun season, in accordance with Virginia's regulations. The hunt would be conducted from sunrise to noontime.

Occoquan Bay National Wildlife Refuge
The deer hunt is currently conducted for 3 days in December and 1 day in January; Virginia Department of Game and Inland Fisheries conducts a deer hunt for youth on a Saturday in December. Refuge deer management hunts take place over the course of two additional days in December and a third optional day in January. Hunting days will always occur during the Virginia Department of Game and Inland Fisheries State-regulated seasons and hunt dates may vary annually based on management needs.

(d) How would the use be conducted?

Elizabeth Hartwell Mason Neck National Wildlife Refuge White-tailed Deer Hunt (shotgun)

The refuge permits hunting within State guidelines in compliance with a hunt program that is adjusted each year to ensure safety and sound wildlife management. The Mason Neck Refuge has held an annual deer hunt since 1989. The shotgun deer management program is a cooperative effort with the Virginia Department of Game and Inland Fisheries and the State Department of Conservation and Recreation, Mason Neck State Park.

The management hunt has an application process, an orientation and firearm certification requirement, and provides for a scouting day prior to selected hunt days. Applications will usually be available during the first week of July and due the first week of October. Once applications have been received and input into a lottery database, selections are made by computer and selection notices are sent out to all hunters. All hunters must certify firearms expected to be used during the hunt prior to attending the orientation session (online or in-person). Once the firearm certification is verified and the prospective orientation session has been attended, hunters will then be allowed to purchase a hunt permit. Scouting usually occurs the first Sunday in November. Hunters selected for the shotgun management hunt have the opportunity to visit their assigned parking lot and scout areas in the hunting area.

On each hunt day, a maximum of 57 hunters are allowed to park within 10 available parking lots, the designated tree stand parking lot, and the mobility impaired hunting lots (1,730 acres). If a slot in a designated parking lot is not filled, a stand-by hunter (hunters that did not get selected for the current hunt day but have permits for other days of hunting) will be directed to those vacant parking slots on a first-come, first-serve basis.

This existing hunt is highly managed by refuge and Mason Neck State Park staff and volunteers. On each day of the hunt, after identification and certification cards have been checked and hunters have been checked-in, the hunters drive to designated parking lots. If deer have been harvested, hunters drive to the deer check station for data collection on harvested game. At that time, the hunters, depending on the harvested game, have an option to return to hunting or leave for the day. Throughout the day, until 3:00 PM, standby hunters have an option to fill vacant parking slots once a hunter has checked out.

Elizabeth Hartwell Mason Neck National Wildlife Refuge White-tailed Deer (archery)

The refuge permits hunting within State guidelines in compliance with a hunt program that we will adjust each year to ensure safety and sound wildlife management. The Mason Neck Refuge has held an annual deer hunt since 1989. As in the past, future plans include an archery component. The deer management archery program will be a cooperative effort with Virginia Department of Game and Inland Fisheries and other possible interested parties (e.g., Mason Neck State Park, Bureau of Land Management–Meadowood Recreation Area).

The management hunt has an application process, an orientation and archery certification course requirement, and provides for a scouting day prior to selected hunt days. Applications will usually be available during the first week of July and due as early as August. Once applications have been received and input into a lottery database, selections are made by computer and selection notices are sent out to all hunters. All hunters must attend an archery certification course prior to attending the orientation session (online or in-person). Once the archery certification is verified and the prospective orientation session has been attended, hunters will then be allowed to purchase a hunt permit. Scouting will be allowed before the first day of hunting. Hunters selected for the archery management hunt have the opportunity to visit their assigned parking lot and scout areas in the hunting area.

On each hunt day, a maximum of 30 hunters are allowed to park within the 10 available parking lots, the designated tree stand parking lot, and the mobility impaired hunting lots (1,730 acres).

Elizabeth Hartwell Mason Neck National Wildlife Refuge Youth Wild Turkey Hunt

We plan to provide an annual youth turkey hunt under the following guidelines:

- Complete all other administrative requirements for a new hunt as soon as determined practicable and resources are available. Ensure adequate funding and enough refuge staff and partners are in place to help coordinate and support hunt. Potential partners include Virginia Department of Game and Inland Fisheries and National Wild Turkey Federation.

- Implement the hunt during the State's spring turkey season. Only gobblers would be harvested. State regulations related to turkey hunting and bag limits will be strictly enforced.

- Allow up to a maximum of five youth per day, over a 3-day period. The three hunt days might not be consecutive. Each hunt day would be from sunrise to noontime.

- Locate youth hunt areas in pre-designated, well-distributed areas that are otherwise closed to the public to minimize user conflicts (so other refuge visitors are not affected). The pre-designated areas will be a safe distance away from all trails open to other refuge visitors.

- Require hunters to complete data forms to document their observations and hunt success.

Occoquan Bay National Wildlife Refuge White-tailed Deer Hunt
The refuge permits hunting within State guidelines in compliance with a hunt program that is adjusted each year to ensure safety and sound wildlife management. The Occoquan Bay Refuge has held an annual deer hunt since 2001. The deer management program is a cooperative effort with Virginia Department of Game and Inland Fisheries.

The Virginia Department of Game and Inland Fisheries Generations Deer Hunting Workshop is coordinated and facilitated by Virginia Department of Game and Inland Fisheries staff. The hunt has an application process, which includes a written essay and a firearm certification requirement. Applications are due to Virginia Department of Game and Inland Fisheries in October. Once applications have been received, selections are made based on submitted material. Emphasis is placed on encouraging youth with little to no hunting experience to participate. The hunt day involves a morning lecture on deer health and behavior and hunting safety, a mid-day break for lunch, and an afternoon of chaperoned hunting from deer stands.

The U.S. Fish and Wildlife management hunt has an application process, an orientation, and firearm certification requirement prior to selected hunt days. Applications will usually be available during the first week of July and due the first week of October. Once applications have been received and input into a lottery database, selections are made by computer and selection notices are sent out to all hunters. All hunters must certify firearms expected to be used during the hunt prior to attending the orientation session (online or in-person). Once the firearm certification is verified and the prospective orientation session has been attended, hunters will then be allowed to purchase a hunt permit.

On each hunt day, the number of hunters allowed on the refuge will be determined by the number of active stands deemed necessary to control the deer herd on 640 acres of the refuge. If hunt stands are not filled, the stand-by hunter (hunters that did not get selected for the current hunt day but have permits for other days of hunting) will be directed to vacant hunt stands on a first-come, first-serve basis.

This existing hunt is highly managed by refuge and Virginia Department of Game and Inland Fisheries staff and volunteers. On each day of the hunt, after identification and certification cards have been checked and hunters have been checked-in, the hunters are dropped off at designated hunt stands. If deer have been harvested, hunters are picked up and brought back to the deer check station for data collection on harvested game. At that time, the hunter, depending on the harvested game, have an option to return to hunting or leave for the day.

All Hunting Opportunities
All hunt zones and hunt boundaries will be posted with permanent and/or temporary markings including, but not limited to, orange carsonite posts, A-series refuge management personnel, and seasonally visible vinyl boundary flagging. Refuge and Mason Neck State Park law enforcement personnel, along with Virginia Department of Game and Inland Fisheries Game officials, will monitor the hunts for compliance with State Game laws and hunt-specific regulations. Organized drives by hunters to move deer into specific directions is deemed to be outside the spirit of the hunt. Hunts facilitated at the Occoquan Bay Refuge will be conducted using refuge stationary hunt stands. The use of hunt stands during the Mason Neck Refuge hunt is optional. The use of dogs is not permitted during any of the managed deer hunts. In addition, the use of rifles or crossbows will not be allowed.

(e) Why is the use being proposed?
White-tailed deer have a high reproductive potential. This potential, coupled with the declining acreage of quality habitat for them on Mason Neck Peninsula, necessitates the use of hunting to control or reduce the population. Biological sampling conducted during these hunts has indicated that the population levels have been stabilized by the hunting and that the overall health of the deer has improved. Though formal vegetation studies have not been conducted to determine changes in habitat, it is visually evident that the impacts attributed to the browsing of forest understory habitat by deer have decreased. The recovery of the understory has afforded certain wildlife with food and cover.

The shotgun deer hunts are conducted in the fall and winter when the neotropical migratory birds are absent and the northern migratory songbirds are not nesting. Any disturbances to these birds, waterfowl, and other wildlife are outweighed by the overall improvements to habitat from reducing the deer herd

Wild turkey hunting is a traditional outdoor pastime. When managed responsibly, it can instill a unique appreciation of wildlife, their behavior, and their habitat needs. We also recognize that we must be proactive in engaging young people in wildlife conservation stewardship of the environment if we are to maintain a legacy of abundant wildlife and healthy habitats for future generations. One way to do that is to offer quality opportunities for youth participation in hunting on our refuges.

Providing hunting will support one of the "Big 6" activities of the Improvement Act (Public Law 105-57) and, if compatible, is to receive enhanced consideration in refuge planning.

AVAILABILITY OF RESOURCES:

The Refuge Complex incurs the bulk of the cost for implementing the hunt program in staff time to administer the hunt each day and to coordinate with our partners. To expand hunting opportunities proposed in the Comprehensive Conservation Plan, there will be increased costs to post hunt boundary and staff additional days; however, this cost (included below) is within the existing budget and staff resources of the refuge.

Costs associated with administering this use include:

- Senior Refuge Biologist (GS-12) and/or GS-09 Refuge Biologist—4 weeks/yr. = **$6,954**
- Visitor Services Manager (GS-12) and/or GS-09 Refuge Operations Specialist—2 weeks/yr. = **$3,476**
- Deputy Refuge Manager (GS-11)—8 weeks/yr. = **$11,603**
- Refuge Manager (GS-14)—2 weeks/yr. = **$4,884**
- Law Enforcement Officer (GS-09)—2 weeks/yr. = **$2,398**
- Maintenance Worker (WG-10)—4 weeks for new hunt opportunities = **$4,408**; 2 week/yr. thereafter = **$2,204**
- Administrative Support Assistant (GS-7)—1 week/yr. = **$980**
- *In addition volunteer hours ranging from 200 to 250 hours contributing approximately $4,000.00.*

ANTICIPATED IMPACTS OF THE USE:

The management goals and objectives of the Refuge Complex, which includes Mason Neck, Occoquan Bay, and Featherstone Refuges, pertain to the preservation and enhancement of habitats for endangered species; management and protection of waterfowl and other migratory bird habitats; maintenance of a diversity of

habitats for indigenous species; and to provide areas for environmental education, research, and public use. Impacts from deer and turkey hunting and scouting opportunities may include the temporary displacement of non-target wildlife and minor impacts to vegetation from foot traffic.

Based on a nationwide survey of all states (Krausman 1992), deer were effectively controlled with hunting and habitat manipulation in many areas where they were overpopulated. The remaining overpopulated herds were either not hunted, had an inadequate doe harvest, or an inadequate general harvest. Because the population of deer in the refuge boundary area is open, with numerous tracts and corridors for movement and contact with other herds, it is unlikely that hunting will reduce the population to such low levels as to place it at risk of becoming genetically bottlenecked. Also, no prevention or control of epizootic hemorrhagic disease exists to date except by keeping populations below the carrying capacity of their habitats. In a 10-year study in northwestern Pennsylvania examining the impacts of varying densities of deer on deer health and habitat, starvation mortality resulted when densities reached higher than 25 deer per square kilometer (247 acres).

Species richness and abundance of shrubs and herbaceous vegetation was also shown to decline when deer densities reach between four to eight deer/km^2 (deCalesta and Stout 1997). Habitats subject to deer damage include forest understory and shrub habitat that migratory songbirds depend on for food resources. Heavily browsed vegetation leaves less food and cover habitat for neotropical migratory birds, a trust resource which the refuge is charged with protecting. Controlled hunting keeps the deer population within the carrying capacity of the habitat. Modifying the hunt program to further reduce the deer population would then reduce the browse effects on vegetation. This would enable the forest understory to grow and produce more food and cover for neotropical migrants. It would also provide additional food and cover for species such as small mammals, reptiles, and invertebrates.

The impacts of dense deer populations on forest regeneration and the composition and diversity of the herbaceous understory have been well documented (Tierson, et al., 1966; Behrend, et al., 1970; Tilghman, 1989).

At high densities, deer may act as a host reservoir for Lyme-disease bearing ticks (Jones et al. 1998). Reducing the deer population will reduce the potential for Lyme disease transmission. Based on these considerations, it is anticipated that hunting would have a positive impact on deer health and quality and habitat condition. Reducing the deer population will also benefit the surrounding human community by reducing damage on crops and residential landscape vegetation. No adverse impacts to vegetation from trampling from hunters are likely, as most species will have already undergone biological aging or become dormant. Soil and water quality are not expected to experience any negative effects.

During the shotgun deer hunt timeframe, populations of most migratory birds are low. Some disturbance occurs to waterfowl, but it is offset by the benefits of a healthy deer herd that is smaller and is not consuming large quantities of waterfowl food plants. Disturbance to endangered species has not been noted in 18 years of hunting. A Section 7 consultation was prepared and approved on the hunt program in 1989. The deer hunt would occur outside of the breeding period of most species, thereby avoiding any potential disturbance. No adverse effects on migratory birds or inter-jurisdictional fishes are anticipated as a result of establishing a hunt program. Wintering or resident birds, small mammals, and reptiles may experience some flushing, but there is ample cover in the form of marsh, hedgerows, shrubland, and tall grasses for flushed wildlife to repair to, therefore it is expected that this disturbance will be temporary and normal use will resume shortly after the hunt closes each day.

Each refuge is completely closed to the public during the managed deer hunts. Though this is an inconvenience for the general refuge visitor, hundreds of individuals who do not visit the refuge on a regular basis are afforded an opportunity to participate in a wildlife-dependent activity and expand their knowledge and skills in wildlife observation and biology.

We do not predict any short-term or long-term impacts from the 3-day turkey hunt on the viability of the local turkey population (VDGIF personal communication 2011). Only males would be taken during the hunt, which occurs after the breeding season. We also anticipate fewer than 10 turkeys would be harvested annually.

According to Virginia Department of Game and Inland Fisheries and their results from other hunt areas, less than 50 percent of youth turkey hunters are successful. This statistic, coupled with the fact that only males would be taken in the spring after breeding, causes us to predict that there would be no short-term or long-term impact, or cumulative effect, on the viability of the local turkey population. This conclusion was substantiated in discussions with Virginia Department of Game and Inland Fisheries wildlife officers (VDGIF personal communication 2011).

No public use trails will be closed during the turkey hunt. All hunting activities will take place on remote portions of the refuge with ample buffers to ensure the safety of the general public and the avoidance of encounters with individuals carrying firearms or carrying killed game.

Hunters benefit from the harvesting of game for personal consumption. Hunters who come from outside the local area also contribute to the local economy by staying at local hotels and eating in local restaurants.

We do not expect a substantial increase in the cumulative effects of visitor use over the 15-year timeframe of this plan. Staff, in collaboration with volunteers, will monitor and evaluate the effects of these priority public uses to discern and respond to any unacceptable impacts on wildlife or habitats. To mitigate those impacts, the Refuge Complex will continue to close areas to the public to protect wildlife during critical life periods.

PUBLIC REVIEW AND COMMENT:

As part of the Mason Neck and Featherstone Refuges Comprehensive Conservation Plan process, this compatibility determination was released for a 49-day public review and comment period following the release of the draft Comprehensive Conservation Plan and Environmental Assessment.

DETERMINATION (CHECK ONE BELOW):

____ Use is not compatible

__X__ Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The hunt program would be managed in accordance with Federal and State regulations. The deer hunt would be reviewed annually to ensure deer management goals are achieved. Both the deer and turkey hunts would be reviewed annually to ensure the program is providing a safe, high quality hunting experience for participants. The Annual Hunt Plan must be approved by Regional Office supervisors. Hunt season dates, limits, and/or number of hunters per day would be adjusted as needed to achieve balanced wildlife population levels within carrying capacities.

Each refuge will be closed to all other public uses during the scheduled deer (shotgun and archery) hunt days. To mitigate user conflicts that arise when we close the refuge to other public use, we would issue news releases and post information at the visitor center and informational kiosks to notify visitors of closings. We maintain safe deer and turkey hunts by limiting the number of hunters per day and by establishing a buffer zone around refuge residence buildings. All deer hunting applicants are sent an information packet detailing specific dates, details, and requirements for the hunt, including, but not limited to: hunt dates, hunt areas, bag restrictions, firearm certification requirements and locations, orientation dates/times, scouting date(s), check station location, and maps.

All deer hunters must adhere to the following stipulations in addition to State regulations:

1. You must possess and carry a refuge permit.
2. We select hunters by lottery using the Quota Deer Hunt Application Form. Contact the refuge office for information on application dates.
3. Hunters must certify/qualify weapons and ammunition and attend an orientation session or take the orientation session online prior to issuance of a permit. Please contact the refuge for the online orientation web address.
4. Hunters must stay in designated areas and report harvest as outlined in the hunt information packet sent in response to refuge permit application.
5. Hunters must wear a minimum of 400 square inches of visible solid hunter-orange clothing and a hunter-orange hat.
6. We may close areas of the refuge to hunting. We will identify these areas on the maps in the information packet and review them during orientation.

All youth turkey hunters must adhere to the following stipulations in addition to State regulations:

1. You must possess and carry a refuge permit. Contact the refuge office for information on permit application dates and requirements.
2. Hunters can only harvest gobblers and only by shotgun.

JUSTIFICATION:

Hunting is a wildlife-dependent priority public use with minimal impact on refuge resources. Hunting is consistent with current Service policy on hunting, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System. Hunting will not materially interfere with or detract from the purposes of the refuge or the mission of the National Wildlife Refuge System. The refuge currently is meeting deer management and visitor services objectives.

SIGNATURE:

Refuge Manager: _____ 8-26-11
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____ 9/1/2011
(Signature) (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE: 9/1/2026

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COMPATIBILITY DETERMINATION

USE:

Fishing

REFUGE NAME:

Featherstone and Occoquan Bay National Wildlife Refuges (Potomac River National Wildlife Refuge Complex)

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

The Potomac River National Wildlife Refuge Complex (Refuge Complex) is composed of three nationally significant wildlife areas: Mason Neck, Featherstone, and Occoquan Bay National Wildlife Refuges. This compatibility determination covers both Featherstone National Wildlife Refuge (Featherstone Refuge) and Occoquan Bay National Wildlife Refuge (Occoquan Bay Refuge).

Each national wildlife refuge is established under specific legislation or administrative authority. Similarly, each refuge has one or more specific legal purposes for which it was established. The establishing legislation or authority and the purposes for each refuge in the Refuge Complex are provided below:

Featherstone National Wildlife Refuge
Date Established: 23 February 1970

Establishing Authorities: Featherstone Refuge was established under Public Law 91-499 (1970).

Occoquan Bay National Wildlife Refuge
Date Established: 28 June 1998

Establishing Authorities: Occoquan Bay Refuge was established under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes (16 U.S.C. § 667b).

REFUGE PURPOSE(S):

Featherstone National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under Public Law 91-499 (1970) were established to "... to protect the natural features of a contiguous wetland area." Public Law 91-499 (1970), dated Oct. 22, 1970.

Occoquan Bay National Wildlife Refuge
Purpose(s) for which refuge was established: Lands acquired under the Act Authorizing the Transfer of Certain Property for Wildlife, or other purposes were established for their "… particular value in carrying out the national migratory bird management program." (16 U.S.C. § 667b)

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

"To administer a national network of land and waters for the conservation, management, and where appropriate, the restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)."

DESCRIPTION OF USE:

(a) What is this use? Is it a priority public use?
The use is freshwater fishing, which is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would the use be conducted?
Featherstone National Wildlife Refuge
Fishing is proposed as a use for the refuge at designated fishing platforms along the shoreline on Farm Creek, Neabsco Creek and/or Occoquan Bay. It is proposed that up to four fishing platforms would be constructed in designated locations on the refuge. The platforms will be 16' x 20' and will be able to accommodate no more than 10 people per platform. Fishing is prohibited in the refuge at any other area.

Occoquan Bay National Wildlife Refuge
Fishing is proposed as a use for the refuge at the Painted Turtle Pond location along the shoreline of the pond and the dock adjacent to the pond. The Painted Turtle Pond will serve environmental education, special event, and fishing uses. Environmental education and special events will have priority over fishing uses. In the event that an environmental education visit or special event is planned, the pond would be closed to fishing for its duration.

(c) When would the use be conducted?
Featherstone National Wildlife Refuge
The refuge is proposed to be open to public fishing during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). The process of opening each location will be phased-in as official fishing locations are designated, the appropriate signage is installed, and gates or other measures to control access and ensure safety, quality, and compatibility are implemented. If law enforcement problems arise or if litter and equipment debris issues become too great, we may limit hours or otherwise restrict access to specific fishing locations. A temporary closure to these activities would be implemented during any scheduled refuge hunt dates.

Occoquan Bay National Wildlife Refuge
The refuge is proposed to be open to public fishing during refuge hours of operation (typically April 1–September 30 from 7:00 AM to 7:00 PM and October 1–March 31 from 7:00 AM to 5:00 PM). The process of opening the pond as an official fishing location will be implemented. The pond will be available for use once the opening package has been completed. Other measures will be implemented to ensure safety, quality, and compatibility—signage installation and access control. If law enforcement problems arise or if litter and equipment debris issues become too great, we may limit hours or otherwise restrict access to the pond. A temporary closure to these activities would be implemented during any scheduled refuge hunt dates

(d) How would the use be conducted?
Featherstone National Wildlife Refuge
Visitors are free to fish from designated platforms, as this activity is deemed wildlife oriented and is promoted within the U.S. Fish and Wildlife Service nationwide. Visitors are required by Virginia regulations to maintain a current fishing license (unless exempt), except for the "Virginia Free Fishing Weekend," and follow all Virginia fishing regulations. The refuge will impose stricter regulations as deemed necessary to protect fish and wildlife populations on refuge lands. Visitors may utilize a rod and reel or hook and line only when fishing. No lead sinkers will be permitted.

While the refuge allows fish to be removed from these areas, catch and release will be promoted to the fisherman using these areas. Visitors will supply their own fishing gear, bait, and access to the open areas.

Occoquan Bay National Wildlife Refuge
Visitors are free to fish the pond, as this activity is deemed wildlife oriented and is promoted within the U.S. Fish and Wildlife Service nationwide. Visitors are required by Virginia regulations to maintain a current fishing license (unless exempt), except for the "Virginia Free Fishing Weekend," and follow all Virginia fishing regulations. The refuge will impose stricter regulations as deemed necessary to protect fish and wildlife

populations on refuge lands. Visitors may utilize a rod and reel or hook and line only when fishing. No lead sinkers will be permitted. Live minnows or other small live fish will not be allowed as bait.

While the refuge may allow some fish to be removed from the pond, largemouth bass will be catch and release only to maintain the existing health and productivity of the fisheries. Visitors will supply their own fishing gear and bait.

(e) Why is this use being proposed?
This use is being proposed by the refuge to accommodate one of the priority public uses of the Refuge System. There is a scarcity of public fishing opportunities in Northern Virginia and this coupled with an increasing demand for access to recreational waters are the reasons we are pursuing this opportunity at the refuge. The 2007 Virginia Outdoors Plan states that over 50 percent of Virginians felt the most needed outdoor recreation opportunities include public access to waters for fishing. It further states that fishing was ranked as the seventh most popular outdoor recreational activity in Virginia and expressed a need to increase access to fishing locales to address increases in demands.

Featherstone National Wildlife Refuge
Fishing is currently taking place on the refuge in an illegal manner. The use has been deemed appropriate on the Featherstone Refuge. The use will not be able to occur unless access issues can be worked out. The use is being proposed to address the needs of our constituency and enhance visitor experience. Refuge expenses would include infrastructure development, already existing standard law enforcement patrols to verify regulations are being followed, and additional signage for information purposes. This use supports wildlife dependent recreation as outlined in the Refuge System Improvement Act of 1997.

Occoquan Bay National Wildlife Refuge
The use is being proposed to address the needs of our constituency and enhance visitor experience. Refuge expenses would include already existing standard law enforcement patrols to verify regulations are being followed and additional signage/brochures for information purposes. This use supports wildlife dependent recreation as outlined in the Refuge System Improvement Act of 1997.

AVAILABILITY OF RESOURCES:

Permitting the general fishing use is not within the resources available to administer our Visitor Services Program. The funding received by the refuge is not adequate to administer this program and to ensure that the use remains compatible with the refuge purposes. The use of the area specified for fishing is a small area, where cost effective administration of the program can occur after the infrastructure has been developed and constructed. Compliance with fishing regulations is handled within the regular duties of the refuge law enforcement officer.

The visitor services manager is available for public outreach. A park ranger will monitor visitor use and user interactions. Maintenance staff performs the regular maintenance and repairs. Permitting the general fishing use is not within the resources available to administer our visitor services program. The funding received by the refuge is not adequate to administer this program and to ensure that the use remains compatible with the refuge purposes. The use of the area specified for fishing is a small area, where cost effective administration of the program can occur after the infrastructure has been developed and constructed. Compliance with fishing regulations is handled within the regular duties of the law enforcement officer.

Costs associated with administering this use include:

- Law Enforcement Officer (GS-09)—2 weeks/yr. = **$2,398**
- Trail and Platform development and construction = **$200**K est.

Additional staff needs and costs are anticipated with the addition of trails and activities within the Refuge Complex. It will be necessary to hire a Visitor Services Manager (GS-11/12), Park Ranger (GS-5), Maintenance Worker (WG-9) and Maintenance Worker (WG-6) to compliment current staffing. The visitor services manager

will be available for public outreach and to facilitate the development of the fishing program on the refuges. The Park Ranger will monitor visitor use and aide in facilitating the fishing program. Maintenance staff will perform the regular maintenance duties and repairs that relate to the fishing program.

Costs associated with administering additional uses include:

- Visitor Services Manager (GS-12)—6 weeks/yr. = **$8,407**
- Maintenance Worker (WG-9)—4 weeks/yr. = **$5,750**
- Maintenance Worker (WG-6)—4 weeks/yr = **$4,677**
- Park Ranger (GS-5)—6 weeks/yr. = **$4,264**

ANTICIPATED IMPACTS OF THE USE:

While the day-to-day activity of fishing does cause the death of fish if removed from the refuge, there are still little significant impacts from the use. While some fish are lost to the system forever, they are renewable resources that reproduce on their own. There is also little significant impact on migratory birds due to the small number of fish that are removed from the refuge through the public fishing program, and while fishing may cause other wildlife disturbances, these impacts are minimal due to the stationary nature of anglers.

Foot travel to fishing areas will occur on established trails. Trail use can disturb wildlife outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where common species (i.e., American robins) were found near trails and rare species (i.e., grasshopper sparrows) were found farther from trails. Songbird nest failure was also greater near trails (Miller et al. 1998).

Humans walking off trail have been shown to cause greater disturbance (greater area of influence, flush distance, and distance moved) to wildlife than walking within trail corridors (Miller et al. 2001). Predictability of disturbance (on trail vs. off trail) has been cited as a major factor in impacts to wildlife. Walking off trail is considered less predictable to wildlife and typically more disruptive (Knight and Cole 1991, Trails and Wildlife Task Force 1998, Miller et al. 2001). Requiring anglers to use designated public use trails to access fishing areas will help limit this type of disturbance.

Potential Impacts to Birds: An indirect benefit to upland habitats and associated species would derive from careful, strategic management of this fishing program. Public awareness and appreciation of the refuge, its habitats, and resources would inspire some to volunteer or in other ways support the refuge needs and conservation of resources on the landscape in general. Increases in annual visitor numbers during the daytime (public use sites would be open during refuge-specific operation hours) will surely result from constructing fishing piers, installing informational kiosks at Featherstone Refuge, opening Painted Turtle Pond at Occoquan Bay Refuge, and other planned activities described herein, although it is difficult to predict a frequency or rate. Visitors at these sites may flush rafting waterfowl or eagles hunting the marshes within view of a trail, launch, or pier, although we anticipate that in the winter public use at these locations would be minimal, at least in the early years after opening.

Higher rates of public use would occur during the warmer months, when most waterfowl are on northern breeding grounds. Wetland species likely to be disturbed and flushed during the warmer months include bald eagle (fewer than in winter), belted kingfisher, mallard, great blue heron, and basking turtles. The sites are not particularly sensitive, rare, or in close proximity to nest areas, and there are protected and secluded areas nearby where disturbed wildlife can retreat to. Disturbance is therefore anticipated to be minor, temporary, and infrequent. Paths from parking areas to fishing access have the potential to disturb forest interior dwelling bird species at Featherstone.

Direct impacts on wildlife in the form of disturbance can be expected wherever humans have access to an area, and the degree may vary depending on the habitat type. In general, human presence disturbs most wildlife, which typically results in a temporary displacement without long-term effects on individuals or populations. Some species, such as wood thrush, will avoid areas frequented by people, such as developed trails and structures, while other species, particularly highly social species such as eastern tufted titmouse, Carolina chickadee, or Carolina wren, seem unaffected or even drawn to a human presence. When visitors approach too closely to nests, they may cause the adult bird to flush exposing the eggs to weather events or predators. Provided that visitor use is confined to designated areas, disturbance during the breeding season will be limited to those areas.

Overall, direct impacts from access to fishing areas would be greatly reduced if facilities avoid area-sensitive habitats (interiors of grasslands and forests). A potential direct negative impact exists for wetland and open waterbird species (such as osprey, herons, and waterfowl) from lost fishing gear; specifically, hooks, lures, and litter, or becoming entangled in fishing line or hooks. Ingestion of lead sinkers is another source of concern throughout the region, but use of lead sinkers is not permitted at the refuge. The extent to which these bird species are impacted by fishing tackle currently is unknown. We will continue to work with our fisheries assistance office and the State in implementing a public education and outreach program on these issues. Increased law enforcement is also planned.

Potential Impacts to Threatened and Endangered Species: Despite their removal in 2006 from the Federal List of Endangered and Threatened Species, we included bald eagles in this section due to the fact they are a focal species within the region and because of the extra protection they are afforded under the Bald and Golden Eagle Protection and Migratory Bird Acts. Permitting public access to any waterfront or marsh managed by the refuge holds the possibility of impacting bald eagles. Impacts may either be displacement or temporary disturbance, depending on the extent of use of a given site by visitors and eagles. As trees mature and forest riparian buffers are improved, sites with low concentrations will likely increase in importance to bald eagles. We will avoid potential adverse impacts to bald eagles by strictly following the management guidelines developed by Federal and State agencies. These include sight and distance setbacks from nests and concentration areas, and time-of-year restrictions.

Potential Impacts to Wetlands: Potential adverse impacts to wetlands could arise if facilities were improperly placed in wetland habitats, if public use were allowed to occur directly in wetlands, or if erosion of sediments into wetlands was allowed to occur during facility construction. The only facilities proposed for construction in wetlands are the fishing docks at Featherstone. Construction of these facilities will cause temporary and minimal (less than 0.01 acre) impacts to wetlands. We will employ silt fencing and other best management practices during construction of any facilities in proximity of wetlands to avoid runoff of sediments. Many of our interpretive messages included on kiosk panels remind visitors of the importance of wetlands and the many beneficial functions they provide to society, including wildlife habitat, flood protection, groundwater recharge, and nutrient uptake.

Potential Impacts to Other Fish and Wildlife: Direct impacts on wildlife in the form of disturbance can be expected wherever humans have access to an area, and the degree may vary depending on the habitat type. In general, human presence disturbs most wildlife, which typically results in a temporary displacement without long-term effects on individuals or populations. Major concerns of any refuge fishing program are accidental or deliberate introductions of non-native fish (used for bait), accidental introduction of invasive plants, pathogens, exotic invertebrates attached to fishing boats, and over-harvesting. The refuge does not permit use of live minnows in order to prevent the likelihood of introductions of non-native fish. Another common concern is the reduction or alteration of prey base important to fish-eating wildlife. Refuge-specific regulations address this concern by limiting bass fishing to catch and release only at Painted Turtle Pond on Occoquan Bay Refuge. The current fishing program of the refuge follows the Virginia State regulations and would adopt any State harvest limits that should become applicable to the fish species in this pond. These limits are set to ensure that harvest levels do not cumulatively impact native fish resources to the point they are no longer self-sustainable. We also follow recommendations of Service fisheries biologists who conduct periodic sampling of this refuge pond. We plan to continue to work with State conservation officers in implementing a public education and outreach program, and increased law enforcement is also planned to address the above concerns.

Mammals in Virginia occupy a diverse array of habitat types, including wetlands on Featherstone and Occoquan Bay Refuges where fishing may occur. As a taxonomic group, mammals will also benefit from the refuge land protection and management actions relative to riparian habitats, forests, grasslands, shrub, and wetlands proposed for listed species, waterfowl, and migratory birds. Likewise, the refuge will benefit from careful attention to the impacts to mammals resulting from any of its activities. We evaluated the management actions proposed for this use for their potential to benefit or adversely affect large and small, aerial, terrestrial, and wetland mammals and believe that they should have no long-term impact on mammal use of the refuge.

Protection and good stewardship of the area's native mammals and herpetofauna is another priority of the refuge, and supports our goals and objectives for wetlands, uplands, and riparian habitats. We evaluated fishing for its potential to benefit or adversely affect mammals, amphibians, and reptiles or their habitats used for mating, reproduction, over-wintering, and foraging. Most of the mammal, amphibian, and reptile species that occur on the refuge are very common and widespread. However, one species of particular concern to us is the eastern box turtle. In addition, amphibians everywhere are considered to be experiencing a general decline. Our fishing programs would only occur in designated areas closely monitored to ensure no habitat degradation occurs. These designated areas would not be placed in or near any sensitive habitat areas, such as vernal pools, to reduce impacts to mammals, amphibians, reptiles, and other native wildlife.

Sometimes maintenance actions for public use may involve preparations or outcomes that have direct negative impacts to native wildlife, including mammals, amphibians, and reptiles. Mowing of grassy access roads and public use trails that lead to these proposed fishing areas occasionally destroys small mammals, turtles, snakes, or frogs, if conducted during times of movement (warm months). The best way to minimize this direct type of negative impact is to keep public use and access roads mowed short so that they do not become attractive habitat. However, in many cases it will be impossible to find a perfect time to carry out maintenance actions that will completely avoid conflict for wildlife. Construction of gravel parking areas and trails leading to the fishing areas pose the potential threat of blocking access between different habitat types, depending on the placement, length, width, and substrate material of the lot and trails leading to the fishing sites. Some salamander species will not cross openings that are too wide or dry, bare ground (Vinson 1998), thus earthen trails, if exposed to sunlight, could become dry enough to form a barrier.

Gravel roads or trails, even though permeable, may also act as a barrier to salamander movement (Marsh et al. 2005). The planned graveled trails are for access and will therefore be located on level terrain, avoiding ravines, which are home to amphibians and reptiles. At most, these trails will be no more than 2 miles in length at Occoquan Bay Refuge and 4 miles in length at Featherstone Refuge, and their widths no more than 6 feet. Disturbance to basking or nesting turtles may occur where public use is concentrated at points where land and water interface. Other walking trails will be simple cleared paths and perhaps mulched in some locations, but these too will avoid moist ravines close to amphibian habitat.

Disturbance to basking or nesting turtles may occur where public use is concentrated at points where land and water interface. Fishing at Featherstone Refuge will occur in areas such as these. Basking turtles can usually find alternate resting surfaces. Nesting turtles, once engaged in the act of digging, usually will not allow their attention to be drawn to anything else, and at such time are vulnerable to predators. A turtle wishing to make landfall to attempt egg-laying, however, may be dissuaded by the presence of humans at the site. Because there will be ample wetland-forest-grassland interface elsewhere, we expect that the cumulative impact of parking lots, roads, and trails to amphibians and reptiles at the landscape scale will be insignificant.

We do not expect a substantial increase in the cumulative effects of visitor use over the 15-year timeframe of this plan. Staff, in collaboration with volunteers, will monitor and evaluate the effects of these priority public uses to discern and respond to any unacceptable impacts on wildlife or habitats. To mitigate those impacts, the Refuge Complex will continue to close areas to the public to protect wildlife during critical life periods.

PUBLIC REVIEW AND COMMENT:

As part of the Elizabeth Hartwell Mason Neck and Featherstone Refuges Comprehensive Conservation Plan process, this compatibility determination was released for a 49-day public review and comment period following the release of the Draft Comprehensive Conservation Plan and Environmental Assessment.

DETERMINATION (CHECK ONE BELOW):

____ Use is not compatible

__X__ Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- State and refuge-specific fishing regulations will apply.
- Cooperate with Virginia Department of Game and Inland Fisheries to implement angling regulations and management actions.
- Maintain closed areas which allow for migratory birds to still feed.
- No motorized access for fishing will be allowed.

JUSTIFICATION:

Fishing is an appropriate, wildlife-dependent use of refuge resources. It has been a longstanding tradition in the Region, and while the refuge is proposing to maintain areas open to public fishing, it still maintains certain areas will remain closed. These closed areas assist in providing the quality food source for migratory waterbirds that depend on fish for survival.

The U.S. Fish and Wildlife Service and Featherstone Refuge promote fishing as a viable wildlife oriented recreational activity. These proposed areas will provide an opportunity to educate children on how to fish, provide for an opportunity to learn about nature, the National Wildlife Refuge System, and enhance ethical fish behavior at a young age. This activity can also build or strengthen a bond between friends and family and enhance both individual's knowledge about the natural ecosystem provided and why it is important to protect them.

SIGNATURE:

Refuge Manager: _____ (Signature) 8-26-11 (Date)

CONCURRENCE:

Regional Chief: _____ (Signature) 9/1/2011 (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE: 9/1/2026

LITERATURE CITED:

Knight, R. L., and D. N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the 56th North American Wildlife and Natural Resources Conference pp. 238-247.

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Appendix C

Dave Menke

Northern flicker

Refuge Operations Needs System (RONS) and Service Asset Maintenance Management System (SAMMS)

Refuge Operation Needs System (RONS) and Service Asset Maintenance Management System (SAMMS)

The refuges' budget requests contained in the Refuge Operating Needs System (RONS) and Service Asset and Maintenance Management System (SAMMS) databases include a wide variety of new projects and maintenance needs. The RONS and SAMMS lists are regularly updated to include priority projects. Contact the refuge for the most current RONS and SAMMS lists.

Table C.1. Projects Currently Listed in, or Proposed for, the RONS Database for Mason Neck and Featherstone Refuges

Station Rank	Project Description	Estimated Cost ($1,000)/FTE*
Projects for Mason Neck Refuge		
1	Develop a multi-refuge biological program (hire Wildlife Biologist GS-0486-11/12)	$123/1.0
2	Develop Forest Management Plan	$120/None
3	Expand the visitor services program (hire Park Ranger GS-0025-7)	$83/ 1.0
4	Invasive species mapping	$50/None
5	Archaeological site inventory	$50/None
6	Provide visitor, resource, and facility protection (Law Enforcement GL-0025-9)	$150/1.0
7	Improve condition of refuge habitat and facilities (hire Maintenance Worker WG-4749-6 PT)	$30/0.5
8	Improve refuge operations and response to public contacts (hire Administrative Support Assistant GS-0303-5)	$67/1.0
9	Improve refuge outreach and public communications (hire Park Ranger, Outreach Specialist GS-0025-9/11/12)	$147/1.0
Projects for Featherstone Refuge		
1	Forest health and condition assessment	$60/None
2	Invasive species mapping	$30/None
3	Provide visitor, resource, and facility protection (Law Enforcement GL-0025-9)	$150/1.0

**Note: FTE= Full time equivalent (e.g. full-time staff position)*

Table C.2. Projects Currently in, or Proposed for, the SAMMS Database for Mason Neck and Featherstone Refuges

Project Description and Project Work #	Estimated Cost (1,000s)	Refuge
Construct Connector Trail (#00123804)	$260	Mason Neck Refuge
Construct refuge housing (#15139890)	$450	Mason Neck Refuge
Rehabilitate Anchorage and Anchorage Fire Roads (#88104920)	$86	Mason Neck Refuge
Rehabilitate Old Barn Road Connection (#98104914)	$132	Mason Neck Refuge
Replace environmental education pavilion (#98104913)	$33	Mason Neck Refuge
Repair damaged boat ramp at shop (#00104819)	$28	Mason Neck Refuge
Replace Sycamore Road/Trail information panels (#00104818)	$16	Mason Neck Refuge
Replace other trail information panels (#98104919)	$27	Mason Neck Refuge
Rehabilitate Featherstone Access Road (#2009943799)	$100	Featherstone Refuge
Rehabilitate eroding shoreline and bulkhead 300 linear feet on Mason Neck Refuge (Phase I) (#2007732574)	$500	Mason Neck Refuge
Rehabilitate eroding shoreline and bulkhead on Mason Neck Refuge (Phase II) (#2007732576)	$690	Mason Neck Refuge
Construct trailer pad and facilities hookup for seasonal temporary volunteers	$30	Mason Neck Refuge
Upgrade water control structure to improve management capability	$144	Mason Neck Refuge
Improve Woodmarsh Trail (realignment to higher ground) and reconfigure to bypass sensitive eagle area	$25	Mason Neck Refuge
Improve Woodmarsh Trailhead and parking	$200	Mason Neck Refuge
Develop a trail from Woodmarsh Trail to end of Sycamore Road	$150	Mason Neck Refuge
Install State highway directional trailblazer signs to the refuge on I-95 and US Route 1 (Estimate of 4 signs)	$20	Mason Neck Refuge
Assist in installing interpretive panels at key locations	$6	Featherstone Refuge
Total	**$2,897**	

Appendix D

Bill Wallen

Heron nests at Mason Neck Refuge

Endangered Species Act and National Historic Preservation Act Consultation Documents

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

[Note: This form provides the outline of information needed for consultation or conference. If more space is needed, attach additional sheets, or set up this form to accommodate your responses.]

Originating Person: Greg Weiler **Signature:** G Weiler
Telephone Number: 703-490-4979
Date: April 27, 2011

I. **Region:** Region 5 – Northeast

II. **Service Activity (Program)** – National Wildlife Refuge System, Potomac River National Wildlife Refuge Complex, Featherstone National Wildlife Refuge Comprehensive Conservation Plan

III. **Pertinent Species and Habitat:**

A. **Listed species and/or their critical habitat within the action area**

Sensitive Joint-Vetch *(Aeschynomene virginica)* – Not currently known on refuge

B. **Proposed species and/or proposed critical habitat within the action area**

None

C. **Candidate species within the action area:**

None

IV. **Geographic area or station name and action:**

Featherstone National Wildlife Refuge, Comprehensive Conservation Plan

V. **Location (attach map):**

A. **Ecoregion Number and Name:** Chesapeake Bay Lowlands #58

B. **County and State:** Prince William County, Virginia

C. **Section, township, and range (or latitude and longitude):** See location map

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D. **Distance (miles) and direction to nearest town:** See location map

E. **Species/habitat occurrence:** See habitat map

VI. **Description of proposed action (attach additional pages as needed):**

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, requires that all national wildlife refuges complete a Comprehensive Conservation Plan (CCP) by fiscal year 2012. In addition, compliance with the National Environmental Policy Act of 1969 requires the completion of an Environmental Assessment (EA). An EA accompanied the draft CCP for Elizabeth Hartwell Mason Neck (Mason Neck) and Featherstone national wildlife refuges (NWRs) which was distributed for a 30-day internal agency review in July 2010, followed by a public review and comment period from January 5 to February 22, 2011. We identified alternative B as the Service-preferred alternative.

The draft CCP/EA document is available online at: *http://www.fws.gov/northeast/planning/MasonNeck_Featherstone/draftccp.html*. The Mason Neck and Featherstone NWRs CCP/EA explains the refuge's purposes, vision, and goals, describes the affected environment of the refuge at the time of the CCP/EA's writing, offers 2 management alternatives for Featherstone NWR, describes the environmental consequences predicted from implementing these management alternatives, and summarizes the refuge's consultation and coordination with others during the CCP/EA planning process.

References to sensitive joint-vetch occur on the following pages: 1-30, 2-49, 2-51, 3-83, and 3-95.

The final CCP for Featherstone NWR will serve to guide refuge management decisions over the next 15 years. We are preparing the final CCP for the Regional Director with the recommendation to adopt alternative B. In response to public comments, the only modification from the draft CCP/EA alternative B that we recommend is the allowance for landing of canoes and kayaks on the shoreline along Farm Creek at the proposed southern-most observation deck and fishing area (see public use map). No additional infrastructure would be developed for this activity.

VII. **Determination of effects:**

A. **Explanation of effects of the action on species and critical habitats in items III.A, B, and C (attach additional pages as needed):**

Currently, no Federal-listed plants have been documented on Featherstone NWR. According to the Virginia Department of Conservation and Recreation (VDCR) in their

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comments on the draft CCP/EA (letter to Nancy McGarigal, dated February 16, 2011), there is the potential for sensitive joint-vetch to occur on the refuge.

Some habitat management actions and public use opportunities proposed in the CCP could impact potentially suitable habitat for this species. Currently, Featherstone NWR is closed to public activity. In the CCP, we are proposing to open the refuge to the public, including establishing designated trails on existing footpaths and old road beds for wildlife observation, photography, interpretation, and for fishing at designated locations. Enhancing existing footpaths for long term use and unauthorized off trail use could result in vegetation trampling. Refuge management activities, such trail maintenance, biological monitoring and surveying, and invasive plant removal, also could result in accidental removal, trampling, or other damage to plants.

B. Explanation of actions to be implemented to reduce adverse effects:
The Service has identified one Federal-listed plant in Prince William County which has not been documented but may be present on Featherstone NWR: sensitive joint-vetch (threatened). Refuge staff will continue to survey for this species wherever we propose any ground disturbing activities on the refuge, such as trail construction. If sensitive joint-vetch is found on the refuge, we will work with the species' Recovery Team and other experts to develop plans to protect the species.

Since, sensitive joint-vetch occurs in wetlands, the refuge's protection of wetland habitat will also reduce adverse impacts to the species. The refuge proposes to:

- Inventory the flora and fauna of these wetlands, including working with VDCR – Division of Natural Heritage to survey for rare plant species.
- Prior to opening the refuge to the public, the refuge will design trails to avoid sensitive wetland areas. Once the refuge is open, public access will be restricted to designated trails to prevent human disturbance to sensitive and unique habitat areas.

VIII. Effect determination and response requested: [* optional]

IX. Notes:

Currently, there are no records of sensitive joint-vetch occurring on Featherstone Refuge. However, according to the Virginia Department of Conservation and Recreation (VDCR), there is the potential for the refuge to support population(s) of sensitive joint-vetch (letter from the Virginia Department of Environmental Quality dated February 16, 2011). The VDCR has recommended that we conduct inventories for the species in all tidal freshwater marsh habitats on the refuge. The VDCR and the Virginia Department of Agriculture and Consumer Services (VDACS) recommend coordinating the results of these inventories with the VDCR – Division of Natural Heritage.

3

A. Listed species/critical habitat:

Determination	Response requested
no effect/no adverse modification (species: Sensitive joint-vetch)	_X_ *Concurrence
may affect, but is not likely to adversely affect (species: X)	___Concurrence ___*Formal Consultation
may affect, and is likely to adversely affect (species:)	___Formal consultation

B. Proposed species/proposed critical habitat:

Determination	Response requested
no effect on proposed species/no adverse modification of proposed critical habitat (species:)	___*Concurrence
is likely to jeopardize proposed species/adversely modify proposed critical habitat (species:)	___ Conference

C. Candidate species:

Determination	Response requested
no effect (species:)	___*Concurrence
is likely to jeopardize candidate species (species:)	___Conference

D Glenn 4/27/11
signature date
[Title/office of supervisor at originating station]
Refuge mgr, Potomac River NWRC

4

IX. Reviewing ESO Evaluation:

A. Concurrence X **Nonconcurrence** _____

B. Formal consultation required _____

C. Conference required _____

D. Remarks (attach additional pages as needed):

Cynthia A Schulz 5/20/11

signature **date**

[Title/office of reviewing official]

5

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

[Note: This form provides the outline of information needed for consultation documentation. If more space is needed, attach additional sheets, or set up this form to accommodate your responses.]

Originating Person: Greg Weiler **Signature:** _____
Telephone Number: 703-490-4979
Date: April 27, 2011

I. **Region:** Region 5 – Northeast

II. **Service Activity (Program)** – National Wildlife Refuge System, Potomac River National Wildlife Refuge Complex, Elizabeth Hartwell Mason Neck National Wildlife Refuge Comprehensive Conservation Plan

III. **Pertinent Species and Habitat:**

A. **Listed species and/or their critical habitat within the action area**

Sensitive Joint-Vetch *(Aeschynomene virginica)* – Not currently known on refuge

Small Whorled Pogonia (*Istoria medeoloides*) – Not currently known on refuge

B. **Proposed species and/or proposed critical habitat within the action area**

None

C. **Candidate species within the action area:**

None

IV. **Geographic area or station name and action:**

Elizabeth Hartwell Mason Neck National Wildlife Refuge, Comprehensive Conservation Plan

V. **Location (attach map):**

A. **Ecoregion Number and Name:** 58, Chesapeake Bay Lowlands

1

B. **County and State:** Fairfax County, Virginia

C. **Section, township, and range (or latitude and longitude):** See location map

D. **Distance (miles) and direction to nearest town:** See location map

E. **Species/habitat occurrence:** See habitat map

VI. **Description of proposed action (attach additional pages as needed):**

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, requires that all national wildlife refuges complete a Comprehensive Conservation Plan (CCP) by fiscal year 2012. In addition, compliance with the National Environmental Policy Act of 1969 requires the completion of an Environmental Assessment (EA). An EA accompanied the draft CCP for Elizabeth Hartwell Mason Neck (Mason Neck) and Featherstone national wildlife refuges (NWRs) which was distributed for a 30-day internal agency review in July 2010, followed by a public review and comment period from January 5 to February 22, 2011. We identified alternative B as the Service-preferred alternative.

The draft CCP/EA document is available online at: *http://www.fws.gov/northeast/planning/MasonNeck_Featherstone/draftccp.html*. The Mason Neck Refuge and Featherstone NWRs CCP/EA explains the refuge's purposes, vision, and goals, describes the affected environment of the refuge at the time of the CCP/EA's writing, offers 3 management alternatives for Mason Neck NWR, describes the environmental consequences predicted from implementing these management alternatives, and summarizes the refuge's consultation and coordination with others during the CCP/EA planning process.

References to sensitive joint vetch occur on the following pages: 1-30, 2-32, 2-33, 3-6, 3-38, and 3-41. References to small whorled pogonia occur on the following pages: 1-30, 2-32, and 3-6.

The final CCP for Mason Neck NWR will serve to guide refuge management decisions over the next 15 years. We are preparing the final CCP for the Regional Director with the recommendation to adopt alternative B.

VII. **Determination of effects:**

A. **Explanation of effects of the action on species and critical habitats in items III.A, B, and C (attach additional pages as needed):**

Currently, no Federal-listed plants have been documented on Mason Neck NWR. According to the Virginia Department of Conservation and Recreation (VDCR) in their

comments on the draft CCP/EA (letter to Nancy McGarigal, dated February 16, 2011), there is the potential for sensitive joint-vetch and small whorled pogonia to occur on the Refuge.

Some habitat management actions and public use opportunities proposed in the CCP could impact potentially suitable habitat for these species. Proposed expansions of the hunt program my result in a higher risk of hunters trampling vegetation while hunting off-trail. Additionally, creating new trail access using existing old road beds (e.g. Tree Stand Road and an extension of Sycamore Road) may also result in visitors trampling vegetation adjacent to these newly designated wildlife observation trails. Refuge management activities, such as biological monitoring and surveying, facilities maintenance, and invasive plant removal, also could result in accidental removal, trampling, or other damage to plants.

B. Explanation of actions to be implemented to reduce adverse effects:

The Service has identified two Federal-listed plants in Fairfax County which have not been documented but may be present on Mason Neck NWR: sensitive joint-vetch (threatened) and small whorled pogonia (threatened). The refuge will continue to survey for these plants in suitable habitat wherever we propose any ground disturbing activities on the refuge, such as facilities construction or habitat management. If either of these species is found on the refuge, we will work with the respective species' Recovery Team and other experts to develop plans to protect them.

Since, sensitive joint vetch occurs in wetlands, the refuge's protection of wetland habitat will also reduce potential adverse impacts to the species. Related actions proposed under alternative B are to:

- Continue to prohibit public access (pedestrian and boat) to Little Marsh and Great Marsh.
- Inventory the flora and fauna of these wetlands, including working with VDCR – Division of Natural Heritage to survey for rare plant species.
- Maintain existing and install additional shoreline protections as warranted, and after consultation with partners, to prevent further erosion.

Similarly, since small whorled pogonia occurs in uplands, the refuge's proposed upland habitat management will help reduce potential adverse impacts to the species. Related actions proposed under alternative B are to:

- Continue to minimize the potential for human disturbance to unique habitat features by restricting public access to designated trails only.
- Work with State resource managers, researchers, educators, and/or volunteers to collect baseline information on wildlife and plants.

VIII. Effect determination and response requested: [* optional]

IX. Notes:

Currently, there are no records of either sensitive joint vetch or small whorled pogonia occurring on Mason Neck NWR. However, according to the VDCR, there is the potential for the refuge to support population(s) of both species (letter from the Virginia Department of Environmental Quality to Nancy McGarigal, Planning Team Leader, dated February 16, 2011). The VDCR has recommended that Refuge staff conduct inventories for sensitive joint vetch in all of the refuge's tidal freshwater marsh habitats, and inventory for small whorled pogonia in the refuge's upland habitats. The VDCR and the Virginia Department of Agriculture and Consumer Services (VDACS) recommend coordinating the results of these inventories with the VDCR – Division of Natural Heritage.

A. Listed species/critical habitat:

Determination	Response requested
no effect/no adverse modification (species: Sensitive joint-vetch and Small whorled pogonia)	**_X_ *Concurrence**
may affect, but is not likely to adversely affect (species: X)	**___Concurrence ___*Formal Consultation**
may affect, and is likely to adversely affect (species: _____)	**___Formal consultation**

B. Proposed species/proposed critical habitat:

Determination	Response requested
no effect on proposed species/no adverse modification of proposed critical habitat (species: _____)	**___*Concurrence**
is likely to jeopardize proposed species/adversely modify proposed critical habitat (species: _____)	**___ Conference**

4

C. Candidate species:

Determination	**Response requested**
no effect (species: _____)	**___*Concurrence**
is likely to jeopardize candidate species (species: _____)	**___Conference**

_____ 4-27-11
signature **date**
[Title/office of supervisor at originating station]
Refuge Mgr, Potomac River NWRC

IX. Reviewing ESO Evaluation:

A. Concurrence X **Nonconcurrence** _____

B. Formal consultation required _____

C. Conference required _____

D. Remarks (attach additional pages as needed):

_____ 5/28/11
signature **date**
[Title/office of reviewing official]

5

COMMONWEALTH of VIRGINIA

Department of Historic Resources

Douglas W. Domenech
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Kathleen S. Kilpatrick
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
TDD: (804) 367-2386
www.dhr.virginia.gov

February 2, 2011

Nancy McGarigal
Planning Team Leader
United States Department of the Interior
Fish and Wildlife Service
300 Westgate Center Drive
Hadley MA 01035-9589

Re: Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges
Comprehensive Conservation Plan and Environmental Assessment
DHR Project No. 2010-1333

Dear Ms. McGarigal:

Thank you for your letter of January 4, 2011 requesting our comments on the draft Comprehensive Conservation Plan and Environmental Assessment for Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges. As we stated earlier in our letter of July 30, 2010, based upon the documentation provided, we fully support the Service-preferred alternatives for these refuges. We agree that these alternatives will best achieve the refuges purposes, visions and goals and best fulfill the Service's stewardship responsibilities under Section 110 of the National Historic Preservation Act.

We note that the two minor suggestions offering in our July letter have been addressed in the current draft. We have no additional comments.

If you have any questions concerning our comments, or if we may provide any further assistance, please do not hesitate to contact me at (804) 367-2323, ext. 112; fax (804) 367-2391; e-mail ethel.eaton@dhr.virginia.gov.

Sincerely,

Ethel R Eaton

Ethel R. Eaton, Ph.D., Senior Policy Analyst
Division of Resource Services and Review

c. John S. Wilson, Region 5 Historic Preservation Officer

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Northern Region Office
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Stephens City, VA 22655
Tel: (540) 868-7031
Fax: (540) 868-7033

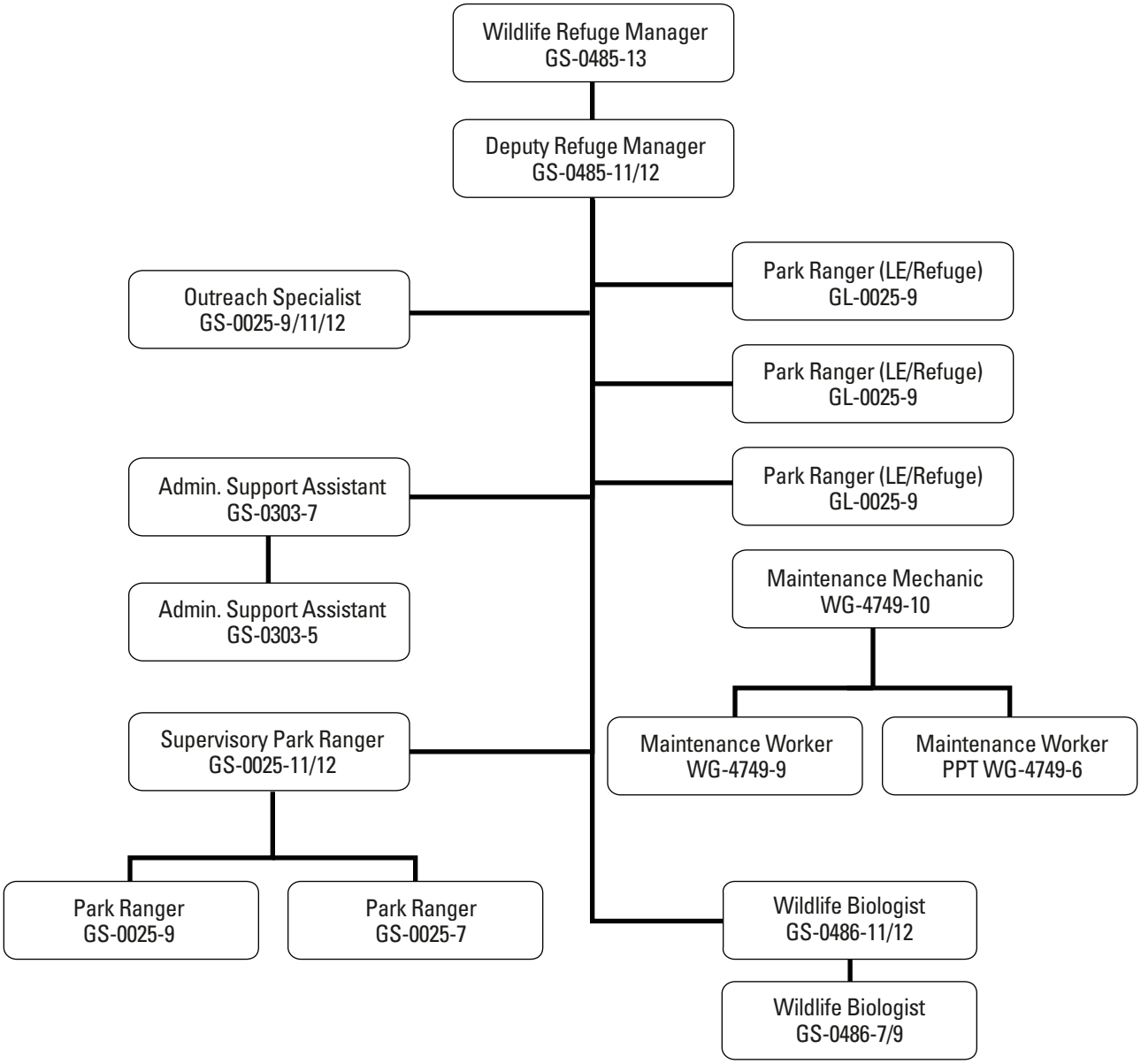
Appendix E

Donna Dewhurst

Bufflehead and Scaup

Staffing Chart

Figure E.1. Proposed Staffing for Potomac River National Wildlife Refuge Complex (Mason Neck, Featherstone, and Occoquan Bay Refuges)



Appendix F

Bill Wallen

Farm Creek on Featherstone Refuge

Archaeological and Historical Resources Overview

- **Elizabeth Hartwell Mason Neck National Wildlife Refuge**
- **Featherstone National Wildlife Refuge**

Archaeological and Historical Resources Overview: Elizabeth Hartwell Mason Neck National Wildlife Refuge

Compiled by Tim Binzen, U.S. Fish & Wildlife Service, Northeast Regional Historian

Archaeological and Historical Resources

Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge, refuge) contains an unusually important and diverse archaeological record, which offers evidence of thousands of years of settlement by Native Americans and of later occupations by Euro-Americans and African-Americans. The variety within this record is known, although no comprehensive testing program has been completed at the refuge. Archaeological sites in the current inventory were identified by compliance surveys in highly localized areas, or on the basis of artifacts found in eroded locations. The refuge contains 25 known Native American sites, which represent occupations that began as early as 9,000 years ago, and continued into the mid-17th century. There are 15 known historical archaeological sites, which offer insights into Euro-American settlement that occurred after the 17th century. The small number of systematic archaeological surveys that have been completed previously at the refuge were performed in compliance with Section 106 of the National Historic Preservation Act (NHPA) and focused on specific locations within the refuge where erosion control activities were considered (Wilson 1988; Moore 1990) and where trail improvements were proposed (GHPAD 2002; Goode and Balicki 2008). In 1994 and 1997, testing was conducted at the refuge maintenance facility (USFWS Project Files). A recent reconnaissance study assessed the serious effects of erosion on shoreline sites to assist with obligations under Section 110 of NHPA, and resulted in the identification of 14 Native American sites that had not been previously recorded (Johnson 2005). The refuge does not contain any significant historical structures.

Native American Archaeological Resources

The availability of natural resources influenced Native American settlement on Mason Neck. The combination of resources was shaped over time by patterns in the geology and ecology of the Chesapeake Bay region. In geological terms, Mason Neck has not been a riverine peninsula for very long. During the late Pleistocene, 18,000 years ago, sea levels were approximately 300 feet lower than they are today, and Mason Neck was an inland ridge. The Potomac River was a narrow channel, which carried glacial meltwater from inland areas to the coastal edge of the Continental Shelf, located many miles to the east of its modern location. Between 10,000 and 7,000 years ago, in the early Holocene, sea levels rose rapidly as waters from melted ice sheets flowed into the Atlantic. Consequently, the valleys of the Potomac, James, and Susquehanna Rivers were inundated under hundreds of feet of water, and the approximate outlines of Chesapeake Bay were formed. Notably, it was not until 3,000 years ago that sea levels stabilized, and the shorelines of the Bay and its tributary rivers and promontories (including Mason Neck) took the forms that are recognizable today. During the historical period, notable changes to the shorelines of the Bay have continued. The cliffs seen on the Bay's middle-western shore by the explorer John Smith in A.D. 1607-8 have eroded as much as 300 feet inland over the ensuing centuries (Dent 1995). Shoreline erosion poses a major concern at Mason Neck today.

The first human inhabitants of the Chesapeake Bay region were the Paleo-Indians, who reached the eastern seaboard approximately 11,500 years ago. Organized in small bands, the Paleo-Indians were highly mobile people who used a specialized toolkit of fluted spear points and distinctive scrapers. The environment that they knew was cool and dry. Their landscape was vegetated in a spruce-pine forest and was populated by temperate terrestrial animals, which included many species still seen in the region today. Some displaced boreal species may have been present as well. Archaeologists have found no evidence that the Paleo-Indians coexisted with mammoths or mastodons in the Northeast, prior to the extinction of those species in the region. While no Paleo-Indian sites are known in the direct vicinity of Mason Neck, two such occupations have been reported less than 25 miles to the north (Dent 1995). During the Paleo-Indian period, Mason Neck was a high bluff overlooking the valley of the ancient Potomac River, which flowed hundreds of feet below.

The successors to the Paleo-Indians were the Native Americans of the Early Archaic period, which occurred between about 9,500 and 8,000 years ago. These people knew a climate that was increasingly warm and humid, and an environment where woodlands dominated by beech, hickory, hemlock, birch, and oak replaced open

conifer-dominated parkland (Dent 1995). This change in vegetation was accompanied by shifts in animal populations in the Chesapeake Bay region. The Native Americans modified their technologies in response, adopting new forms of corner-notched and side-notched spear points and using spear-throwing devices to launch projectiles over greater distances than was possible by hand (Egloff and McAvoy 1990). As forests of deciduous trees closed in over the landscape, previously barren zones offered attractive resources, such as hazelnuts, hickory nuts, butternuts, and some tuberous plants. The innovative subsistence strategies practiced by the people of the Early Archaic led them to adjust their system of settlement, as they used longer-term occupations and took advantage of resources that were seasonally available and found in a wider variety of locations (Dent 1995). Mason Neck was still an elevated bluff, not yet a peninsula, although sea levels (and the level of the Potomac) rose steadily throughout the Early Archaic period. An Early Archaic spear point has been recovered from an archaeological site in the southeastern part of the refuge, overlooking the Great Marsh (Goode and Balicki 2008). This indicates that Native Americans were attracted to Mason Neck as early as 9,000 years ago.

During the Middle Archaic period, between 8,000 and 5,000 years ago, a climatic warming trend prevailed, marked by sub-episodes that were moister or drier. Oak and hickory became the dominant tree species, and by the end of the period, mixed deciduous forests prevailed, similar in composition to those seen in the region today. Mast products, such as acorns and nuts, were both nutritious and easily stored and became a key source of food for Native Americans (Dent 1995). Another ecological trend with major implications for Native American settlement was the development of estuarine conditions along the shorelines of the Potomac River as the water level continued its rise in the river valley and the Chesapeake Bay came into being (Dent 1995). The effects of tidal action on the Potomac reached as far upriver as Mason Neck (Wilson 1988). Within the Potomac, freshwater fish were joined by marine species that had left their natural predators behind in the open sea. Abundant resources were available for all fish in these newly formed estuarine habitats, resulting in great species diversity (Dent 1995). The seasonal migrations of anadromous fish, and the greater availability of shellfish, waterfowl, and terrestrial species, did not escape the attention of Native Americans who lived near the Bay and its tributaries during the Middle Archaic period. This was reflected in their settlement system, which was oriented around a seasonal system of floodplain base camps and smaller settlements located near wetlands in upland areas (Gardner 1987). The Fall Zone of the Potomac offered hundreds of locations for seasonal fish harvesting (Dent 1995).

Native Americans of the Middle Archaic period devised a variety of contracting-stem and side-notched projectile points that were suitable for hunting and fishing, and supplemented their tool kits with grinding and milling stones, ground-stone axes, drills, and wood-working tools such as adzes and celts (Dent 1995). Evidence of Middle Archaic settlement has been reported from two sites on the refuge (USFWS Site Files; Goode and Balicki 2008).

Between 5,000 and 3,000 years ago, sea levels stabilized and the coastline of Chesapeake Bay took the form that is recognizable today. Native American populations grew in size and social complexity, and the settlement system became more sedentary. There was a profusion of artifact styles, as projectile points included broadspear variants, notched broad spears, and narrow-bladed, stemmed forms. Stone bowls were fashioned from steatite. Distinct cultural groups, or traditions, emerged throughout the region during the Late Archaic, and the people of these traditions adopted contrasting settlement systems, focusing variously upon the vast woodlands beyond the Fall Line or upon the riverine and estuarine resources of the Fall Zone and Coastal Plain (Dent 1995).

Formerly an elevated bluff standing hundreds of feet above the Potomac, Mason Neck became a riverine peninsula, defined by the confluences of the Occoquan River and Pohick Creek with the larger river. The interior of Mason Neck featured loamy, well-drained soils (USDA 1963) and gentle terrain crisscrossed by creeks. A variety of wetland, estuarine, and mast forest resources became easily accessible to the Native American inhabitants of the area. From the southern escarpment of Mason Neck, there was a commanding view for miles down the middle Potomac River. Archaeological evidence from three sites on the refuge suggests that Native Americans settled Mason Neck more intensively during the Late Archaic period (USFWS Site Files).

The greater Woodland period, which archaeologists divide into three sub-periods, began approximately 3,000 years ago and continued until the era of first contact with Euro-Americans. It is clear from the archaeological record that by the onset of the Woodland period, Mason Neck had become an important focus of Native American settlement on the Potomac.

The Early Woodland period, between about 3,000 and 2,300 years ago, saw the introduction of fired clay pottery and the Native American occupation of large villages located in the floodplains of major rivers. The use of storage pits and larger habitation structures indicates that these larger settlements supported long-term occupations. People evidently used smaller sites in upland settings for specialized and seasonal purposes, such as hunting for deer and turkey, and harvesting nuts and wild plant foods. The consumption of shellfish became an increasingly important element of Native American subsistence. There was considerable continuity in settlement locations between the Early Woodland period and the Middle Woodland period, which occurred between about 2,300 and 1,200 years ago, indicating that Native American subsistence strategies and settlement systems persisted during a time of climatic stability (Dent 1995). According to archaeological evidence, these regional patterns were reflected on Mason Neck, where artifacts of the Early Woodland and/or Middle Woodland periods have been reported from at least seven sites on the refuge (USFWS Site Files).

The Late Woodland period, from 1,200 to 500 years ago, marked the final centuries before contact between Native Americans of the Northeast and European explorers. Starting about A.D. 900, maize horticulture was adopted by Native American societies in the Middle Atlantic. Hunting, gathering, and fishing remained important subsistence activities, which shaped the annual cycle (Dent 1995). After A.D. 1300, the storage of surplus crops enabled the establishment of permanent hamlets and larger villages. An increase in the Native American population between A.D. 1300 and 1400 may have led to competition between neighboring groups. Nucleated settlements were frequently enclosed in palisades, indicating that territorial conflicts may have flared. Village sites were marked by deep cultural deposits and many storage pits, suggesting the accumulation of surplus crops and increased sedentism. The factors of population growth, food surpluses, and permanent villages may have led to the development of complex social and political structures and the emergence of the ranked chiefdoms that the first Europeans encountered in the late 16th and early 17th centuries (Turner 1992).

No sites representing large, Woodland-period villages have been recorded to date on the refuge, but it is possible that evidence for long-term settlement during the late pre-Contact period may yet be found. Between 1991 and 1993, investigations were conducted at the Hartwell Site (State Number 44FX1847), located outside the refuge on the shoreline of upper Mason Neck, near Colchester. The site included extensive shell midden deposits and produced Late Woodland projectile points, pottery, and a soapstone animal effigy (VA DHR Site Files). Early European accounts provide strong indications that Mason Neck and the Occoquan River confluence area were a focal Native American settlement locale on the Potomac (Barbour 1969). Given the rate of shoreline erosion since the 17th century, it is possible that some large sites at Mason Neck may have already been lost.

In summary, the inventory of pre-Contact Native American settlement locations at the refuge includes 25 sites, with evidence of occupation as early as 9,000 years ago. Several of the sites were re-occupied multiple times during different time periods, suggesting that they offered access to natural resources that remained important over time. Remarkably, one refuge site (the Great Marsh site, State Number 44FX410) produced an assemblage of projectile points that date to the Early Archaic, Middle Archaic, Late Archaic, Early Woodland, and Middle Woodland periods (Goode and Balicki 2008). Only two of the Native American sites on the refuge are well understood archaeologically (the Great Marsh Site, State Number 44FX410, and the Little Marsh Creek Site, State Number 44FX1471). Most of the sites represent occupations of undetermined period (Johnson 2005) and have never been subject to subsurface testing, so their dimensions, integrity, and levels of significance are unknown. All but one of the known refuge sites is located on the modern shoreline or next to an estuary or marsh. While this likely reflects a Native American preference for such locations, as of 2010 no archaeological survey has investigated the margins of creeks or the interior upland zones of Mason Neck. It is very likely that additional sites await discovery in such interior settings.

For historians and archaeologists alike, Mason Neck belongs to an elite group of places for study of the Contact period (A.D. 1500-1600) and of 17th-century cultural dynamics in the Chesapeake Bay region. This high level of research value can be attributed to several factors. First, Mason Neck was the main settlement location for the Native American tribe (known as the Dogue) that held sway over the middle Potomac during the Contact period (Moore 1990c). Second, this prominent Dogue settlement was documented in the accounts of the area's first European explorers and early colonists, linking the location to the documentary record (Moore 1990c).

Third, much of the landscape within the refuge and in adjacent portions of Mason Neck has been spared intensive development, resulting in a greater likelihood that Contact-period archaeological resources may be preserved (erosion of shoreline sites notwithstanding).

During the Contact period, the Powhatan chieftanship dominated the Virginia tidewater area. One of several Potomac River groups, the Dogue, were a large tribe, with subgroups in Virginia and Maryland (Johnson 1986). The name "Dogue" may have been derived from the Powhatan word "taux" (Harrington 1955), which was subject to numerous alternative spellings in early colonial records. Their language may have been Siouan, and not Algonquian as was the case with many of the neighboring tribes in the region (Moore 1990c). Their way of life was similar to other Chesapeake tribes of the period, which included the Potomac Tribe further up the river and the Piscataway of the western shore of Maryland. The Dogue occupied large focal settlements and used small satellite camps for seasonal resources, following an annual cycle of hunting, fishing, gathering of plant foods, and maize horticulture (Moore 1990b). They may have been less amenable to close relations with Europeans than other tribes (Moore 1990c).

When John Smith voyaged up the Potomac in 1608, he mapped the village of the "Tauxenent" near the mouth of the Occoquan River (Barbour 1969) and noted that the settlement featured a "king's house" defended by 40 "bowmen," with a population of 135-170 people, who occupied as many as 20 longhouses enclosed within a palisade (Johnson 1986). The Dogue settlement at Mason Neck was called "Moyumpse" and was visited by the sachem Powhatan in 1617 (Kingsbury 1933) and by Henry Fleet in 1632 (Neil 1876). It has been suggested that this main village may have been located in upper Mason Neck, near Colchester, while the Dogue maintained smaller villages and seasonal encampments on the lower part of the peninsula (Wilson 1988). According to documentary sources, the area that is south of Kanes Creek and west of Great Marsh within the refuge was called "Dogues Island" in early deeds related to the general vicinity, and the tribe cultivated fields of maize in an area separated from the mainland by a swamp (Moxham 1975; Moore 1990c). The Dogue may have relocated their main village several times on Mason Neck during the period between 1608 and 1654. After the latter date, colonial settlement increased in the Mason Neck vicinity and the Dogue likely discontinued settlement there at that time (Moore 1990c).

By 1658, relations between the Dogue and the colony of Virginia had deteriorated, as the tribe and colonists on the frontier became increasingly antagonistic. In 1666, the colony slated the Dogue for complete annihilation, but the directive was not carried out. Members of the Dogue joined their Susquehannoc counterparts in frontier raids in 1675. Bacon's Rebellion in 1676-1677 was a colonial protest against the colony's handling of Native American raids, in which the Dogue had played a central role. The Dogue population was reduced by warfare and disease, and after 1681 many survivors joined members of other tribes who sought refuge at the large and densely vegetated Zachiah Swamp in Maryland. By the early 1700s, documentary sources ceased to refer to the Dogue as a distinct tribal group (Moore 1990c).

Notably, an archaeological site at the refuge (the Little Marsh Creek Site, State Number 44FX1471) has provided evidence of 17th-century Dogue settlement (Moore 1989). It is the only conclusively Dogue site known to exist in Virginia, and one of only two that have been identified, the second being in Maryland (Moore 1990b). The artifact assemblage from the site includes chipping debris of various materials, forms of Potomac Creek pottery and small triangular projectile points that date to the Late Woodland or Contact period, and three gunflints that were manufactured by Native Americans using both domestic raw materials and European flint (Moore 1989). Cumulatively, the artifacts suggest that the Little Marsh Creek Site was occupied by members of the Dogue between A.D. 1625 and 1650 (Moore 1990a).

Unfortunately, the Native American archaeological record at the refuge is under imminent threat from shoreline erosion. Numerous sites literally are vanishing, as artifacts fall out of eroding banks and are exposed to visitors who may be tempted to remove them. Archaeological resources are finite and unique, and much important information may be lost if action is not taken (Johnson 2005).

Historical Archaeological Resources

Even as Mason Neck had figured prominently in the Native American settlement systems of the Potomac, it was also significant in the geography of the Euro-American occupations that followed. The first colonial land patent in Fairfax County involved property on Mason Neck and was granted to Richard Turney in 1651 (GHPAD 2002). Soon thereafter, the Dogue vacated the locale (Moore 1990c). In 1690, George Mason II started acquiring lands on Mason Neck, including Turney's Patent (GHPAD 2002). By 1704, he had a house on the western shore (Wilson 1988). The tobacco port of Colchester was established on the Occoquan River shore of western Mason Neck in 1753. Six years later, George Mason IV established the Gunston Hall Plantation in the eastern part of lower Mason Neck (GHPAD 2002). An American patriot and statesman, George Mason IV served as a delegate from Virginia to the U.S. Constitutional Convention. Along with James Madison, he is called the "Father of the Bill of Rights" and is considered one of the "Founding Fathers" of the United States (Heymsfeld and Lewis 1991).

While the main house (Gunston Hall) and its associated complex of structures and outbuildings were situated in the southeast corner of Mason Neck, outside the current refuge boundary, the plantation as a whole encompassed an area of 5,500 acres in the southern part of the peninsula (GHPAD 2002), much of it within the current boundaries of the refuge. The Mason family owned dozens of slaves, who lived on the plantation in quarters near the mansion and also under overseers in four outlying hamlets at Mason Neck (Mitchell 1987; Wilson 1988). After 1750, soil depletion led Virginia plantation owners to phase out labor-intensive hoe tobacco cultivation in favor of wheat production (Copeland and McMaster 1975). This may have affected the number of slaves owned by the Mason family in the later 18th century (Wilson 1988). Approximately one quarter of Mason Neck was still wooded during that period (Wilson 1988). Several parcels of land were occupied by tenant farmers, who also owned slaves (Copeland and McMaster 1975).

In 1775, George Mason IV apportioned 1,000 acres in the west-central part of Mason Neck to create the Lexington Plantation, which he gave to his eldest son, George V. During the 19thcentury, the Mason descendants sold off the holdings in parcels, and after the Civil War the family no longer owned any land on Mason Neck (GHPAD 2002).

Commercial fishing, logging, and farming were the main enterprises at Mason Neck in the late 19th century. Hunting and fishing camps were used seasonally, and a few summer homes were built. Between 1900 and 1960, logging continued, but there was very little development in the lower section of Mason Neck, where the refuge is located. A small number of seasonal dwellings were built along the shoreline. The lands narrowly avoided development in the mid-1960s, and the refuge was established in 1969. The dwellings dating to the first half of the 20th century were demolished (Wislon 1988; GHPAD 2002).

Fifteen historical archaeological sites have been recorded at the refuge (USFWS Site Files). As with possible Native American resources, it is likely that a program of systematic survey that addresses the refuge as a whole will identify numerous additional sites. No Euro-American sites dating to the Contact period or to the 17th century are known, but there are five 18th-century sites. Two of them (the Moore's Farmstead Site and the Bronaugh's Landing Site) are located in the eastern extremity of the refuge, near Gunston Hall, while the other three (the Maill's Landing Site, the Dogues Neck Site, and the Crawford's Landing Site) are on the south-central shoreline. Six of the known sites include evidence of 19th-century land use, and six have components that date to the first half of the 20th century.

The Gunston Hall historical museum, located to the east of the refuge, has sponsored archaeological research programs to better understand the heritage of the Mason family. John Mason, the fourth son of John Mason IV, wrote a set of boyhood "recollections" that described the 18th-century layout of buildings, grounds, and landscape features at the plantation (Mason 2004). In addition to the mansion house of Gunston Hall with its lawns and gardens, buildings included the slaves' quarters, stables, a corn house and granary, and outbuildings. Agricultural facilities featured a hay yard, cattle pens, and agricultural fields. Extensive orchards were planted with fruit and nut trees. Hundreds of ornamental trees were planted in carefully designed rows in order to screen the slaves' quarters and agrarian structures from line of sight from the mansion.

Archaeological research undertaken by the museum has not yet identified the locations of the slaves' quarters or other structures and landscape features that may have been located beyond the immediate mansion grounds. It is possible that most, if not all, of these historical features were concentrated to the east of Gunston Road, in proximity to the mansion, and thus are located outside the refuge boundary. However, some 18th-century features related to the plantation, such as agricultural fields or outbuildings, may have been located west of the road, and thus may have resulted in archaeological resources that await discovery within the refuge. Other possible sites on the refuge may contain evidence of the outlying slave hamlets, tenant farmers' properties, landings, fishing stations, logging camps, and 19th-century seasonal homes.

Much of the land in the eastern section of the refuge was cleared and used for agricultural cultivation during the historical period. If useable farmland was abundant in the southeastern part of Mason Neck, the southwestern area (which constitutes the western half of the refuge) may have been used primarily for logging and not for cultivation after the early 19th century. Notably, a recent archaeological investigation of a Native American site located in a wooded area overlooking Great Marsh encountered a natural soil profile, indicating that the landform had never been plowed (Goode and Balicki 2008). This unusual circumstance is favorable for the preservation of archaeological resources that are not deeply stratified or buried. Possibly the Mason family or their successors intentionally maintained a strip of woodland along the southern shoreline of Mason Neck, perhaps to screen the view of their holdings from the Potomac or to inhibit erosion.

In summary, the inventory of archaeological resources at the refuge currently includes 15 historical sites, representing settlement and land use that occurred between the early 18th century and the mid-20th century. Euro-American resources dating to the second half of the 17th century may exist, but none has been identified yet. The archaeological record of the refuge may have particular research value for advancing knowledge concerning the agrarian lifeways of the early colonial period on the Potomac.

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Archaeological and Historical Resources Overview: Featherstone National Wildlife Refuge

Compiled by Tim Binzen, U.S. Fish & Wildlife Service, Regional Historian

Archaeological and Historical Resources

Two archaeological sites have been recorded at Featherstone National Wildlife Refuge (Featherstone Refuge, refuge), each on the basis of artifacts that were visible on the ground surface. No professional archaeological surveys involving subsurface testing have been conducted at the refuge. One of the sites is Native American in origin and is located in the northern part of the refuge. Its condition is unknown, and its period of occupation has not been established. One historical site was recorded in the southern part of the refuge and contained materials dating to the late 19th and early 20th centuries. The refuge does not contain any significant historical structures.

Native American Archaeological Resources

Featherstone Refuge has much in common with neighboring Mason Neck Refuge in terms of its geological and paleoenvironmental history. Consequently, it can be expected that there are parallels regarding the forms of Native American settlement that were seen in both refuges prior to European contact. The landform at Featherstone offered gentle terrain and access to the estuarine environment, just north of the confluence of Neabsco Creek, Occoquan Bay, and the Potomac. The density of sites and the duration of occupations likely were much less complex at Featherstone than has been recognized at Mason Neck, but landscape settings like that of Featherstone nonetheless figured significantly in Native American land use practices. One Native American site of undetermined age has been recorded at the refuge. It is likely that systematic testing at Featherstone would result in the identification of additional Native American archaeological resources.

Historical Archaeological Resources

Little is currently known about possible historical resources at Featherstone Refuge. One historical site has been recorded on the basis of artifacts observed on the ground surface. Deeds dating to the late 17th and early 18th centuries suggest that the lands within the refuge, along with other areas on the west side of the Occoquan River, were part of the extensive holdings of the historic Deep Hole Farm. Given the mainly estuarine environment of the refuge, it is not likely that extensive agriculture or domestic settlement occurred there prior to the mid-1800s, when the railroad corridor for the Richmond, Fredericksburg & Potomac Railroad was constructed. The railroad bed, with its cinder and coal slag, is still a prominent feature that traverses the refuge from north to south, following the west shore of the Potomac. For the residents of the nearby community, the presence of the railroad line inhibited access to the lands now within the refuge. Thus, it can be expected that any unrecorded historical resources are low in density and may be related to seasonal fishing and hunting camps of the late 19th and early 20th centuries.

Appendix G

Tim Williams

Great blue heron

Summary of Public Comments and Service Responses on the Draft Comprehensive Conservation Plan and Environmental Assessment for Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges

- Introduction
- Summary of Comments Received
- Service Responses to Comments by Subject

Summary of Public Comments and Service Responses on the Draft Comprehensive Conservation Plan and Environmental Assessment for Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges

Introduction

In December 2010, we completed the Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges Draft Comprehensive Conservation Plan and Environmental Assessment (draft CCP/EA). The draft CCP/EA outlines three alternatives for managing Mason Neck National Wildlife Refuge (Mason Neck Refuge) and two alternatives for managing Featherstone Refuge over the next 15 years. Alternative B is identified as the "Service-preferred alternative" for each refuge.

We released the draft CCP/EA for 49 days of public review and comment from January 5 to February 22, 2011. We evaluated all the letters and e-mails sent to us during that comment period, along with comments recorded at three public meetings. Two of those meetings were held in Woodbridge, Virginia, including an afternoon and evening session on February 2, 2011. The third meeting was held in Lorton, Virginia on February 3 in the evening. This document summarizes all of the substantive comments received and provides our responses to them.

Based on our analysis in the draft CCP/EA and our evaluation of comments received on that document, we modified both Service-preferred alternatives (alternative B for both refuges) as originally presented in the draft CCP/EA and recommend these modified versions to our Acting Regional Director for implementation. The final CCP represents the modified alternative B for both refuges. Our modifications include one addition and four clarifications of the management actions from the draft CCP/EA alternatives. We have determined that none of these changes warrants our publishing a revised or amended draft CCP/EA before submitting the final CCP to our Acting Regional Director for approval.

Below we list the change (item #1) and clarifications (items #2, #3, #4, and #5) we made in the final CCP.

1. Upon CCP approval, we propose to allow non-motorized boat landings at one designated area of Featherstone Refuge's shoreline to facilitate wildlife observation and nature photography. The designated landing site is a portion of tidal beach on Farm Creek (refer to map 4.3 in the final CCP) and corresponds with the proposed location of the southernmost observation deck and fishing platform that we presented in the draft CCP/EA (map 3.3 in the draft CCP/EA). Visitors accessing the refuge at this location by non-motorized boat would be allowed to walk approximately 0.4 miles along an existing footpath (indicated on map 4.3 in the final CCP). Boaters would be confined to this section of footpath until the rest of the refuge is officially open to public use, as described in the draft CCP/EA. No special infrastructure would be constructed to facilitate non-motorized boat access. We predict no short- or long-term impacts to resources given

   - our expectation that less than 200 boat landings per year would occur;
   - the landing site location is primarily on tidal sandy beach which is a dynamic, shifting substrate and has very little vegetation or soils that would be impacted;
   - none of the vegetation in the area is of conservation concern, and people would be required to stay on the existing footpath to minimize additional off-trail impacts; and
   - our current knowledge of wildlife inhabiting the area indicates no disturbances to nesting or breeding wildlife would occur.

   We would monitor to see if any of these conditions change, or unanticipated impacts are occurring, and would adapt management as warranted. We would also conduct regular outreach and enforcement of refuge regulations to insure minimal to no impacts results.

The proposal to allow non-motorized boat landings on Featherstone Refuge is included in the final CCP, chapter 4 for Featherstone Refuge, goal 2, objective 2.4 "Wildlife Observation and Photography," and in appendix B, the final compatibility determination for "Wildlife Observation, Photography, Environmental Education, and Interpretation."

2. For Mason Neck Refuge, we clarify our proposal to open the refuge to a youth turkey hunt since some respondents thought there were inconsistencies in the way we described this youth hunt when comparing text between draft CCP/EA chapters 3 and 4. Our proposal assumes a maximum of five youth per day would hunt on refuge lands over a 3-day period. The three hunt days might not be consecutive. Each hunt day would be from sunrise to noontime and all 3 days would occur during the State's spring turkey hunting season. Only gobblers would be harvested and only by shotgun. Youth hunt areas would be in pre-designated, well-distributed areas that are otherwise closed to the public. We do not propose any disruption of access for other refuge visitors. Hunters would be required to complete data forms to document their observations and success. This documentation would allow us to evaluate the program periodically and make changes as warranted. We would work with the Virginia Department of Game and Inland Fisheries (VDGIF), the National Wild Turkey Federation, and other partners to design and implement the hunt once we have additional staff in place. According to VDGIF and their results from other hunt areas, less than 50 percent of youth turkey hunters are successful. This statistic, coupled with the fact that only males would be taken in the spring after breeding, causes us to predict that there would be no short-term or long-term impact, or cumulative effect, on the viability of the local turkey population. This conclusion was substantiated in discussions with VDGIF wildlife officers (VDGIF pers. com. 2011).

   The final CCP includes these details in chapter 4 for Mason Neck Refuge, goal 3, in the rationale for objective 3.2 "Youth Turkey Hunting," and in appendix B, the compatibility determination for "Hunting." Also, see our response below under **"Hunting – Youth Turkey Hunt."**

3. For both refuges, we clarify our proposal on deer hunting. For Mason Neck Refuge, in addition to the shotgun season we currently provide, our proposal is to also open the refuge to an archery deer hunt. Similar to the shotgun season, the archery hunt would be cooperatively managed with VDGIF and Mason Neck State Park, and would be consistent with State regulations. With additional staff in place, and with partner support, we would also consider changing the length of the annual refuge shotgun season, the number of hunters, and/or their distribution when declining forest health conditions warrant an increased deer harvest. If we determine major changes to the shotgun hunting program are justified, we would complete all administrative requirements to formally make the changes. On Featherstone Refuge, we do not currently have a hunt program on the refuge, nor do we have a specific proposal to review and analyze yet. Once additional staff are in place, we would identify and analyze a detailed hunt proposal, and include additional public involvement during that evaluation, before making a decision on a specific program.

   The final CCP includes these details in chapter 4 for Mason Neck Refuge, goal 3, in the rationale for objective 3.1 "Deer Hunting," and in appendix B, the compatibility determination for "Hunting." In chapter 4 for Featherstone Refuge, goal 2, objective 2.2 "Hunting," we explain our plans to evaluate hunting on this refuge at a later date. Also, see our response below under **"Hunting – Deer."**

4. For both refuges, we clarify our proposal on waterfowl hunting. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, goal 3, objective 3.3, we state that waterfowl hunting in refuge waters is not compatible with refuge purposes due to concerns about disturbing breeding and wintering bald eagles and wintering waterfowl. As noted above in our discussion on deer hunting, in the draft CCP/EA, chapter 3 for Featherstone Refuge, goal 2, objective 2.2 "Hunting," our proposal is to conduct a more detailed evaluation of possible hunting alternatives when we have additional staff in place, and include additional public involvement during that evaluation, before making a decision on a specific program.

   We recognize and fully support waterfowl hunting as a traditional and legitimate activity in the region. Under objective 3.3 for Mason Neck Refuge, we would plan to fully support VDGIF in ensuring that the public

continues to have quality waterfowl hunting opportunities in State waters near the refuge. As part of that cooperation, we identify a strategy under objective 3.3 to work with VDGIF to evaluate the use of temporary floating blinds to replace fixed blinds as a way to expand opportunities, but otherwise we have no jurisdiction or intent to mandate this.

The final CCP includes these details in chapter 4 for Mason Neck Refuge, goal 3, in the rationale for objective 3.3 "Waterfowl Hunting." In chapter 4 for Featherstone Refuge, goal 2, objective 2.2 "Hunting," we explain our plans to evaluate hunting on this refuge at a later date. Also, see our response below under **"Hunting – Waterfowl and Hunting Blinds."**

5. For both refuges, we clarify our intent with regards to shoreline protection measures. In the final CCP Chapter 4, for Mason Neck Refuge, goal 2, objective 2.3 "Shoreline Protection," we describe our proposal to continue working with partners to maintain and evaluate the existing breakwater structures. We also state that our proposal includes working with experts to conduct a risk assessment to identify and prioritize other potential shoreline restoration areas and identify viable protection methods. Our intent is the same for Featherstone Refuge's shoreline, as described in the final CCP chapter 4, for Featherstone Refuge, goal 1, objective 1.2 "Shoreline Protection, Wetlands, and Water Quality."

   We acknowledge that our proposal is vague as it relates to specific protection methods. This is intentional as we have no particular design in mind and recognize that we need to get additional expertise to conduct the risk assessment and to evaluate potential viable protection methods. While some respondents suggested possible tools and techniques, prior to discussing options with experts, we do not want to limit ourselves to any one method. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, under the heading "Conducting Additional NEPA Analysis" we state that before a decision is reached on the design, and before any actions are taken on the ground, we would conduct additional or supplemental National Environmental Policy Act (NEPA) analysis. Also, see our response below under **"Shoreline Protection."**

For either refuge, our Acting Regional Director decides between essentially three choices. The Acting Regional Director may select

- our modified alternative B for implementation;
- one of the other alternatives analyzed in the draft CCP/EA; or
- combine actions from among the alternatives in his decision.

The Acting Regional Director will also determine whether a Finding of No Significant Impact (FONSI) is justified prior to finalizing the decision. The decision will be made after

- reviewing all the comments received on the draft CCP/EA, and our responses to those comments; and

- affirming that the CCP actions support the purpose and need for the CCP, the purposes for which the refuges were established, help fulfill the mission of the Refuge System, comply with all legal and policy mandates, and work best toward achieving each refuge's vision and goals.

Concurrent with release of an approved CCP, we will publish a notice of the availability in the *Federal Register*. That notice will complete the planning phase of the CCP process, and we can begin implementing the plan.

Summary of Comments Received

Given our interest in an objective analysis of the comments we received, we enlisted the U.S. Forest Service's Recreation Solutions Enterprise Team (Forest Service) in compiling a database that would identify and code specific issues and concerns. That team has particular expertise in providing unbiased analyses of public comments on major proposals by Federal land management agencies, a process called "content analysis." The team evaluated and coded all of the comments we received, including all letters, e-mails, and comments recorded at public meetings. Our responses below follow the subject headings in their coding structure. Their full report is available online at: *http://www.fws.gov/northeast/planning/MasonNeck_Featherstone/ccphome.html* (accessed August 2011).

During the comment period, we received 79 responses, both written and oral. These responses represent 85 different signatures and 353 individual comments.

We gathered oral comments at the following public meetings attended by a total of 65 people:

- February 2, 2011: Potomac Community Library, Woodbridge VA (two sessions; one afternoon, one evening)
- February 3, 2011: Gunston Elementary School, Lorton, VA

We received a variety of letters from local, State, and Federal Governmental agencies and entities, including the following:

- Virginia Council on Indians
- Virginia Department of Historic Resources (VDHR)
- Virginia Department of Game and Inland Fisheries (VDGIF)
- Representative Gerald E. Connolly, Congress of the United States, House of Representatives
- Fairfax County Stormwater Planning Division (SWPD)
- Potomac Heritage National Scenic Trail – National Park Service
- Prince William County, Woodbridge District Supervisor
- Fairfax County Department of Planning and Zoning

We also received a consolidated letter (dated February 16, 2011) compiled by the Virginia Department of Environmental Quality (VDEQ) that included comments from the seven State and county agencies listed below (several agencies submitted both individual comments and comments in the consolidated letter). We either refer to that letter herein as the "VDEQ" letter, or refer to respective agency comments.

- Virginia Department of Environmental Quality
- Virginia Department of Agriculture and Consumer Services (VDACS)
- Virginia Department of Conservation and Recreation (VDCR)
- Virginia Department of Health (VDH)
- Virginia Department of Historic Resources
- Fairfax County
- Prince William County

We also received comments signed by representatives from the following organizations:

- Friends of Potomac River Refuges
- Prince William Conservation Alliance
- Northern Virginia Chapter of Delta Waterfowl
- Elizabeth Hartwell Environmental Education Fund
- Northern Virginia Bird Club
- Virginia Chapter of the Sierra Club
- Virginia Conservation Associate Audubon Naturalist Society
- Audubon Society of Northern Virginia (ASNV)
- Virginia Native Plant Society (VNPS)
- Prince William Wildflower Society

In the discussions below, we address every substantive comment received. Substantive comments are those that suggest the analysis is flawed in a specific way. Generally substantive comments

- challenge the accuracy of information presented;

- challenge the adequacy, methodology, or assumptions of the environmental or social analysis and supporting rationale;

- present new information relevant to the analysis; or

- present reasonable alternatives (including mitigation) other than those presented in the document.

Such substantive comments may lead to changes or revisions in the analysis or in one or more of the alternatives. There may be many or no substantive comments in each response we received (BLM 2010).

Occasionally, the Forest Service coded the same comment under two or more headings because the subject matter related to more than one discussion area. As such, there may be some responses that direct the reader to another heading where the topic is covered in additional detail. Finally, we did not include in the responses below some comments that the Forest Service coded in their report that we consider non-substantive. For example, there were people who wrote us to thank us for hosting the public meetings, tell us that they thought the document was well written, or explain the mission of their organization or agency.

Directly beneath each subject heading, you will see a list of unique letter ID numbers that correspond to the person, agency, or organization that submitted the comment. A cross-referenced list appears as attachment 1 to this appendix.

In several instances, we refer to specific text in the draft CCP/EA and indicate how the final CCP was changed in response to comments. The full versions of both the draft CCP/EA and the final CCP are available online at: *http://www.fws.gov/northeast/planning/MasonNeck_Featherstone/ccphome.html* (accessed August 2011). For a CD-ROM or a print copy, please contact the Potomac River National Wildlife Refuge Complex (Refuge Complex) headquarters.

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Service Responses to Comments by Subject

Purpose and Need

Decision Framework Response
(Letter ID#: 34)

Comment: One respondent stated that an EA was insufficient and that NEPA requires that we write an Environmental Impact Statement (EIS).

Response: The Acting Regional Director reviewed the final CCP to assess whether there would be one or more significant environmental effects that would require an EIS under NEPA (40 C.F.R. 1508.27). The determination, detailed in the FONSI (see final CCP appendix H), summarizes why an EIS is not warranted and an EA is sufficient.

Document – Specific
(Letter ID#: 2, 18, 48, 67, 69)

Comment: A representative from Virginia Council on Indians suggested changing the wording of a strategy for Mason Neck Refuge under goal 5, objective 5.1 "Archaeological Resources" in alternative B. The suggested change was from "Raise awareness of the importance of protecting cultural resources through outreach and interpretive information and programs" to "Raise awareness of the importance of protecting cultural resources, and interpret the existing cultural resources through outreach and interpretive information and programs." The Virginia Council on Indians also offered to assist in the refuge's interpretation, education, and outreach programs related to the indigenous cultural resources of the refuges.

Response: We have updated the text to reflect the suggested language and look forward to working with the Virginia Council on Indians to improve our cultural resources programs. In the final CCP, we will also identify the Virginia Council on Indians as a partner in chapter 4 for Mason Neck Refuge, under goal 5, objectives 5.1 "Archaeological Resources" and 5.2 "Historical Resources."

Comment: Two people commented about inconsistencies they saw with information in different parts of the document. One respondent specifically mentioned there were "…somewhat inconsistent descriptions of staff needs. A reasonable person I think may ask at what point fiscal reality influences management planning and it doesn't make sense to plan from millions of dollars in capital development and a vastly expanded staff or does it make more sense to plan for sufficient funds to provide basic wildlife management and public services at all of the refuges that presently exist."

The other respondent expressed support for the Service-preferred alternatives, but said he noticed "… incomplete, possibly inconsistent, data on the occurrence of birds and other fauna and flora (e.g., inventories by [ASNV] and the [VNPS] have recorded over 250 bird species, 82 butterflies, 87 dragonflies, and well over 700 plant species)." He went on to describe specific places in the document where we listed species that he thought was incomplete or inconsistent.

Response: In response to the first comment, see our discussion below under the heading **"Staffing."**

With regard to the second comment, we hope readers can appreciate, given the level of detail we provide in this plan, that we are bound to have some errors. We corrected all typographical or factual errors and inconsistencies in the final CCP that were brought to our attention. In addition, based on information provided by regional experts, we updated information in our species listings in appendix A "Species Known or Suspected on the Refuges and Their Conservation Status." We also updated information on refuge management activities that was provided to us from reliable sources. Also see our response below under the heading **"Inventories and Surveys."**

Comment: The VDGIF recommended we update the CCP to reflect that chronic wasting disease (CWD) has been detected in the Commonwealth of Virginia as of January 19, 2010.

Response: We thank the VDGIF for providing updated information on the status of chronic wasting disease in Virginia. We have included this information in the final CCP for each refuge in Chapter 4 "Management Direction and Implementation," under the heading "Monitoring and Abating Wildlife Diseases."

Document – Maps
(Letter ID#: 43, 59)

Comment: One commenter wrote that the label for Great Marsh was misplaced on one of the maps in the CCP. Another person who gave public testimony at one of the public meetings had trouble understanding the displayed map and felt it limited his ability to comment.

Response: We regret the error and frustration people may have had with our maps. Fortunately, we were able to discuss the map concerns directly with the gentlemen who attended our public meeting and explain to him what we were trying to convey. We understand what was difficult for him to interpret. We reviewed all of our maps for the final CCP and made some adjustments to improve their presentation and understandability. We hope readers agree. In the event there are still questions, we request that readers call the refuge headquarters for an explanation.

Regulatory Framework
(Letter ID#: 7)

Comment: The consolidated response from the VDEQ listed a number of regulations that may apply to the Service and projects proposed in the CCP.

Response: We appreciate and respect the jurisdiction and authority of State of Virginia agencies. We will continue to coordinate with the VDEQ and other respective State agencies to ensure compliance with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges. In particular, we recognize the responsibility to comply with the Coastal Zone Management Act and meet the requirements for a Federal consistency determination. Throughout their response they recommend specific actions to mitigate impacts on the refuges' natural and cultural resources. We include all applicable recommendations as general strategies in the final CCP, chapter 4, under "Best Management Practices for Construction and Maintenance Activities."

CCP Planning Process and Methodology
(Letter ID#: 6, 18, 37)

Comment: One person commented that the review of wildlife and plants for Mason Neck Refuge in the draft CCP/EA was weak and out of date.

Response: We updated our discussions on wildlife and plant species in the final CCP with the information that was provided to us from reliable sources. One respondent, who has expertise and firsthand knowledge of species and habitats on the refuges, provided us with updated information for our species listings in appendix A "Species Known or Suspected on the Refuges and Their Conservation Status." We greatly appreciate this level of review and willingness to share information. Also see our response below under the heading **"Inventories and Surveys."**

Comment: One respondent was interested in how the 15-year review of the CCP would be conducted. This person was concerned with the lack of explanation of this review in the draft CCP. In particular, she was interested in whether the review will include "open, public participation" and if there would be any other interim reviews. Finally, she wondered how these reviews would differ from those "promised in the CCP for Occoquan Bay [Refuge]."

Response: Service planning policy (602 FW 3) describes the CCP planning process we used in developing the draft and final CCPs. Part 3.4 (8) of that policy describes the CCP planning step "Review and Revise Plan." Under Part 8(a) Plan Review, the direction is to "Review the CCP at least annually to decide if it requires revisions. Modify the plan and associated management activities whenever this review or other monitoring and evaluation determine that we need changes to achieve planning unit purpose(s), vision and goals."

Under Part 8(b) Plan Revision, the direction is to "Revise the CCP when significant new information becomes available, ecological conditions change, major refuge expansion occurs, or when we identify the need to do so during plan review. This should occur every 15 years or sooner, if necessary. All plan revisions should follow the procedure outlined in this chapter for preparing a plan and will require NEPA compliance…"

There appears to be some confusion about what is to be expected in a "review" of the CCP versus a "revision." The annual reviews will be conducted by the refuge manager. During the review, the refuge manager will determine whether there is significant new information to warrant a more detailed and formal revision process. As stipulated by Service planning policy (602 FW 3), the revision process will occur at least every 15 years following the detailed CCP planning process outlined in policy. That revision process will also comply with NEPA. Both NEPA and Service planning policy require we inform and involve the public, as we have done during the development of this CCP.

Comment: One commenter suggested postponing the CCP planning process for Mason Neck and Featherstone Refuges by two years due to her perception of corruption and deception in the current administration in Washington, D.C.

Response: We respect this respondent's right to her own political opinions and affiliations. We wish to emphasize, however, that the Service is committed to creating a CCP for Mason Neck and Featherstone Refuges that is based on the principles of sound biological science, supports the mission of the U.S. Fish and Wildlife Service (Service) and the National Wildlife Refuge System (Refuge System), and helps achieve the purposes of the refuges. In chapter 1 of the draft CCP/EA, we define the purpose of, and need for, a CCP for these refuges. We believe we have developed a plan with a strong and clear vision for how to manage Mason Neck and Featherstone Refuges to best conserve wildlife resources and offer appropriate and compatible wildlife-dependent recreational opportunities.

Throughout the planning process, we invited elected officials, State and county agencies, the public, our partners, and organizations to provide comments and feedback as we developed our recommendations. We feel public and partner involvement not only ensures that the planning process is transparent, but also holds us accountable to creating a scientifically sound and defensible management plan.

By delaying the completion of this CCP for two years, Mason Neck Refuge and Featherstone Refuges would continue to operate without a master plan, and the strategic direction a CCP provides. Also, a delay would put us in violation of a Federal law; the 1997 Refuge Improvement Act requires that each refuge which existed prior to 1997 have a completed and approved CCP by 2012.

CCP (Use One Plan for All Three Refuges in Potomac River National Wildlife Refuge Complex)
(Letter ID#: 9, 13, 16, 18, 24, 38, 39, 40, 48, 67)

Comment: Ten respondents commented that they would have liked to see the Service develop one CCP that covers the entire Potomac River National Wildlife Refuge Complex, including Occoquan Bay, Mason Neck, and Featherstone Refuges. The following quote reflects the general sentiment of these comments:

> …this draft falls short of being sufficiently comprehensive to meet the demands of the entire Refuge Complex. Contained within the draft are what seem to be plans for two, essentially separate, refuges rather than a plan for integral parts of an overall complex of natural ecosystems…At the outset of this planning process, various groups and individuals argued that without a single planning process there can be no truly comprehensive plan for the management and staffing of the entire Refuge Complex. This would necessitate including not just the two units addressed in this draft but Occoquan Bay [Refuge] as well. The plan for that refuge was done in 1998, is quite out of date, and – despite significant issues raised at the time of its adoption – has had no public review since then (although such reviews were promised every five years). Presumably, under current rules, that plan's review must now occur no later than 2013 which is certainly soon enough to warrant its inclusion in this current planning process.

Response: We began the CCP planning process for Mason Neck and Featherstone Refuges in 2006. At that time, we made the decision not to include Occoquan Bay Refuge in this new planning effort for several reasons. First, Occoquan Bay Refuge CCP was only 8 years old and was developed to be a 15-year plan. Second, we felt it was important to focus our attention on developing plans for the other two remaining refuges in the Potomac River Refuge Complex in order to comply with the 1997 Refuge Improvement Act mandate to complete all refuge CCPs by 2012. Third, in our opinion, management of Occoquan Bay Refuge had not appreciably changed from the 1997 CCP decision, or in situations where it had, we addressed those changes in subsequent, more recent planning processes which included a 30-day public input, review, and comment period. Those additional planning processes included development of a Fire Management Plan and accompanying EA (April 2001), the Deer Management Plan and accompanying EA (October 2001 and April 2007), the Potomac River Refuge Complex Administrative Headquarters and Visitor Facility Plan and accompanying EA (February 2009), and the Habitat Management Plan (April 2010).

We appreciate and respect the comment that having two separate CCPs covering the Refuge Complex diminishes the interdependent links among the three refuges as part of a complex administered together with many shared resources. However, we wish to point out there are many places in the draft CCP/EA where we emphasize the Refuge Complex connections. For example, the inside title page includes a vision statement for the Refuge Complex. In chapter 1, in our "Introduction" and accompanying map 1.1, and under "Refuge Management Profiles," we describe details about the Refuge Complex and the relationship among the three refuges. In chapter 2, under "Potomac River Refuge Complex Administration," we describe staffing, budget, the headquarters facility, and the Friends Group for the Refuge Complex. We describe staffing needs and proposals for the Refuge Complex in chapter 3 under "Actions Common to Alternatives B and C" and in appendix E "Staffing Charts." We make a recommendation for the priority order in filling Refuge Complex positions in appendix C "Refuge Operations Needs." We include consideration of all three refuges in chapter 4, "Cumulative Impacts." Finally, appendix B includes findings of appropriateness and compatibility determinations made for all three refuges combined in the Refuge Complex.

We will make a recommendation to the Regional Director that a more seamless connection between the three refuges is made when the CCP revision process for Occoquan Bay Refuge is initiated.

CCP Planning Cycle
(Letter ID#: 6, 18, 24, 48, 67)

Comment: Five respondents commented on the length of the CCP planning cycle. Specifically, they felt that 15 years was too long for a CCP to be in place; most suggested the planning cycle be reduced to 5 years. One person wrote, "Fifteen years seems an awfully long time for a strategic plan; 5 or 10 years max[imum] seems much more reasonable." Another stated,

> …15 years is a long time to wait for a general review of something as comprehensive as this [CCP] purports to be. A five year plan review process was in place apparently at the time the Occoquan Bay Comprehensive Plan was adopted and I'm concerned about how this process works because there has not been, as far as I'm aware, any public review at the five year intervals and that raises the possibility that we are not sure what will happen at the end of the 15 years for this plan if, in fact, it can be reduced to five years which is in my view a much more realistic timeframe than 15.

Response: The final CCP for Occoquan Bay Refuge (USFWS 1997) states, "The objectives identified in this Comprehensive Conservation Plan are expected to be accomplished in approximately 15 years, with reviews every five years to make adjustments due to new information…data collected will be used to continually evaluate and adjust management activities" (pages 49-50).

In our response above under "CCP Planning Process and Methodology," we summarize Service planning policy (602 FW 3) specifically as it relates to plan review and revision. In summary, an informal review should occur annually to determine whether a minor or major revision is warranted. CCPs should be modified "…whenever this review or other monitoring and evaluation determine that we need changes to achieve planning unit purpose(s), vision, and goals." A CCP should be revised "…when significant new information becomes available, ecological conditions change, major refuge expansion occurs, or when we identify the need to do so during plan review. This should occur every 15 years or sooner, if necessary."

It is incumbent on the refuge manager to conduct CCP reviews. The refuge manager should then notify the Assistant Northeast Regional Director for the National Wildlife Refuge System (e.g. Regional Refuge Chief) if they believe a major revision is warranted at any time prior to the 15-year revision requirement. Regional refuge planning staff can then provide assistance in conducting detailed planning and NEPA analysis, as appropriate.

Outside of Scope
(Letter ID#: 43)

Comment: One respondent felt that the postal address for Mason Neck Refuge was listed incorrectly in the CCP as "Lorton, VA 22079," and should instead be listed as "Mason Neck, VA 22079."

Response: The determination of what city name is affiliated with a particular zip code is outside of the proposed action and the purpose of, and need for, a CCP as stated in the draft CCP/EA, chapter 1. However, we will let readers know that we defer to the U.S. Postal Service's Web site for naming conventions. The Web site identifies the "Actual" city name for zip code 22079 as Lorton, VA. However, the Web site also indicates that an "Acceptable" city name alternative for this zip code is Mason Neck, Virginia (USPS 2011). We will continue to use Lorton, VA.

Physical Environment

Global Climate Change
(Letter ID#: 6, 13)

Comment: Two letters contained comments on global climate change. One urged the refuge to consider sea level rise in all planning processes, due to its potential to cause flooding adjacent to the Potomac River. Another respondent felt that that discussion of climate change in the draft CCP/EA was "filler" and simply a "…repeat of overworked PC drivel as is trying to predict its impact on the wetlands and swamp in the area."

Response: We disagree that our discussion on climate change is "drivel." On the other hand, we recognize that we currently provide few specific details on the direct impacts predicted for Mason Neck and Featherstone Refuges from climate change. In the draft CCP/EA we identify climate change impacts as an issue in chapter 1 for both refuges under the discussion on "Issues, Concerns, and Opportunities." We also discuss climate change impacts in chapter 4 under "Cumulative Impacts." There is uncertainty about the exact impacts of climate change and, unfortunately, we are currently unaware of any specific studies on the predicted localized effects of climate change near the Refuge Complex. As proposed in the draft CCP/EA, chapter 3 for Mason Neck, under alternative B, goal 1, objective 1.3, we plan to conduct a Sea Level Affecting Marshes Model (SLAMM) analysis to better understand how sea level rise may affect the Refuge Complex's marshes. The information we gain from this analysis will help us to make more informed management decisions. In chapter 4, we describe how we would manage Refuge Complex lands to increase resiliency and redundancy, and improve the diversity, integrity, and health of refuge habitats. We also plan to use an adaptive management approach on refuge lands to adjust to new information about, and respond to, impacts caused by climate change.

The Service has been actively engaged in leading Federal natural resource agencies to develop guidance on assessing and responding to the impacts on climate change (*http://www.fws.gov/home/climatechange/*; accessed June 2011). Since publication of our draft CCP/EA, several Service publications have been issued on this topic, including one that involved multiple agencies and non-governmental organizations titled "Scanning the Conservation Horizon, A Guide to Climate Change Vulnerability Assessment." This document is available online at: *http://www.nwf.org/vulnerabilityguide* (accessed June 2011). The guidance in this document was produced by

an expert workgroup on climate change vulnerability assessment convened by the National Wildlife Federation in collaboration with the Service. The document provides guidance on assessing the vulnerability of species, habitats, and ecosystems in an effort to help practitioners understand how vulnerability assessments can help them respond to the challenges of managing natural resources in an era of rapid climate change. This guidebook is one of many tools the Service advocates use of to identify, assess, and adapt strategies to deal with the impacts of climate change. We will use these and other peer-reviewed science publications, as well as work with other Federal and State agency partners, and resource experts, to insure we are working with the best available information prior to making resource decisions.

Hydrology and Water Quality
(Letter ID#: 7, 41)

Comment: The VDEQ submitted comments relating to the Virginia Water Protection Permit Program as it relates to the protection of surface waters. They felt the CCP did not clearly address whether any of the projects proposed in the draft CCP/EA would impact surface waters. In particular, they referenced three proposed actions that might have potential impacts to water quality and wetlands: herbicide use to control invasive plants in wetlands, trail construction and maintenance, and the proposed construction of Refuge staff quarters. The VDEQ further stated that if any actions could impact surface waters under the jurisdiction of the Commonwealth of Virginia that the Service would need to apply for a water protection permit from the VDEQ Northern Regional Office (NRO). They recommend that projects avoid or minimize impacts to surface water to the maximum extent practicable.

The VDEQ also submitted comments related to the Virginia Pollutant Discharge Elimination System Permit Program and offered many specific suggestions to the Service regarding practices, regulations, and permits that may be required for any proposed projects that may affect water quality, wetlands, or drinking water. They clarify that VDEQ is the appropriate State agency for coordination on water quality data, citizen water quality monitoring, and discharge permits for pesticides and wastewater, and that the Virginia Marine Resources Commission "…regulates encroachments in, on, or over state-owned subaqueous beds as well as tidal wetlands…" Also, they mention that updated information for the CCP is in the draft Integrated Report (published in 2010) which has more current details on Total Maximum Daily Loads (TMDL's) and other water quality information for waters near the refuges. In addition, they mention they are an interested partner in the establishment of a water quality monitoring station at the refuges.

VDEQ also emphasized the need for refuge activities to be compliant with the Coastal Zone Management Act and Virginia Coastal Zone Management Program Regulations, and the Chesapeake Bay Preservation Act and Chesapeake Bay Preservation Area Designation and Management Regulation administered by VDCR Division of Chesapeake Bay Local Assistance.

One individual also submitted the following comment, "We would like to see a greater emphasis on improved water quality in your plan. "

Response: We will continue to coordinate with the VDEQ, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges, including those regarding hydrology and water quality. Specifically, we will review requirements applicable to refuges and submit applications for all necessary permits before we actually undertake activities of concern (e.g. herbicide use, trail construction and maintenance, and the Refuge staff quarters construction). We also included the specific suggestions made by VDEQ for avoiding or minimizing unavoidable impacts to wetlands and waterways. We listed these as general strategies in the final CCP, chapter 4, under "Best Management Practices for Construction and Maintenance Activities". We also updated the CCP to list the latest TDML information using the 2010 Integrated Report.

We agree that protecting water quality is an important component of refuge management and included actions throughout the draft CCP/EA to ensure that no degradation occurs. For example, in chapter 3, alternative B for Mason Neck Refuge, goal 2, objective 2.4 "Aquatic Habitat and Water Quality" and in alternative B for Featherstone Refuge, goal 1, objective 1.2 "Shoreline Protection, Wetlands, and Water Quality," we detail strategies and monitoring we would undertake in the proposed action to protect and enhance water quality. Finally, we welcome VDEQ as a partner in developing and implementing a water quality monitoring program on the refuges and will look to their expertise when we initiate the project.

Storm Water Control
(Letter ID#: 7)

Comment: The VDEQ stated that the Service may need to obtain a permit and develop a storm water pollution prevention plan in order to comply with the Virginia Stormwater Management Law and Regulations. In particular, they referenced the proposed action to construct a Refuge staff quarters as an activity that might require the permit and plan. They also clarify that VDCR is the appropriate point of contact for storm water management related to construction activities.

Response: We will continue to coordinate with the VDEQ, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits,required on national wildlife refuges, including those regarding storm water control. Specifically, we will review requirements applicable to refuges and submit applications for all necessary permits before we actually undertake the construction of Refuge staff quarters.

Erosion and Sediment
(Letter ID#: 7, 50)

Comment: The VDEQ stated that the Service may need to obtain a permit and develop an erosion and sediment control plan for certain activities in order to comply with Virginia Erosion and Sediment Control Law and Regulations. They suggest that the proposed construction of Refuge staff quarters, other clearing and grading activities, and related land disturbances activities that result in…"land-disturbance of equal to or greater than 2,500 square feet…" should be regulated by a permit and plan submitted to VDCR.

Response: We will continue to coordinate with the VDEQ, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges, including those regarding erosion and sediment control. Specifically, we will review requirements applicable to refuges and submit applications for all necessary permits before we actually undertake the construction of Refuge staff quarters and other major land clearing activities.

Comment: One person wrote that care must be taken to protect Featherstone Refuge because a small number of people walking on a trail can create erosion. The respondent stated witnessing rapid erosion occurring on trails on the refuge, including deepening of trails and trails becoming muddier. The respondent was particularly concerned due to the amount of wetlands on the refuge, and wrote "…you simply can't walk across a wetland without causing erosion. Wetlands are sensitive and there is no such thing as a low impact use of a wetland."

Response: In the draft CCP/EA, under chapter 3 for Featherstone Refuge, goal 2, objective 2.4 "Wildlife Observation and Photography," we describe our proposal for new trails on this refuge. In chapter 4 for Featherstone Refuge, we describe the impacts we anticipate from developing trails as proposed in alternative B under the discussions on "Soil Impacts," "Forest Habitat Impacts," and "Wetland Impacts." In each of those discussions we emphasize that best management practices would be followed in designing and constructing the trail and that outreach and enforcement will be important to insuring that resource impacts are kept to a minimum.

Solid and Hazardous Waste Management
(Letter ID#: 7)

Comment: The VDEQ stated that a review of their Geographic Information System (GIS) database did not reveal any documented hazardous waste sites within a ½-mile radius that would impact or be impacted by refuge activities. However, a cursory review of data files by the VDEQ Division of Land Protection and Revitalization determined that "…there are a number of hazardous waste sites, solid waste sites, voluntary remediation program sites, and formerly used defense sites located within the zip code…"; however, their proximities to the refuges is unknown and encourage Refuge Complex staff to look into this further. With regard to refuge management activities, they specifically mention the need to check, if applicable, all structures proposed to be demolished for asbestos-containing materials and lead-based paints. They also commented on the status of hazardous materials cleanup at the former defense site on Occoquan Bay Refuge (e.g. Nike Battery 64/65).

Response: We will continue to coordinate with the VDEQ, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges, including those regarding solid and hazardous waste management. In addition, prior to the demolition of any structures, we will check for asbestos-containing materials and lead-based paints.

With regards to the comments on hazardous materials cleanup at the former "NIKE Battery 64/65," that discussion is outside the scope of this CCP as it does not relate to either Mason Neck or Featherstone Refuge. If you would like to discuss this matter further, please contact the refuge manager directly.

Air Quality
(Letter ID#: 7, 37)

Comment: The VDEQ stated that they are charged with carrying out the mandates of Virginia's Air Pollution Control Law and is responsible for Virginia's federal obligations under the Clean Air Act. They identify several proposed refuge activities that may affect air quality: refuge trail maintenance, land-clearing debris burning, fugitive dust during construction, and fuel burning equipment. As with previous items they offered specific jurisdiction, regulations, permitting requirements, and suggested practices concerning maintaining air quality.

Response: We will continue to coordinate with the VDEQ, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges, including those regarding actions that could affect air quality. Specifically, we will review requirements applicable to refuges and submit applications for all necessary permits before we actually undertake the construction of Refuge staff quarters, new trails, and other major land clearing activities. We also include their recommended practices to minimize fugitive dust as general strategies in the final CCP, chapter 4, under "Best Management Practices for Construction and Maintenance Activities."

Comment: A respondent wanted prescribed burning prohibited on the refuges because of human health concerns. In her opinion, fine particulate matter generated from burning could cause health problems such as "lung cancer, heart attacks, strokes, allergies, pneumonia, [and] asthma."

Response: We understand the concern over air quality and human health impacts of prescribed burning. We rarely burn on either refuge, and do not propose it in the draft CCP/EA as a habitat management tool. If future habitat monitoring reveals that prescribed burning is necessary to maintain forest health, we would propose a program that would follow strict protocols designed to minimize impacts to human health and safety. For example, we would only burn when wind conditions are such that smoke and particulate matter are well diluted in the atmosphere and carried away from sensitive areas such as hospitals or concentrations of residential development. We would obtain all State permits and follow all regulations and notification requirements for national wildlife refuges.

Our evaluation of other refuge management activities and their effects on air quality is included in the draft CCP/EA chapter 4, under "Air Quality Impacts."

Shoreline Protection
(Letter ID#: 10, 19, 40, 71)

Comment: One individual and the SWPD supported shoreline protection on the refuges. The SWPD encouraged the Service to work collaboratively to address degraded shorelines. Another respondent thought the CCP comments on shoreline protection were vague, writing, "We find the CCP comments regarding shoreline protection at Featherstone [Refuge] to be unnecessarily vague. The topography at Featherstone is dramatically different from the Mason Neck [Refuge]. Hardening the shoreline at Featherstone, rather than proposing a 'Living Shoreline' comparable to what the Service has highlighted at Eastern Neck National Wildlife Refuge, would be a direct invitation for every property owner in the Chesapeake Bay to build bulkheads. The FWS should set the example at Featherstone for a managed retreat, if sea level rises."

Response: Shoreline protection is a huge concern that we mention throughout the draft CCP/EA. We identify it in chapter 1 as a key issue raised by many during the scoping phase of the CCP process. In chapter 2, we describe the existing shoreline protection structures (e.g., breakwaters) off Mason Neck Refuge, which were part of a Wilson Bridge mitigation project in State waters. In chapter 3, under Mason Neck Refuge, preferred alternative B, goal 2, objective 2.3 "Shoreline Protection," we describe our proposal to continue to work with partners to maintain and evaluate the existing breakwater structures. We also state that our proposal includes working with experts to conduct a risk assessment to identify and prioritize other potential shoreline restoration areas and identify viable protection methods. Our intent is the same for Featherstone Refuge's shoreline, as described in chapter 3, under Featherstone Refuge, Service-preferred alternative B, goal 1, objective 1.2 "Shoreline Protection, Wetlands, and Water Quality."

We acknowledge that our proposal is vague as it relates to specific protection methods. This is intentional as we have no design in mind and recognize that we need to get additional expertise to conduct the risk assessment and to evaluate potential viable protection methods. Providing protection through a "living shoreline" would be an important method to consider based on our successes at other refuges in the Chesapeake Bay. However, prior to discussing options with experts, we did not want to limit ourselves to any one method. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, under the heading "Conducting Additional NEPA Analysis" we state that before a decision is reached on the design and construction of new shoreline protection measures, we would be required to conduct additional or supplemental NEPA analysis.

Comment: A commenter thought that placing hunting blinds offshore would negatively impact any efforts to protect shorelines, while only providing a very limited number of new waterfowl hunting opportunities.

Response: We do not believe the State regulated use of hunting blinds offshore would negatively impact our shorelines. Hunting blinds currently exist off our refuge shorelines, and we have not noticed any impact on refuge shorelines. We would continue to use outreach and enforcement to insure no impacts occur. In addition, see our response under **"Hunting – Waterfowl and Hunting Blinds"** below.

Cultural Resources

Heritage and Cultural Resources
(Letter ID#: 7, 19, 69)

Comment: Three respondents, including the VDGIF, expressed support for protecting heritage and cultural resources on the refuges. The VDEQ submitted a list of applicable regulations and jurisdictions relating to cultural resources. They also stated that the VDHR fully supports the Service-preferred alternatives for both Mason Neck and Featherstone Refuges. Another respondent felt that meeting objectives for heritage and cultural resources could be accomplished under current management (alternative A) for both refuges through the use of existing organizations and volunteer groups with no impact on the refuge's budget.

Response: We will continue to coordinate with the VDEQ, the VDHR, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges, including those regarding archaeological and historic sites. Appendix D has a letter we received from VDHR indicating compliance with our proposals in the draft CCP/EA.

We appreciate the support for cultural resource protection and agree with the suggestion that we work with partners to accomplish priority work. As projects arise, we would seek those opportunities.

Refuge Administration

Refuge Administration and Goals
(Letter ID#: 9, 17, 22, 23, 25, 34, 37, 40, 43)

Comment: One person sent in a list of "Do Nots" including no pesticides, no logging, no new roads, and no burning.

Response: The commenter did not provide us with substantive comments to support their opposition to these actions, but merely provided a list of actions of concern. As such, we are unable to respond in a specific way. In addition, not all of the actions of concern are actually in our proposal. In our **"Introduction"** above, we define substantive comments as those that suggest the analysis is flawed in a specific way, and challenge the accuracy or adequacy of information presented, or challenge the methodology, or assumptions used (BLM 2010).

For those actions of concern listed in the letter that are part of our proposal (e.g., use of herbicides to control invasive plants, use of pesticides to control invasive pests during a regional epidemic, and trail infrastructure), we stand by our descriptions and analysis in the draft CCP/EA, chapter 4.

Comment: One commenter felt the refuges should encourage wildlife viewing, while another asked the Service to establish passive observation zones (without development) on the refuges. Another commenter felt the refuges could offer greater public use opportunities while "still protecting flora and fauna."

Response: We believe our proposed programs under both Service-preferred alternatives (alternative B for both refuges) in the draft CCP/EA for wildlife observation, nature photography, environmental education, and interpretation represent a reasonable, practical, and feasible approach over the next 15 years in support of meeting the purpose and goals of Mason Neck and Featherstone Refuges and the mission and goals of the Refuge System. The proposal promotes wildlife viewing and nature photography, and includes some new infrastructure (e.g., trails and viewing platforms), but they would all occur in existing, disturbed areas, such as old roadbeds or footpaths. The draft CCP/EA, in chapter 3 for Mason Neck Refuge, goal 4, objective 3.4 "Wildlife Observation and Photography," and in chapter 3 for Featherstone Refuge, objective 2.4 "Wildlife Observation and Photography," we describe our proposal and our rationale. In the draft CCP/EA, in chapter 4 under discussions for air quality, soils, water quality, wetlands, and wildlife, we describe both the beneficial and adverse impacts we predict from our proposal. Also, appendix B includes compatibility determinations for "Wildlife Observation, Photography, Environmental Education, and Interpretation."

Comment: One respondent suggested the Service use Mason Neck Refuge as its "flagship" refuge due to its proximity to the Nation's capital in Washington, D.C. to demonstrate "the benefits of wildlife habitat preservation" and "private, public and intergovernmental cooperation."

Response: The Refuge Complex is indeed strategically located to the Washington, D.C. metropolitan area and offers a welcome respite from the surrounding urban setting. We also agree that the Refuge Complex, including Mason Neck Refuge, provides an opportunity to showcase cooperative conservation opportunities. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, the objectives and strategies under goal 4 were developed with the intent to improve outreach and community involvement, and to encourage and foster new partnerships to advance conservation in the area. In chapter 3 under "Actions Common to All Mason Neck Refuge CCP Alternatives," in the subheading "Coordinating with Partners, Friends of Potomac River Refuges, and the Mason Neck Peninsula Community," we also identify several strategies to enhance our relationship with the Mason Neck Mangers Group and the Friends Group. We welcome other ideas and opportunities on how to enhance these opportunities further.

Comment: Several commenters stated that the purpose of national wildlife refuges are to preserve and enhance natural habitats and native wildlife. Another person was concerned that the Service is suffering from "mission creep," stating that "[e]ither you are managing refuges to protect wildlife or you are managing parks for the public's entertainment." The commenter felt the Service was planning to manage Mason Neck and Featherstone Refuges more like a national park by proposing to offer so many recreational opportunities. The respondent wrote, "We neither need nor can afford two National Park Services" and that the Service should be "turned over to the National Park Service to combine duplicate functions and reduce costs."

Response: In the draft CCP/EA, chapter 1, under the heading "The Service and Refuge System Policies and Mandates Guiding Planning," we summarize the mission of the Refuge System, its goals, and significant policies guiding the management of refuges. Of the five stated goals of the Refuge System, three goals relate to natural resource protection and conservation, and two are focused on people. These latter two goals are

- Provide and enhance opportunities to participate in compatible, wildlife-dependent recreation; and

- Help to foster public understanding and appreciation of the diversity of fish, wildlife, plants, and their habitats.

As we state in the draft CCP/EA in chapter 3, for both Mason Neck and Featherstone Refuges, the introduction to each respective preferred alternative B includes a statement that we believe alternative B for both refuges represents "…the best combination of actions to meet the Refuge System mission and policies, and refuge purposes and goals. It is also the most effective of the alternatives in addressing public issues."

Appendix B in the draft CCP/EA presented findings of appropriateness and compatibility determinations explaining our rationales for allowing or not allowing activities. We stand by these recommendations and our determination that alternative B best meets the Service and Refuge System mission and refuge purposes.

Comment: One person felt equal attention should be given to Mason Neck Refuge, and was concerned that Occoquan Bay and Featherstone Refuges were receiving more attention.

Response: It is the responsibility of the refuge manager to determine the distribution of resources among the three refuges in the Refuge Complex each year. This decision is based on many factors including the availability of staff, budgets and other resources, priority and time-sensitive projects, issues, concerns, threats, and opportunities.

In addition, as noted below under **"Staffing,"** the CCP is meant to provide, "…long-term guidance for management decisions and set forth goals, objectives, and strategies needed to accomplish refuge purposes and identify the Service's best estimate of future needs." Decisions on how to distribute specific resources each year to implement the CCP are at the discretion of the refuge manager.

Refuge Establishment and Land Acquisition History
(Letter ID#: 15, 24, 48, 67)

Comment: Two respondents wanted Elizabeth Hartwell to be given full credit for being instrumental in the establishment of Featherstone Refuge.

Response: We apologize for omitting this from the draft CCP/EA. We will include this information in the final CCP, Chapter 3 "Refuge and Resource Descriptions," under the heading "History of Refuge Land Acquisition" for Featherstone Refuge.

Comment: One person supported Mason Neck Refuge purchasing the 789 acres in fee from Northern Virginia Regional Park Authority. Another suggested annexing Mason Neck State Park and administering it all under a Potomac River Complex.

Response: We appreciate the support for our proposal to purchase the 789 acres from the Northern Virginia Regional Park Authority.

With regards to annexing Mason Neck State Park, if the State of Virginia were interested in closing Mason Neck State Park and/or divesting itself of its interest in the property, then the Service would evaluate purchasing the land as an addition to the refuge. In the meantime, the Potomac River Refuge Complex works cooperatively with Mason Neck State Park to manage wildlife populations, as well as outdoor activities. Our working relationship has proven beneficial to both agencies as well as the visiting public. This design provides conservation for the benefit of wildlife while also allowing opportunity for the public to take pleasure in the use of this area. Therefore, we do not believe it would be beneficial, nor in the best interest of either Mason Neck Refuge or Mason Neck State Park, to annex this park.

Staffing
(Letter ID#: 5, 6, 13, 14, 15, 16, 18, 19, 40, 48, 64, 67)

Comment: Thirteen comments referred to staffing; most were in favor of hiring a biologist. For example, a respondent wrote, "We believe that responsible management of refuges requires the onsite, regular presence of a biologist and we urge the Service to hire at least one." However, two people questioned whether hiring staff was prudent given current budgets constraints and uncertainty about future funding. Another respondent stated that no employee hires are identified for Featherstone Refuge in appendixes C and E of the draft CCP/EA.

Response: In the draft CCP/EA, chapter 3 for Mason Neck, under "Actions Common to all Mason Neck Refuge Alternatives," subheading "Refuge Staffing and Administration," and under "Actions Common to Alternatives B and C Only," subheading "Implementing the National Staffing Model," we describe our proposed Refuge Complex staffing by alternative. The respondent is correct that we are not proposing any staff specifically stationed at Featherstone Refuge. Refuge Complex staff are shared amongst the three refuges in the Refuge Complex, including Featherstone Refuge. Appendix E "Staffing Charts," presents the proposed staffing graphically. Also in chapter 3, in our "Introduction" to alternative B, we describe the refuge staffing we recommend. This is followed in chapter 3 by our presentation of goals and objectives that include a strategy to hire one or more of the staff identified. In Appendix C "Refuge Operations Needs System," we recommend a priority order for acquiring new staff under alternative B.

As we review the information on staffing we provided, the numbers are all consistent with a recommendation to eventually fill a total of 16 positions for the Refuge Complex. That being said, the respondents comment about fiscal realities and whether it is reasonable to assume we would ever have the funding to support that many staff is well taken. We appreciate that this may seem like a reach given past funding and challenging future forecasts for the Federal budget. However, we maintain as stated in the inside cover of the draft CCP/EA that,

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

Funding, Budget, and Implementation
(Letter ID#: 9, 11, 15, 18, 19, 24, 36, 49, 57)

Comment: Ten comments referred to either funding, budget, or how the Service would implement its goals and objectives. Most of these expressed doubt that the Service's goals could become reality due to current Federal budget constraints and uncertainties. A commenter wanted the refuges to focus on using their funds wisely and plan for reduced budgets. They stated, "Allocation of funds should be given to protection of Bald Eagle habitat, flora, fauna, shorelines, public access (where appropriate) and management of existing facilities and habitat, rather than planning new facilities." Another wrote, "Does it really make sense under present and foreseeable conditions to plan for a multi-million dollar administration and visitor's center at Occoquan Bay and a vastly expanded staff …? Or, does it make more sense to plan for sufficient funds and staff to provide basic wildlife management and public services at all of these refuges?" Several people also suggested using more volunteers to help offset the refuges costs.

Response: Under the **"Staffing"** discussion above we share the statement that was published on the inside cover of the draft CCP/EA, which describes how the CCP provides strategic direction and is not meant to be a commitment of funding or resources.

The decision to develop and construct a visitor center at Occoquan Bay refuge was made under a separate NEPA analysis and is not part of this CCP.

The suggestion to use more volunteers to accomplish priority work, given limited refuge funding, is a good one and is something we have pursued at various levels in the past and will continue into the future. Volunteers are vital to many refuge programs, and we value all the time and effort that people have donated. However, we believe it is important to point out that organizing for volunteer activities, including developing meaningful work, providing appropriate tools, support, and oversight, takes a fair amount of staff time and some funding. We need to pick those projects carefully until we have more staff on board.

Comment: One person asked, "How long will it take for a decision to be made once the public review period is completed? The timing is important for our conservation program."

Response: We are also interested in completing the CCP and are diligently working to that end. We hope to have a final plan approved in July or August 2011. The final decision rests with the Acting Regional Director.

Partnerships and Volunteers
(Letter ID#: 6, 9, 10, 11, 12, 13, 28, 30, 40, 48, 52, 57, 61, 62, 67, 79)

Comment: Seventeen commenters encouraged the Service to plan for and better use volunteers and partnerships. For example, one respondent wrote, "The FWS should make a clearer commitment in the CCP to work with partners to enhance the inventory data on species and communities at Featherstone [Refuge]." Another wrote, "The USFWS must better utilize the volunteer resources available to assist in its management of the Wildlife Refuges. Volunteers have proven to be a valuable asset towards achieving management goals, improving public facilities, and enhancing the visitor experience." Several people specifically mentioned using volunteers to aide with bird banding projects. Fairfax County, the Native Plant Society, the Northern Virginia Chapter – Delta Waterfowl, and others also encouraged the Service to foster partnerships with them.

Response: We fully agree with the comments about the value and importance of engaging volunteers and partners in the work that we do to support refuge goals, and we mention their vital role in numerous places in the document. We only regret that we cannot accommodate all offers of volunteer time, nor can we implement all the project ideas brought to us.

We provide an overview of our partnerships and volunteer program in the draft CCP/EA in chapter 2 under "Refuge Administration." In chapter 3 for Mason Neck Refuge, we identify as an "Action Common to all Mason Neck Refuge CCP Alternatives" the intent to enhance our efforts at "Coordinating with Partners, Friends of Potomac River Refuges, and the Mason Neck Peninsula Community," including the Mason Neck Land Managers Group. Also, under alternative B goal 4, objective 4.1 "Volunteers," objective 4.3 "Partner Outreach," and objective 4.5 "Research," we emphasize the importance of either volunteers or partners to our successes. In fact, most of the objectives under goals 1, 2, and 3 identify one or more strategies that use either volunteers or partners as a key resource to accomplish the work.

Interagency Agreements and Coordination
(Letter ID#: 7, 13, 23, 39, 40, 79)

Comment: Six commenters wanted the refuges to enhance their interagency agreements and coordination with other agencies. Some of the organizations and agencies specifically mentioned as potential partnerships opportunities included the following:

- Fairfax County
- Leesylvania State Park
- Mason Neck State Park
- Virginia Institute of Marine Science
- Bureau of Land Management - Meadowood Special Recreation Management Area
- Northern Virginia Regional Park Authority - Pohick Bay Regional Park

Fairfax County encouraged the FWS to consult and collaborate with several other agencies while implementing actions proposed in the draft CCP/EA. Specifically, they mentioned the following opportunities:

- Consulting with the Virginia Institute of Marine Science to select the most appropriate shoreline stabilization methods to protect eroding refuge coastlines and to develop strategies to adapt to sea level rise and other climate change effects; they also suggested referring to the "Fairfax County and the City of Alexandria, Virginia Shoreline Inventory Report Methods and Guidelines" for more information

- Consulting with the Virginia Department of Planning and Zoning to ensure the location of staff housing is consistent with the county's Environmental Quality Corridor policy

- Referring to the Lower Occoquan Watershed Management Plan to identify appropriate stream restoration projects

- Continuing to collaborate with staff in Natural and Cultural Resources Management Branches of the Fairfax County Park Authority and the Stormwater Planning Division of the Department of Public Works and Environmental Services to develop curricula for environmental and cultural resource education and interpretation

Response: As noted in our response under **"Partnerships and Volunteers"** above, we are indebted to our partners and volunteers for their assistance in accomplishing priority work on both refuges. We regret that we cannot accommodate all the suggestions or ideas brought to our attention. However, coordinating with other Federal and State agencies in accomplishing mutually beneficial work is a priority for us. We are presently working with most of the State and county agencies listed in the comment. We appreciate the suggestions to collaborate with specific agencies on particular actions that we identified under alternative B. Our plans will be to follow through on these recommendations.

Comment: Two respondents indicated a concern with shoreline developments to support visitor services. They specifically mentioned, "In coordinating with the National Park Service to manage the Captain John Smith Trail, we urge you not to create extensive shoreline visitor services infrastructure that would displace native habitats and wildlife or cultural resources."

Response: Our proposed visitor services infrastructure for the refuges are depicted on maps 4.1, 4.2, and 4.3. No developments would occur without first evaluating site-specific cultural and natural resources impacts and their potential to displace native habitats. Also in the draft CCP/EA, chapter 3 for Mason Neck Refuge, goal 3, objective 3.5 "Interpretation Program" and Featherstone Refuge, goal 2, objective 2.5 "Interpretation," we describe our coordination with the National Park Service on the Captain John Smith Chesapeake National Historic Trail. We plan to continue coordinating with the National Park Service on identifying opportunities that would be compatible with refuge purposes and the Refuge System mission. In chapter 3 for Mason Neck Refuge, goal 2, objective 2.3 "Shoreline Protection," we have a strategy that specifically states we would "Engage in public outreach and education to explain the sensitive nature of shoreline habitats and the importance of reducing human disturbance, particularly along the proposed Captain John Smith Trail."

Special Use Permits
(Letter ID#: 52)

Comment: One commenter was concerned with the need to conduct research to gather baseline data on the species present on the refuges. They wrote, "It's also appropriate for us to have research permits in order to expand upon the information. If you look at the CCP itself, you'll find that there is a generic list of species rather than a refuge specific list of species."

Response: We concur that conducting research that is compatible with refuge goals and objectives is important for our future understanding and management of refuge resources. In the draft CCP/EA, in chapter 3 for both Mason Neck and Featherstone Refuges, under "Actions Common to All Alternatives," we discuss our support for "Research and Investigations" and the conditions under which we will facilitate it. As we gain new information, we would update our species lists, outreach, interpretation, and education materials, and habitat management and other step-down plans as appropriate.

Infrastructure
(Letter ID#: 7, 9, 15, 16, 18, 23, 39, 40, 69)

Comment: The VDEQ responded with specific regulations, permit requirements, jurisdictions, and suggestions concerning sewage systems for Mason Neck staff housing.

Response: We will continue to coordinate with the VDEQ, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges, including those regarding sewage systems.

Comment: Two people wanted to delay construction of the visitor center at Occoquan Bay Refuge until all three of the refuges of the Potomac River National Wildlife Refuge Complex were under the same planning umbrella. Another specifically stated, "I generally support the future location of a refuge headquarters at Occoquan Bay National Wildlife Refuge, but urge two possible courses of action: 1) First explore consolidating the Mason Neck Elizabeth Hartwell Refuge with the adjacent Virginia Mason Neck State Park and using the state park existing facilities for the refuge headquarters, offices, etc.; and 2) if the headquarters is located at Occoquan Bay [Refuge], place it either just inside the front gate near the existing building or near the existing public parking lot, but do not destroy habitat on the ridge over Marumsco Creek to build a new facility."

Another respondent wrote that it would be advantageous to coordinate joint use of a visitor center with Northern Virginia Park Authority and the Commonwealth of Virginia. They stated, "Early in this draft are found references to consolidating refuge lands on Mason Neck as well as the building of a new headquarters/visitor center at Occoquan Bay. In a further effort to secure facilities and rationalize refuge borders, I suggest there is merit in consulting not only with the Northern Virginia Regional Park Authority but with the Commonwealth of Virginia on possible joint use of the visitor center at Mason Neck State Park and transfer to USFWS of certain other park elements, including the Jammes property."

Response: The decision to develop a new headquarters and visitor center on Occoquan Bay Refuge is incorporated by reference into this CCP. In chapter 3 for Mason Neck Refuge, under "Actions Common to All Mason Neck Refuge Alternatives," we discuss the building of a new refuge headquarters and visitor center. A separate EA was distributed for public review and comment in 2009. The former Regional Director made a determination that the EA sufficiently evaluated a reasonable range of alternatives and he approved the proposed location on Occoquan Bay Refuge. We did not readdress this decision in the draft CCP/EA for Mason Neck and Featherstone Refuges.

With regards to acquiring State Park property or sharing their visitor facility, please see our response under, **"Refuge Establishment and Land Acquisition History."**

Comment: One commenter wanted paved trails constructed and another commenter encouraged the Service to use low-impact development techniques, natural landscaping, native plants, LEEDS (Leadership in Energy and Environmental Design)-certified green buildings, and to avoid increasing impervious surfaces. Similarly, another commenter wanted the FWS to utilize trails and infrastructure that maximized passive wildlife-related recreation.

Response: We agree that new developments on the refuge should be low-impact and designed to maximize green infrastructure and technology and we are committed to the use of those practices. Evidence of our commitment to constructing green buildings in the Northeast Region can be found at: *http://www.fws.gov/northeast/climatechange/stories/greenbuildings.html* (accessed June 2011).

With regards to the trail surfaces, we would plan to build only what is necessary to safely accommodate the type and volume of traffic we anticipate while protecting the refuges' resources. The high volume, multi-purpose trails (High Point Trail on Mason Neck Refuge and the proposed segment of the Potomac Heritage National Scenic Trail on Featherstone Refuge) will have hardened, smooth surfaces for concurrent, safe use by pedestrians and non-motorized, wheeled transport, such as wheelchairs and bicycles. Other trails on the refuges would have more permeable surfaces, such as dirt or stone dust, to minimize impacts on natural resources. We also point out that all the proposed new trails will be built in existing disturbed areas, such as old dirt roads or footpaths.

Throughout chapter 4 of the draft CCP/EA, we identify low-impact construction measures and energy efficient practices we will implement to minimize impacts to resources. Under the heading "Soils," we identify how we would use best management practices during construction and maintenance activities to ensure that we maintain soil productivity. Specifically, we state, "Site conditions, including soil composition, condition, and hydrology will be the ultimate determinant of what management actions can occur on any particular site on the refuges. No site would be managed in a manner that permanently degrades site conditions."

Under the heading "Water Quality, Wetlands, and Aquatic Biota Impacts," we state how we will minimize the effects on those resources by locating infrastructure away from streams, rivers, or other wetlands, routinely monitoring roads and trails for damage and remediating any problems encountered, and being vigilant during maintenance and construction activities to watch for damage and prevent it. We also state in this section, under alternative B, "Proper site preparation and use of standard mitigation practices, such as silt fences, would be implemented and further limit any potential for impacts."

In chapter 4, under the heading "Air Quality Impacts That Would Not Vary by Alternative," we state, "…we would reduce [air quality] impacts through the use of energy efficient systems and vehicles. We have already implemented actions such as installing fluorescent lighting, motion-activated night lighting, and low-emittance glass windows. These windows reduce the ultraviolet radiation factor by suppressing radiative heat flow, as well as fluorescent lighting, and motion-activated night lighting. We use "green" bio-degradable solvents whenever feasible. We have also achieved a 60-percent level of recycling of materials on the Refuge Complex."

Comment: VDGIF wrote, "We support the expansion of wildlife viewing, wildlife photography, and interpretive programs on the [Mason Neck] Refuge. However, we would like to see additional opportunities such as installation of observation platforms and interpretive signage included in the Preferred Alternative. Because there is great demand among our constituents for additional wildlife viewing opportunities, we are supportive of additional opportunities for such activities at Mason Neck [Refuge]. VDGIF would be happy to assist the USFWS in those efforts."

Response: Our proposal includes a level of infrastructure development that we believe is commensurate with the predicted availability of resources to construct and maintain structures and demand. We have intentionally limited the level of development on the refuge to minimize impacts on wildlife and to offer a more natural outdoor experience where visitors are immersed in nature. We encourage those visitors interested in a more developed and structured environment to visit Mason Neck State Park.

However, we do propose maintaining and constructing some facilities to orient visitors, provide information about the refuge's wildlife and natural resources, and offer self-guided opportunities. Under alternative B for Mason Neck Refuge, goal 4, objective 4.3 "Wildlife Observation and Photography," we propose that all of our trails, existing and proposed, will have at least one viewing platform and at least one information kiosk at each trailhead. Those same proposals are in our final CCP (maps 4.1 and 4.2 in the final CCP show existing and proposed public use features at Mason Neck Refuge). Several will also have interpretive signage along the trail to offer self-guided interpretive opportunities. We plan to work more closely with Mason Neck State Park to offer interpretive programming. Under alternative B for Featherstone Refuge, goal 2, objectives 2.3-2.5, we propose infrastructure such as fishing and viewing platforms. Again, these proposed platforms are in our final CCP (map 4.3 in the final CCP shows proposed public features at Featherstone Refuge).

We look forward to the support of VDGIF in implementing our wildlife observation, nature photography, and interpretive programs.

Education and Community Outreach
(Letter ID#: 40, 58, 69, 71)

Comment: Five people responded that the refuges should enhance efforts in environmental education. The Fairfax County SWPD offered several specific suggestions including the following:

- Exploring all opportunities for collaborative public outreach and environmental education with partners in Fairfax County, Virginia

- Collaborating with the SWPD to distribute a variety of environmental outreach information and materials from their extensive library

- Using the SWPD "We All Live Downstream" activity books and the "Stormy the Raindrop" coloring books to help education young readers about stormwater, watersheds, and aquatic wildlife

- Working with SWPD and Fairfax County Public Schools to develop a combined curriculum to include a field trip to the refuge as part of the schools' "Virginia Ecosystems" unit

Response: We also recognize the value of developing a high quality environmental education program. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, goal 3, objective 3.6 "Environmental Education Programs," we propose to rehabilitate our outdoor education facilities and increase education partnerships and educator-led programming. With additional staffing, we would, "be more proactive in developing a core environmental education program in conjunction with the facilities and programs of Mason Neck State Park, as well as through rehabilitation of our own educational facilities on Sycamore Road." We list strategies that we would continue to implement, as well as identify additional strategies to implement over the next 15 years in support of an environmental education program. SWPD offers some great suggestions as we develop our future program. The draft CCP/EA, chapter 3 for Featherstone Refuge, goal 2, objective 2.6 "Environmental Education," states that we rely more on partner-led environmental education opportunities because of limited resources and less capacity.

Biological Resources

Biological Resources – General
(Letter ID#: 7, 14, 15, 25, 39, 69)

Comment: Comments placed in this category were very general concerning the refuges' natural resources and protecting them. One person listed a variety of threats to local natural resources, such as loss of wetlands and poor regional air and water quality. VDEQ submitted comments stating that the VDCR had jurisdiction and would make specific biological comments. Those comments listed the following natural heritage resources of concern with descriptions of each: bald eagle, fine-lined emerald dragonfly, Parkers pipewort, small whorled pogonia, sensitive joint-vetch, river bulrush, and rare skipper butterfly. VDEQ also requested we coordinate with VNHP for information updates and to share any survey results. The VNPS also listed general descriptions of several rare plants and expressed their concern with protecting them. On Featherstone Refuge, the VNPS specifically mentions an interest in protecting State rare species such as river bulrush, Virginia day flower, and pitch pine. One respondent identified an interest in spotted salamander. Another respondent included a list of local threats and degrading influences to natural resources in Fairfax County, Virginia.

Response: We share the desire to actively conserve rare plants and wildlife, wetlands, and to address the threats affecting these and other natural resources. Addressing these conservation concerns is one of the purposes of, and a stated need for, developing a CCP. We appreciate the additional species information provided to us and have included it in the final CCP, Chapter 3 "Refuge and Resource Descriptions." We will also obtain updated resource information from VNHP and share our survey results.

With regards to concerns about water quality and wetlands, please see our responses under, **"Hydrology and Water Quality"** and **"Freshwater Wetland Habitat."**

Comment: VDGIF wrote in support of our proposed management for bald eagles, waterfowl, migratory birds, aquatic resources, and other native wildlife under the Service-preferred alternative B for both refuges.

Response: We thank VDGIF for their support and look forward to continuing our valuable partnership.

Freshwater Wetland Habitat
(Letter ID#: 7, 39, 49, 69)

Comment: The VDEQ submitted the applicable regulations and agency jurisdictions for wetlands and subaqueous lands. Several people expressed that wetlands must be protected. One commenter also wanted to make sure that refuge wetlands stay as wetlands and are not converted to hardwood forest habitat. VDGIF also wrote in support of our proposed management of aquatic and marsh habitats under the Service-preferred alternatives for both refuges.

Response: We will continue to coordinate with the VDEQ, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges, including those regarding wetlands protection.

We concur that protecting existing wetlands should be a priority on refuges, and we developed a goal and several objectives in the draft CCP/EA to that effect. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, goal 2, objectives 2.1 to 2.4, and in chapter 3 for Featherstone Refuge, goal 1, objective 1.2, we describe our proposal to protect and enhance existing wetlands. Nowhere do we propose converting wetlands to forest habitat. In chapter 4 for both Mason Neck and Featherstone Refuges, under headings for "Water Quality, Wetlands, and Aquatic Biota Impacts," we describe how other CCP actions might affect those resources.

Invasive Species and Pests
(Letter ID#: 15, 16, 30, 39, 40, 61, 69)

Comment: Seven respondents favored removing and controlling invasive and pest species, including comments on controlling mute swans, resident Canada geese, and emerald ash borer.

Response: We concur that controlling invasive species is critically important to maintaining the health, integrity, and diversity of refuge resources. The level of importance for control efforts is reflected in the fact that those actions are identified in the draft CCP/EA, chapter 3, in the sections "Actions Common to all Mason Neck Refuge CCP Alternatives" and "Actions Common to Both Featherstone Refuge CCP Alternatives." Discussion on control measures for invasive plants and pest animals and insects, including mute swans and resident Canada geese, are specifically mentioned.

Threatened and Endangered Species
(Letter ID#: 7)

Comment: The VDEQ was the only commenter to address threatened and endangered species. They wrote that surveys for the federally listed small whorled pogonia and sensitive joint-vetch should be coordinated between the Service and the Virginia DCR Natural Heritage Program (VNHP). If the plants are found to be present on the refuges and there is a likelihood of negative impacts to the species, they recommend coordinating with the VDACS to ensure compliance with Virginia's Endangered Plant and Insect Species Act.

Response: We take seriously our responsibility to protect federally listed species. We acknowledge in the draft CCP/EA, chapter 3 for Mason Neck Refuge, in "Actions Common to All Mason Neck CCP Alternatives," and in "Actions Common to Both Featherstone CCP Alternatives," the potential for these plants to occur on the refuges and our commitment to survey for them before conducting any ground disturbing activities. Presently, we have no documented occurrences. Since release of the draft CCP/EA, we enlisted the assistance of the VNPS to begin surveys for these and other rare plants with priority given to surveying where high probability habitat areas coincide with existing or proposed visitor access areas. We will coordinate our plans with Virginia DCR DNH and share the results to date.

Inventories and Surveys
(Letter ID#: 7, 13, 14, 15, 18, 25, 39, 40, 48, 57, 67, 71, 79)

Comment: Several commenters called for increased resource surveys, and specifically mentioned the need to complete full vegetative, invasive plant and animal, and deer browse inventories and surveys. One person urged us "…to conduct complete assessment of the health of all the habitats on the refuges." Many views are reflected in a comment we received about the need for baseline surveys at Featherstone Refuge and the importance of enlisting volunteers to help. The comment reads,

> A formal vegetation survey of the refuge has not been done by the FWS. We believe that as part of opening the Featherstone National Wildlife Refuge to the public, volunteers can help conduct surveys of the plants and plant communities found there. This will help refuge staff and others better understand the resources onsite, make decisions on how to manage them, and guide human activities to avoid impacting sensitive plants and ecosystems. The plant surveys will also supply much needed information on the presence and location of non-native invasive plant species which can harm native plants and greatly reduce the value of the habitat for animal species. We also believe a deer browse survey should be done and appropriate deer management implemented to reduce the impact of deer browse and promote the health of native plant communities.

Response: We fully agree that collecting more baseline resource information would be hugely beneficial to support future refuge management decisions, especially as we respond to climate change impacts. In the past, staffing, funding, and the availability of other resources have all hampered our ability to implement an intensive program.

The draft CCP/EA acknowledges the importance of research, resource inventories, and monitoring in many places. In chapter 3 for Mason Neck Refuge, all of the biological objectives under alternative B goals 1 and 2 include specific strategies for conducting various resource inventories and surveys, in addition to listing monitoring elements to implement. In chapter 3 for Featherstone Refuge, all of the biological objectives under goal 1 identify similar strategies. Also in chapter 3, under the sections "Actions Common to all Mason Neck Refuge CCP Alternatives" and "Actions Common to Both Featherstone Refuge CCP Alternatives," we identify the need to complete an Inventory and Monitoring Plan, which is a required refuge-specific step-down plan.

During development of the CCP, we continued to make progress in improving our information base through the use of partnerships and the dedicated efforts of our Friends Group and volunteers. In the draft CCP/EA, chapter 2, under our resource narratives for Mason Neck and Featherstone Refuges, respectively, we describe surveys that we have conducted over the years in partnership with others. For example, we describe our annual coordination with VDGIF to conduct breeding and wintering bald eagle and wintering waterfowl surveys, and deer density and population assessments. We have continued our annual inspections for invasive plants. In addition, the Forest Health and Condition Inventory and Assessment conducted by the Virginia Department of Forestry in 2009 on Mason Neck Refuge provided us with important information on the condition of our forests. Also, as noted above in our response under the heading **"Threatened and Endangered Species,"** we recently enlisted the assistance of the VNPS to begin surveys for rare plants. We recognize, however, that this does not fully address the commenters request for a "formal" vegetative survey of the refuges.

Once the CCP is approved, we will look forward to pursuing opportunities to work with partners and volunteers with expertise in resource inventorying and monitoring to assist us in reaching our goals and objectives.

Comment: One person noted that the bird and invertebrate lists for the refuges were lacking some species seen on and known to be on the refuges. They attached documents containing current species lists of birds, butterflies, and dragonflies on the refuges.

Response: We thank this respondent for providing us with information we did not have at the time of publishing the draft CCP/EA. We have edited our lists of amphibians and reptiles (tables A.2 and A.7) in appendix A in the final CCP to reflect the information provided. We have added two additional lists representing butterfly and dragonfly species (tables A.11 and A.12) suspected to occur on the refuges. We also clarify that the bird lists (tables A.1 and A.6) in appendix A are not intended to be an exhaustive list of all the species that may occur on the refuges. These lists only represent bird species that are considered to be of elevated conservation concern in the region.

Comment: A commenter wanted the refuges to "…conduct wetland analysis and enhancement to benefit wintering and migratory waterfowl." Another individual wanted us to "…institute and maintain baseline studies of water and soil quality…"

Another respondent specifically wanted the Service to address the need to conduct biological monitoring on the refuges: "Objective 2-4 of the EA states that the FWS intends to 'obtain baseline information of fish species diversity and species health in order to evaluate impacts of tidal marsh water quality changes.' However, the refuge currently lacks the ability to conduct biological monitoring due to a lack of staff biologists. Previous assessments conducted by SWPD indicated that Kane Creek is a high-quality stream ecosystem; sites in the watershed have been used by the County to develop reference conditions to which other Coastal Plain streams in the county were compared. SWPD staff would be willing to offer assistance to the Service and its partners in biological monitoring and assessment of Kane Creek as well as Mason Neck's other aquatic ecosystems, and in developing and interpreting indicators of environmental integrity. Biological monitoring could also provide documentation of aquatic invasive species such as the rusty crayfish, Northern snake head etc."

Fairfax County encouraged the Service to conduct inventories and baseline surveys: "Staff recommends that the draft CCP be enhanced with the inclusion of inventory plant communities on [Mason Neck Refuge]. Such inventories would establish a baseline and support other management objectives for the refuge. Staff supports FWS efforts to inventory and control non-native invasive plant species as well as to control resident Canada goose and white tail deer populations."

Response: Our response to these comments is similar to what we stated above in our first response under **"Inventories and Surveys."** In summary, we recognize the importance of all of the surveys mentioned and look forward to developing our Inventory and Monitoring step-down plan to help identify and prioritize activities. In the meantime, we look forward to working with the SWPD and other partners, our Friends Group, and volunteers to conduct inventory and monitoring activities of mutual interest and benefit.

Comment: The VDEQ listed the applicable regulations and suggestions for needed surveys.

Response: We will continue to coordinate with the VDEQ, and other respective State agencies, to comply with all applicable State laws and regulations, and obtain all necessary permits, required on national wildlife refuges.

Migratory Birds
(Letter ID#: 39, 40, 47)

Comment: One respondent representing the ASNV wanted the refuges to focus on conserving habitat for bird species. The comment states that declining trends in several bird species "point to the critical importance of strong conservation, restoration and stewardship of our refuge resources that provide habitat for birds. For example, most of the eastern United States' woodlands have been destroyed or compromised, a fact that makes the refuge's forests are especially critical." Another person wanted Mason Neck Refuge to undertake healthy forest management to benefit neotropical migratory birds.

Another person specifically commented on the lack of information on the effects of natural predators on migratory birds in the draft CCP/EA and would like to see the refuge gather information on these impacts.

Response: Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) and, therefore, are a Federal trust resource. Their protection, and the conservation of their habitat, is of paramount importance to achieving the mission of the Refuge System, and refuge purposes and goals. We share the concern that the Audubon Society and others have with the declining trends in many bird species, often attributable to habitat destruction or human induced impacts that affect the diversity, integrity, and environmental health of the region's forests.

In the draft CCP/EA, we emphasize the important contribution that the refuges make to resident and migratory birds dependent on forested and wetlands habitats. In chapter 3 for Mason Neck Refuge, under "Actions Common to All Mason Neck Refuge CCP Alternatives," we list "Managing Forest Health and Condition" as a priority for management regardless of the alternatives implemented and describe in this section the measures we would take to control invasive species. During development of the CCP, our elevated concern with forest health motivated us to enlist the assistance of the Virginia Department of Forestry. They conducted field surveys and prepared a 2009 report titled, "Forest Health and Condition Inventory and Assessment for Mason Neck Refuge," which we used to develop objectives and strategies for management. That report is available from refuge headquarters.

In addition, in chapter 3 for Mason Neck Refuge, goal 1, objectives 1.1, 1.2, and 1.3 specifically relate the importance of protecting and conserving forested habitat for bald eagles, migratory forest-dependent birds, and great blue herons. Goal 2 for Mason Neck Refuge, objectives 2.1 and 2.2 relate the importance of protecting the refuge's wetlands for birds such as waterfowl, wading birds, and other migratory birds. Under all of these objectives, we detail actions we will undertake to benefit those resources over the long term. Similarly, in chapter 3 for Featherstone Refuge, goal 1, objective 1.1 relates that refuge's importance to migratory birds, and identifies the measures we will undertake to benefit them over the long term.

With regard to the comment on natural predators of migratory birds, it is true we did not discuss this topic specifically in the draft CCP/EA. Owls, hawks, eagles, cowbirds, blue jays, crows, snakes, fox, raccoons, skunks, and mink and other weasels are all known natural predators to birds and bird eggs on the refuge. However, with regard to this comment, we are unsure what specifically the commenter would like us to address. We are not aware of any predatory impacts on migratory bird populations on the refuge outside of the natural range of variation. In addition, the impacts to populations from predators will vary greatly between individual bird species, which is a level of analysis and detail beyond the scope of this draft CCP/EA. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, under goal 1, objective 1.2 "Mature Hardwood-mixed Forest – Migrating Forest Dependent Birds," we mention a strategy to continue our support for two project sites in the Monitoring Avian Productivity and Survivorship Program (MAPS). The MAPS Program comprises a continentwide network of hundreds of constant-effort mist netting stations. Analyses of the resulting banding data provide critical information relating to the ecology, conservation, and management of North American landbird populations, and the factors responsible for changes in their populations. We encourage people to access the program's Web site at: *http://www.birdpop.org/maps.htm* (accessed June 2011). There is a wealth of additional information on this topic. If there is a particular species of interest on the refuge, we encourage the respondent to contact refuge headquarters for additional information.

Bald Eagle
(Letter ID#: 9, 19, 39, 69)

Comment: Four respondents commented on our proposals for bald eagle conservation.

The VDGIF stated that they would fully support and work with the refuges to achieve the goal of meeting or exceeding bald eagle protection guidelines.

Two respondents pointed out that Mason Neck Refuge was established specifically to protect bald eagles, and urged the refuge to enhance their conservation of bald eagles through increasing shoreline protection, improving water quality, restricting public access to sensitive areas, ensuring adequate fish populations, and providing nesting, roosting, and foraging habitat.

Conversely, another person felt that bald eagles were rebounding in the area and that refuge staff time and effort should be spent elsewhere: "My observations - through regular year-round visits to the Mason Neck State Park and National Wildlife Refuge and surrounding waters, and those of the bird watching community, have witnessed a steady increase in the number of bald eagles utilizing the surrounding habitat. In addition, vast areas up and down the Potomac waterway support large populations of eagles (and other raptor species) in their current state. Given these factors, I feel there is not an adequate threat to support valuable budget dollars on trying to fix something that is not broken."

Response: In the draft CCP/EA, chapter 3 for Mason Neck Refuge, under alternative B, goal 1, objective 1.1 "Mature Hardwood-mixed Forest–Bald Eagles," we identify our proposed conservation measures for the bald eagle in the mature hardwood-mixed forest on the refuge. In our rationale for that objective, we acknowledge the remarkable recovery of this bird and its removal from the Federal list of threatened and endangered species. However, we also point out that sustaining those gains is based on the continued maintenance and protection of quality bald eagle habitat throughout its range. Further, we highlight that even though the bald eagle is no longer federally listed, the species continues to be protected by both the MBTA and Bald and Golden Eagle Protection Act and, therefore, is a Federal trust resource. The bald eagle is also State-listed as threatened in Virginia. This, combined with the fact that protecting the bald eagle was one of the primary purposes for establishing Mason Neck Refuge, supports the actions we propose on its behalf.

Deer
(Letter ID#: 15, 16, 22, 39)

Comment: Within this category are a group of comments dealing with the need for deer management to protect the health of the forest and reduce overbrowsing. One commenter shared their observations about the condition of the forest within and outside a deer exclosure on Mason Neck Refuge, and suggested it was a good education tool. Some, but not all commenters, mentioned hunting as a specific deer population control tool. Three comments favored increasing management of the deer population to reduce overbrowsing of native vegetation. One person stated that Mason Neck Refuge's current hunting season was not sufficiently addressing the deer overpopulation problem and other management techniques were needed: "I would like to see the forest undergrowth returned to a reasonable level. The still large deer population is still foraging on the small pines needed in the future for [bald e]agle nesting…I believe the deer population which still looks unhealthy needs to be brought down to a healthy level."

Response: We appreciate, and fully agree with, the concerns expressed with overabundant deer populations affecting forest understory. We describe the problem in the draft CCP/EA, chapter 1, under "Issues, Concerns, and Opportunities" for both refuges, and in chapter 2 for Mason Neck Refuge, under the heading "Mammals." An important point we make is that the deer on the refuge are not an isolated population, and we cannot effectively control deer numbers over the long term unless there is a coordinated effort across ownerships on Mason Neck Peninsula.

Nevertheless, active deer management, through a public hunt on Mason Neck Refuge is a high priority for us each year and helps reduce the deer population for the short term. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, under alternative B, goal 3, objective 3.1 "Deer Hunting," we propose to continue our annual public hunt, in coordination with VDGIF and Mason Neck State Park, with some enhancements to increase deer control reflected in our strategies. Some of those strategies include encouraging and supporting a deer hunt on other public lands on Mason Neck Peninsula, and working with partners to annually evaluate whether to increase the length of the season, increase the number of hunters, or distribute hunters differently. Also, we propose consideration of an archery deer hunt in the future as another tool.

In partnership with VDGIF and Mason Neck State Park, we believe implementing a hunt program is the most effective tool we have available at present to manage deer given our combined resources. We will adapt management, as warranted, in response to increases or declines in the regional deer population.

Waterfowl
(Letter ID#: 19)

Comment: One respondent wrote about the refuge's proposed waterfowl management program. The commenter wrote, "Alternatives B and C include improvement of wintering waterfowl and other migratory bird habitat. The current habitat in the area currently supports some the largest numbers of migrating waterfowl in recent history. Thousands of wintering waterfowl, and other migratory birds, utilize the existing wetlands and tidal creeks and bays surrounding the area that provide abundant sub-aquatic vegetation (SAV) to support these populations. I do believe the health of these habitats to be critical to overall health of the ecosystem and migratory waterfowl

and I encourage the Mason Neck and Featherstone National Wildlife Refuge management and administrators to continue to expend budgetary funds for monitoring at the current levels and leverage partner program assistance to the maximum extent." The respondent was also concerned about allowing waterfowl hunting on the refuges, writing "the introduction of a public waterfowl hunting program on the shorelines of Mason Neck and Featherstone Refuges is inviting a host of potential problems as a result of misuse that are counterintuitive to habitat preservation and enhancement activities."

Response: We agree with the comment about the importance of the refuges to regional wintering waterfowl and that protecting the integrity of the refuge's wetlands is critical to providing quality waterfowl habitat. We acknowledge this importance to waterfowl in our proposal in the draft CCP/EA, chapter 3 for Mason Neck Refuge, under goal 2 and its objectives 2.1 to 2.4 that relate to conserving and protecting the health, diversity, and integrity of wetlands, protecting the shoreline, and improving water quality.

With regard to the comment on waterfowl hunting, we refer to our response under **"Hunting - Waterfowl and Hunting Blinds"** below.

Public Access and Use

Public Access and Public Use – General
(Letter ID#: 7, 8, 17, 39, 72)

Comment: The VDEQ commented on which State agency has jurisdiction and regulations regarding public access and use, and specifically mention that our visitor service's program proposals support priorities of the VDCR, Department of Planning and Recreational Resources. Their letter also included comments that Prince William County is committed to securing public parking and safe and legal public access to Featherstone Refuge and working with stakeholders regarding the Potomac Heritage National Scenic Trail (PHNST).

Response: We appreciate the State's support of our visitor services programs. We will continue to coordinate with the VDCR, Prince William County, and other respective State and county agencies, to implement mutually beneficial goals. Also, see our responses below under the heading **"Specific Trails and Areas."**

Comment: One respondent was concerned that care be taken that planned trails are constructed with limited or no erosion and that no vehicles other than staff or emergency vehicles be allowed on the refuges. Another person was concerned with the fragile natural resources on the refuges, and urged refuge staff to only allow passive recreational activities on the refuges.

Response: We are also concerned with the sensitive placement of new refuge infrastructure, including trails. Please see our response above under the heading **"Infrastructure."**

Comment: Another wrote us to clarify his understanding that research would be allowed regardless of the alternatives selected, including under Alternative A "Current Management." He referred to an article that he felt misrepresented research opportunities as it indicated research activities would not be allowed unless the refuge was opened up to public use and access.

Response: Research is currently allowed on both refuges after the refuge manager completes a finding of appropriateness and a compatibility determination, and issues a special use permit, as warranted. This is proposed under all alternatives. In the draft CCP/EA, chapter 3, in the sections "Actions Common to All Mason Neck CCP Alternatives" and "Actions Common to Both Featherstone Refuge CCP Alternatives," we include a discussion on "Supporting Research and Investigations." In addition, appendix B "Findings of Appropriateness and Compatibility Determinations," includes a finding of appropriateness and compatibility determination for research, including inventories and monitoring.

Comment: One person wanted refuge staff to allow kayak and canoe access and consider constructing landing areas. He stated, "I don't see any consideration for access to the refuges for kayakers or canoe enthusiasts, despite being adjacent to the Occoquan Water Trail and Leesylvainia and Mason Neck State Parks. I request that a landing area be added to the public use options for both refuges. These could be seasonal if not year round and would boost ecotourism and environmental education."

Response: We describe why we do not allow shoreline access on Mason Neck Refuge in several places in the draft CCP/EA. First, it is mentioned in chapter 2, under "Mason Neck Refuge Environment," under the section "Visitor Services." Next, it is mentioned in Chapter 3 "Actions Common to All Mason Neck Alternatives," in the section on "Continuing a Fishing Closure at Mason Neck." Finally, it is mentioned in chapter 4, under "Impacts on or Between Refuge Users." With regards to Featherstone Refuge, the final CCP includes our plans to allow non-motorized boat access in one designated location along Farm Creek. Please see our discussion above under the heading **"Introduction,"** item #1 in our list of changes and clarifications that we made for the final CCP.

Specific Trails and Areas
(Letter ID#: 6, 9, 26, 40, 55, 70, 76, 77)

Comment: The PHNST and Captain John Smith Trails were specifically mentioned by respondents. An additional comment was specifically about access to Great Marsh on Mason Neck Refuge, and another mentioned the High Point Trail on Mason Neck Refuge. Also, please refer to the section below, **"Opening Featherstone Refuge to Public Access"** for more comments on providing public access to Featherstone Refuge.

An elected official, county officials, and several citizens expressed their desire to see the PHNST segment on Featherstone Refuge completed and open to the public. Congressman Connolly wrote, "…I strongly urge you to prioritize completion of the Potomac Heritage National Scenic Trail in both Featherstone and Occoquan Bay Refuges as part of the CCP." Examples of representative comments are presented below.

Prince William County officials commented on the PHNST writing, "As identified in Alternative B, Prince William County is committed to working with the U.S. Fish and Wildlife Service to pursue and evaluate options to secure public parking and safe and legal public access to the refuge. The County is also committed to working with stakeholders to design and construct the PHNST through the Refuge. The PHNST is of national importance and the County is committed to completing its portion of the trail through its leadership and funding. Once public access has been established, the County hopes to maintain an open and supportive relationship to identify and resolve issues and to take advantage of opportunities as they arise. The Prince William County Park Authority, which is the lead agency for the County's portion of the Potomac Heritage National Scenic Trail, the Trails and Blueways Council, a citizen's advisory group appointed by the Board of County Supervisors, and the Park Authority Board, have all voiced their support for Alternative B. The portion of the PHNST that will traverse the Refuge is a critical component of the County's Trails Plan. The County, the Park Authority and the Trails and Blueways Council urge the U.S. Fish and Wildlife Service to follow approval of the Comprehensive Conservation Plan with timely implementation of the recommendations in Alternative B to speed completion of the PHNST."

A representative from the Prince William Trails and Blue Ways Council expressed the council's "firm support" for completing the segment of the PHNST on Featherstone Refuge. They also shared their opinion that, "We also believe that it should not be dependent upon the perfect [conditions]…and it's our belief that it should be opened as soon as possible.…we're so blessed in Prince William County that they have a number of volunteer organizations to help with…the implementation of [the PHNST]."

An individual wrote, "I would like use of the Featherstone Refuge. I would like to see the Potomac Heritage Trail have more work done to it and I think it would be great to connect the trail thru Featherstone. As a runner it is difficult to find a safe trail in the area away from the roads and this would be a great opportunity to start moving forward on the plan as intended." Another individual suggested we, "Integrate [the PHNST] with the Virginia Birding and Wildlife Trail [new for Featherstone]."

One person representing The Audubon Society said, "In coordinating with the National Park Service to manage the Captain John Smith Trail, we urge you to not create extensive shoreline visitor service infrastructure that would displace native habitats and wildlife or cultural resources."

Another person wrote us with a request to specifically allow greater access to Great Marsh on Mason Neck Refuge. Their comment was, "I believe that one of the greatest assets of the [Mason Neck Refuge] is the Great Marsh. Once a fishery of George Mason, I believe some limited access via special tours by boat for legislators or historians should be provided or allowed. This area is too precious to simply leave out of the public access equation and one of the most beautiful and historic areas of the refuge…"

One person wrote us to suggest that the community proposal to develop an extension of the High Point Trail along Gunston Road to terminate at Great Marsh Trail head should be a priority.

Response: We are impressed with the strong support for the PHNST, in particular, the segment that is proposed through Featherstone Refuge. In the draft CCP/EA, chapter 3 for Featherstone Refuge, under alternative B goal 2, objective 2.1 "Public Access," we indicate our intent to continue discussions with Prince William County, the National Park Service, and other stakeholders for viable options for resolving the public access issue to the refuge and establishing the trail.

With regards to developing visitor access points along either refuge shoreline, we do not believe that what we have proposed in the draft CCP/EA is "extensive" or excessive. In chapter 3 for Mason Neck Refuge, under alternative B goal 3, objective 3.4 "Wildlife Observation and Photography," we indicate only one observation platform is proposed for the shoreline at Sycamore Point. Map 3.1 in the draft CCP/EA shows this graphically. We also stipulate in the rationale for the objective that the platform and trail access would only be built if field surveys indicate resource impacts, in particular on cultural resources, would be minimal or avoided entirely. This stipulation would also hold true for the infrastructure we have proposed in the draft CCP/EA, chapter 3 for Featherstone Refuge, goal 2, objective 2.1 "Public Access," and displayed graphically on map 3.3. Appendix B includes a compatibility determination for "Wildlife Observation, Photography, Environmental Education, and Interpretation," which concludes that the visitor infrastructure proposed does not interfere with, or detract from, achieving refuge purposes or the mission of the Refuge System.

In response to the comment about providing greater access to Great Marsh, we discuss in the draft CCP/EA, chapter 2 for Mason Neck Refuge, under the heading "Visitor Services," that virtually all of the refuge shoreline is closed to public access due to concerns with wildlife disturbance or impacts to sensitive habitat areas. A Directors Order in 1969 specifically closed Great Marsh to hunting in order to protect breeding and wintering bald eagles and wintering waterfowl. However, there are two observation platforms that offer sweeping views of Great Marsh. One is at the end of the 0.75-mile Joseph V. Gartlan, Jr. Great Marsh Trail and the other is along Woodmarsh Trail. Both of these trails would continue to remain open under our proposed alternative B.

In the draft CCP/EA, chapter 3 for Mason Neck Refuge, under alternative B goal 2, objective 2.1 "Great Marsh," we describe Great Marsh's regional importance year round to wildlife which, in part, is due to the sanctuary it provides with limited public access and potential for human disturbance. We believe our proposal under alternative B, objective 2.1, to continue to prohibit public access to Great Marsh, both on foot and by boat, is necessary to achieve refuge purposes for protecting species of conservation concern.

With regard to the comment about the community proposal for an extension of the High Point Trail along Gunston Road to the Great Marsh Trailhead, we express our concerns in the draft CCP/EA, in chapter 3 for Mason Neck Refuge, under "Actions Considered, but Not Fully Developed," and explain our reasons for not evaluating this proposal in detail. No new information has surfaced for us to change our position, and so we have no plans to pursue further.

Hunting – General
(Letter ID#: 1, 6, 8, 19, 24, 29, 30, 37, 42, 68, 69)

Comment: Thirteen people responded with general comments about hunting. Sentiments were nearly evenly divided with approximately one half of the comments in favor of hunting and the other half against hunting. Of those opposed to hunting, several felt it was a human safety issue. One such comment stated, "Proposing recreational hunting in a wildlife preserve in a highly populated area like Mason Neck is not consistent with public safety and proposing hunting of turkeys by children is going beyond the pale." Another commenter

urged refuge staff to not allow any type of hunting on Featherstone Refuge: "[Featherstone Refuge] is a very narrow refuge and not much room between the [the railroad] tracks [and] the water…please consider these serious points." One comment was specifically about the proposal for an archery deer hunt. The commenter was concerned that there would be user conflicts between hunters and non-hunting visitors because the archery hunt would occur during the fall when refuge visitation is high. They expressed concern that "…development of an archery season could propose some significant risk and conflict…the use of trails and paths are likely to see some of the highest traffic during these months…having to close the area to the majority of visitors to allow hunting, not including the expenses associated with it, is not the best utilization of money or facilities." One other respondent felt any type of hunting was immoral and unethical, while another commenter felt there were ethical issues specifically with archery hunting, writing, "…archery is difficult sport to master. Many deer each year are wounded [by archers] and often take days to expire."

Further, one respondent felt that there were ample hunting opportunities in other areas off refuge lands, and that limited refuge resources should be devoted to other programs. Finally, three other comments opposed to hunting on the refuges were concerned about the impact of hunting on non-target wildlife resources. In particular, one respondent was concerned about the potential for hunting to disturb bald eagles and over-wintering ducks in Great Marsh.

On the other hand, there were several commenters in support of hunting in general. Two of those respondents wrote about the "heritage" of hunting, while another felt hunting is an important wildlife management tool. Another specifically mentioned "Executive Order 13443" which encourages refuges to offer hunting opportunities.

Response: Hunting is identified as one of six priority public uses for national wildlife refuges under the 1997 Refuge Improvement Act and Service policy (605 FW 2). Our mandate is to provide for those uses when they are compatible with refuge purposes, goals, and other management priorities. In addition, there is a Presidential Executive Order that supports hunting. We referenced Presidential Executive Order #13443 – "Facilitation of Hunting Heritage and Wildlife Conservation" in the draft CCP/EA, chapter 3, Mason Neck Refuge, alternative B, goal 3, objective 3.1 "Deer Hunting." In addition, under the rationale for this objective, we describe how deer hunting accomplishes a vitally important role in keeping the deer population within the carrying capacity of the habitat. This is a major concern on Mason Neck Refuge where deer overbrowsing is impacting the health, integrity, and diversity of the forest.

We have been conducting a quality deer hunt on Mason Neck Refuge for over a decade and have not documented the concerns expressed in the comments related to safety, impacts on non-target species, including concerns with disturbing bald eagles and waterfowl. We specifically design our hunt, in cooperation with State and other partners, to be safe and consistent with the Service's guiding principles for a hunt program, which we describe under objective 3.1. Our program is very popular. Our success notwithstanding, we propose some enhancements to our deer hunt program under objective 3.1, and a new youth turkey hunt under objective 3.2. We provide responses to comments on those specific programs under the respective headings for **"Hunting – Youth Turkey Hunt,"** and **"Hunting - Deer,"** below. We believe the impacts analysis we conducted in chapter 4 of the draft CCP/EA supports our recommendations for an enhanced and expanded hunt program on Mason Neck Refuge.

For Featherstone Refuge, in chapter 3, goal 2, objective 2.2, we acknowledge interest in allowing hunting on this refuge. However, our proposal under objective 2.2 is to conduct a more detailed evaluation of possible hunting alternatives when we have additional staff in place, and include additional public involvement in that evaluation, before we develop a specific program. Considerations like those raised in the comments above would be part of the analysis.

Hunting – Youth Turkey Hunt
(Letter ID#: 9, 13, 16, 18, 22, 24, 30, 61, 63, 65, 66, 69)

Comment: We received 12 comments about the proposed youth turkey hunt on Mason Neck Refuge under alternative B. Nine comments were against youth turkey hunts or hunting turkeys in general. Several of the reasons cited included concern that turkeys were not abundant or overabundant on the refuge, they are not currently causing any habitat damage, there is not enough information on the population to warrant a hunt, and

conflicts with bald eagle protection. A representative comment states, "I urge USFWS not move forward with the plan to allow hunting wild turkeys on Mason Neck. I have seen very few turkeys since we moved to Mason Neck in 1987. Further, they are delightful to see but this is not very often and thus the population would not seem to indicate sufficiency to sustain a wild turkey hunt."

Both the Northern Virginia Delta Waterfowl group and the VDGIF stated their support for a youth turkey hunt. The VDGIF indicates they were willing to work with refuge staff to help implement the hunt. However, they were concerned that limiting the hunt to only 10 youth hunters may be too conservative given the amount of interest in a youth deer hunt at Occoquan Bay Refuge and the unique nature of the program.

Response: As noted above under **"Hunting – General,"** hunting is mandated by Service policy and Federal law as a priority public use on national wildlife refuges if determined to be compatible with an individual refuge's purposes. In addition, in 2010, the Secretary implemented his "Youth in the Great Outdoors Initiative" to promote youth programs in all Departmental agencies.

In our Introduction to this document on page 1, we clarify our proposal for the youth turkey hunt on Mason Neck Refuge described in the draft CCP/EA, objective 3.2. Our plan would be to open the refuge to a youth turkey hunt where a maximum of five youth per day would hunt for 3 days from sunrise to noontime during the State's spring turkey hunting season. Only gobblers would be harvested and only by shotgun. Both our rationale for objective 3.2 and our compatibility determination for this activity would be edited in the final CCP to reflect this clarification. Our maximum of five youth per day is based on the amount of area we propose would be open for this activity and would not impact other refuge visitors.

Our proposal for a youth turkey hunt, including the analysis on the potential impacts on the local turkey population, was developed in partnership with VDGIF who have the best biological expertise and experience with implementing a program such as this in the region. They fully support this program, as noted in their comment, and we look forward to working with them, the National Wildlife Turkey Federation, and other partners to implement a successful and quality program.

Hunting – Deer
(Letter ID#: 15, 16, 22, 27, 30, 34, 57, 61, 69)

Comment: Most of the comments on this topic were in favor of controlling deer populations through public hunting opportunities. Several people favored adding a muzzleloader season and an archery season. One respondent was in favor of deer hunting, but did not want to see a sharpshooter program implemented because it would be costly, labor intensive, limited to only certain areas of the refuges, and negatively perceived by the local hunting community.

Response: As mentioned in our response above under **"Hunting – General,"** hunting is mandated by law and Service policy as a priority public use on national wildlife refuges, if determined to be compatible with an individual refuge's purposes. In addition, hunting on Mason Neck Refuge controls the tremendous impact the local deer population is having on forest regeneration. During the CCP planning process, we evaluated the current hunting program on Mason Neck Refuge, including potential expansions of that program, as well as a potential new program on Featherstone Refuge. We believe we propose a program that is reasonable and feasible given existing and projected resources, and would improve an extremely popular activity on the refuge. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, alternative B, goal 3, objective 3.1 "Deer Hunting," we describe some enhancements to the existing deer hunt program that include increasing the length of the shotgun season, increasing the number of hunters permitted, and providing an archery hunt. In chapter 3 for Featherstone Refuge, alternative B, goal 2, objective 2.2 "Hunting," we detail our proposal to evaluate a potential hunt program when we have additional staff in place. This evaluation would require additional public involvement before making a decision.

We discussed using "sharpshooters" as one potential method of keeping the deer population in check, but have no specific plans to implement such a program, and it is not part of our final CCP. At any time, however, if the refuge manager determines that deteriorating resource conditions warrant it, for example, as a means to control CWD,

the manager could implement such a program as an administrative or management activity. We would work with USDA – Animal and Plant Health Inspection Services (APHIS), Wildlife Services wildlife damage experts or their contractors, VDGIF, and/or Fairfax County – Department of Public Safety to implement a sharpshooter program.

Hunting – Waterfowl and Hunting Blinds
(Letter ID#: 19, 24, 30, 61, 66, 69)

Comment: Four respondents commented on waterfowl hunting opportunities, and two others made specific recommendations on how hunting blinds could be managed.

In support of waterfowl hunting, we heard from the Northern Virginia Chapter of Delta Waterfowl, three of its members, and VDGIF. Delta Waterfowl specifically mentioned support for the use of public blind stakes and temporary floating blinds.

Delta Waterfowl also suggested a youth waterfowl hunting in Little Marsh on Mason Neck Refuge. They state, "While Objective 2.2 – Little Marsh Management in all Alternatives proposes to continue prohibiting public access to Little Marsh, [the Northern Virginia Chapter of Delta Waterfowl] would like FWS to consider a youth waterfowl hunt in Little Marsh on the youth waterfowl hunt day determined by [V]DGIF. Because this area is already closed, there would be no conflicts with other uses. Additionally, the waterfowl hunting season occurs in fall and winter, thus would have no affect on the heron rookery. Little Marsh would provide a great opportunity for youth to have a successful waterfowl hunt, which would in turn help get youth involved in waterfowl hunting in Virginia. According to the 2010 [V]DGIF Waterfowl Hunter Survey, the average age of the Virginia waterfowler is increasing and is currently 47 years old. This increase indicates a lack of youth recruitment…"

We also heard from two people in opposition to waterfowl hunting on the refuges. One person thought there were already enough waterfowl hunting opportunities in the area and that the blinds currently available are underutilized. The other person was concerned because he has observed abandoned hunting blinds elsewhere in the area, and felt that the blinds and associated debris and litter are an "eyesore."

Another person also felt that there was adequate waterfowl hunting opportunities in the area, and that the refuge's limited resources should not be wasted on adding public stake blinds. This person was also concerned that the addition of public stake blinds may create a potential conflict with the non-hunting public. That respondent also wrote specifically about temporary floating blinds,

> The use of temporary floating blinds is another concern proposed in Alternatives B and C. It is not clear that an assessment of the existing (and ample) opportunity for the public to hunt waterfowl adjacent to Mason Neck [Refuge] and surrounding areas was made when selecting this aspect of Alternative B. Why use valuable resources when current opportunities exist? … Approximately 4000 acres of water surface is currently available to support hunting from approximately 40 floating blinds simultaneously in Occoquan Reservoir (open to public no blind laws/west of 95… It would seem that the resources necessary to manage, enforce, and administer a quality waterfowl hunting program out strip any benefits this small net gain in public waterfowl hunting in this region would accomplish.

Response: First, we would like to be clear about what our draft CCP/EA states about waterfowl hunting. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, alternative B, goal 3, objective 3.3 "Waterfowl Hunting," we state that waterfowl hunting in Mason Neck Refuge waters is not compatible with the purposes of this refuge and we continue to stand by this determination. This includes the decision to continue to prohibit waterfowl hunting in both Great and Little Marshes. However, we also recognize and fully support waterfowl hunting as a traditional and legitimate activity in the Potomac River and greater Chesapeake Bay region. Under objective 3.3, we would plan to fully support VDGIF in ensuring that the public has quality waterfowl hunting opportunities in those State waters near the refuge where it is currently allowed. As part of that cooperation, we identify a strategy under objective 3.3 to work with VDGIF to evaluate the use of temporary floating blinds to replace fixed blinds as a way to expand opportunities and reach more people. That being said, we have no jurisdiction or intent to mandate this recommendation, but merely offer it for consideration to VDGIF. We made no change to our recommendations in the final CCP.

In chapter 3 for Featherstone Refuge, alternative B, goal 2, objective 2.2 "Hunting," we indicate the public and VDGIF interest in allowing hunting on this refuge. However, our proposal under objective 2.2 is to conduct a more detailed evaluation of possible hunting alternatives when we have additional staff in place, and include additional public involvement in that evaluation, before we develop a specific program. Considerations like those made in the comments above would be part of the analysis.

Fishing
(Letter ID#: 69, 55)

Comment: A few comments were in support of providing recreational fishing opportunities on Featherstone Refuge. One commenter emphasized that allowing a wildlife-dependent activity such as fishing will, "…increase the enjoyment and appreciation of the refuge resources to visitors and nearby residents." The VDGIF is in favor of designating fishing sites on Featherstone Refuge, as proposed under alternative B. They expressed an interest in helping the refuge to manage the fishing program.

Response: We appreciate the support for our proposed recreational fishing program on Featherstone Refuge. Details on our recommendation are presented in the draft CCP/EA, in chapter 3 for Featherstone Refuge, under alternative B, goal 2, objective 2.3 "Recreational Fishing." As described under objective 2.3, once the refuge is officially opened to public use and access, we would develop infrastructure at designated sites to facilitate fishing. These same recommendations are in the final CCP.

Dog Walking
(Letter ID#: 8)

Comment: One respondent stated that dog walking should be allowed on the refuges, but that refuge staff should strictly enforce that dogs remain on a leash and owners pick up their pets waste.

Response: We agree with the comment. We edited our finding of appropriateness and compatibility determination on dog walking in appendix B of the final CCP to make it more explicit that visitors walking dogs are required to keep their dog on a maximum 10-foot leash and are required to pick up all waste left by their dogs.

Opening Featherstone Refuge to Public Access
(Letter ID#: 10, 12, 13, 14, 15, 17, 18, 24, 25, 30, 47, 50, 52, 53, 54, 55, 56, 57, 60, 61, 67, 69, 70, 73, 74, 78)

Comment: Comments included both support for and against opening Featherstone Refuge to public use and access.

Most people who responded want to see the refuge opened for public access and recreation. Many of these people want the refuge opened immediately upon CCP approval. However, some people in favor of opening the refuge also want safeguards put in place to protect natural resources from visitor impacts (e.g., low impact trail locations). A few other people in support of opening the refuge in the long term want the Service to delay that opening until biological inventories are completed and we know where sensitive areas are (e.g., rare plant communities, vernal pools, or wildlife nesting or breeding sites) in proximity to proposed access and trails. A few others who want the refuge opened expressed concern with providing safe access. Some offered suggestions as to potential access points. Several others point out that, although the refuge is currently closed, trespass and other illegal activities are continuing to occur and are a challenge to control, and in their opinion, officially opening the refuge to public access would afford more control over inappropriate activities.

The following are representative quotes in support of opening Featherstone Refuge to public access.

Prince William County wrote, "Providing a recreational amenity in the community will allow citizens to enjoy a healthier lifestyle by creating an enhanced walkable community. By opening up the Refuge, we can also further our research and understanding of the wildlife. Prince William County has many hidden treasures in the Refuge, and it is a shame that we do not have access. By better utilizing our volunteer conservation resources, we can reduce federal budget needs. I urge you implement a time line that will lead to the opening of the Refuge in 2011."

The VDGIF wrote, "We support the development of safe public access to Featherstone. VDGIF recognizes the substantial barriers that currently exist to providing access and will assist the USFWS in addressing those barriers where appropriate. Adequate, safe public access to Featherstone is necessary to provide valuable fishing, hunting, education, and wildlife viewing programs. Once access has been established, VDGIF is willing to work closely with the USFWS to implement these programs at Featherstone."

Another person wrote: "… I would like to state that based on my 19 years of experience managing public lands in Northern Virginia that even though the refuge is officially closed, it is not really closed, and the people who are going there are making management decisions in the absence of guidance from staff. Since the site is active, it is better to open it to the public and guide the use of the site through appropriate location of trails and types of allowed activities."

Another person wrote, "…I do not think staff increases are necessarily needed to make Featherstone [Refuge] more accessible to the public. Forty years is a very long time for planning public use of this refuge unit. While such uses certainly should be subject to reasonable limitations – protection of known sensitive wildlife areas, periodic closures for breeding birds, etc. – there are pathways at present and areas of lesser sensitivity that can offer visitors insight into Featherstone's unique riparian ecosystem. With minimal infrastructure improvements this unit could and should be made accessible to the public for prescribed uses that assure protection of its special natural character."

A few people recommended we allow non-motorized boat access to the refuge. At one of our public meetings, an official advisor to Congressman Connolly read a letter from the Congressman to Assistant Secretary of Interior Thomas Strickland. The letter conveyed the Congressman's support for opening the refuge immediately to public use and access and included a specific recommendation to allow non-motorized boat access from the shore of the refuge on a section of sandy beach. In their opinion, this would afford another means of access to the refuge and would not be a disturbance to wildlife. The Congressman states, "Access to trails and low impact boat landings would offer public access in a manner consistent with wildlife conservation." Another person commented, "I don't see any consideration for access to the refuges for kayakers or canoe enthusiasts, despite being adjacent to the Occoquan Water Trail and Leesylvainia and Mason Neck State Parks. I request that a landing area be added to the public use options for both refuges. These could be seasonal if not year round and would boost ecotourism and environmental education."

Several commenters did not wish to see the refuge opened to the public primarily because they felt it would negatively impact the refuge's natural resources. The following are representative quotes regarding maintaining a closure to public access on Featherstone Refuge.

One respondent who felt vegetative and wildlife surveys were needed wrote, "We don't really know what's on Featherstone [Refuge]…Opening Featherstone [Refuge] to the general public, hunters, and fisherman will permanently alter this ecosystem. Experience tells us that the refuge will slowly be developed to accommodate uses by the public over time. Those species that we know nothing about may simply disappear before we get to them."

Another person wrote, "The introduction of roads, trails, and human accommodation disrupts vernal pools (which are dry and not obvious most of the year. They are often unknowingly bisected or their water retention properties are destroyed) and the natural migration paths that amphibians (new trails, roads, and paths often disrupt these routes as migration paths simply aren't known) follow to get to these pools to breed. Simply put, we really don't know or understand the natural ecosystems which we desire to disrupt…It is important that we maintain some "wild spaces" free from all human disruption with the exception of managed research to learn more about the ecosystem and the creatures that inhabit that ecosystem. While it sounds well intended to open Featherstone, we know that once humans are introduced into a natural environment, damage will occur… We really don't know the impact of doing something as simple as running a bush hog around a property to create paths will have on the environment and those organisms it hosts. Despite the best intentions, we know that environmental hazards will be introduced and the environment will suffer. This is a pragmatic assessment. "We" (people") tend to do more harm than good when we start tramping around "wild spaces."

Another respondent wrote: "The issue of Featherstone [Refuge] opening has become politicized, which is unfortunate. As the Service noted, there is currently no parking or safe public access. I believe that at the minimum, that must be identified & funded before even entertaining opening. Equally important, there simply isn't enough known about the site to consider opening even if the parking/access issue was resolved. On the surface it appears FWS is being pressured to open because "it is public land and the public should have access." Well, maybe yes and maybe no, but certainly not yet (and maybe not ever). Natural resource surveys, wetland mapping, and hydrology identification needs to be completed; safe access and parking need to be identified and brokered as well. While Option B states provisos to be in place before opening, I think that is a very slippery slope. On one hand, it might deflect criticism from FWS since the provisions to opening are not funded and complaints can be defected. But I think you will find it to be the opposite and FWS will face unfair pressure to get it open somehow, potentially with resources that are desperately needed at Occoquan Bay & Mason Neck [Refuges]. In no way should we ever get into this type of rob Peter to pay Paul scenario, especially when 1) the two sister refuges in the Complex are not being managed in accordance to its CCP's due to lack of funding and staffing levels and 2) there really isn't a huge need to open Featherstone at this time; Occoquan Bay is literally 1 mile away as the eagle flies. There is no compelling reason to open Featherstone to the public, except to cave in to political and public pressure."

Response: The proposal to open Featherstone Refuge to public use and access received the most comments of any category for either refuge. We appreciate and respect the various opinions and heartfelt expressions on whether or not to open the refuge. We seriously considered each comment and weighed it against our original proposal and analysis before developing the following final recommendation.

We believe our analysis in the draft CCP/EA under alternative B is still valid and relevant in support of opening Featherstone Refuge to public use and access once public parking and safe access across the railroad tracks is secured. We continue to work with Prince William County officials and other stakeholders in pursuit of viable overland access options as we indicated in the draft CCP/EA under Featherstone Refuge alternative B, goal 2, objective 2.1 "Public Access." However, after careful consideration of public comments, we propose the following modifications to that proposal.

- We have scheduled a survey on the refuge in partnership with the VNPS to locate and map any rare plant communities in proximity to proposed trail corridors. We would adjust trail locations or modify trail designs as warranted to minimize impacts, and would enlist the assistance of these partners in monitoring use and impacts over the long term.

- We will work in partnership with VDGIF and VNHP to locate and map any sensitive wildlife or plant areas in proximity to proposed trail corridors. We would adjust trail locations, modify trail designs, or implement seasonal closures as warranted to minimize impacts, and would enlist the assistance of these partners in monitoring use and impacts over the long term.

- As detailed in our **"Introduction"** to this appendix on page 1, immediately upon CCP approval, we propose to allow non-motorized boat landings on tidal beach at one location on Farm Creek (refer to map 4.3 in the final CCP) to facilitate wildlife observation and photography. This landing site corresponds with our proposed location of the southernmost observation deck and fishing platform that we presented in the draft CCP/EA. Visitors accessing the refuge at this location by non-motorized boat would be allowed to walk approximately 0.4 miles between points A and B on the existing footpath. Boaters would be confined to this section of footpath until the rest of the refuge is officially open to public use. Recreational fishing would not be allowed from this location until all administrative procedures are completed as described in the draft CCP/EA under Featherstone Refuge alternative B, goal 2, objective 2.3 "Recreational Fishing."

Alternatives

Service-preferred Alternatives – General
(Letter ID#: 2, 4, 7, 13, 28, 31, 48, 51, 69)

Comment: Ten commenters expressed favorable comments about the Service-preferred alternatives for both Mason Neck and Featherstone Refuges. Specific reasons for support included the proposed cultural resources conservation and interpretation, protection and enhancement of tidal marsh and forest habitat on Mason Neck Refuge, protection of sensitive wetlands on Featherstone Refuge, public use opportunities, and habitat management for bald eagles, great blue herons, and other migratory birds.

Response: We appreciate the support of our preferred alternatives. All of the actions mentioned by respondents are included in our final CCP.

Alternative B – Mason Neck Refuge
(Letter ID#: 9, 29, 30, 71)

Comment: Five people stated they preferred Alterative B specifically for Mason Neck. Specific reasons cited included the proposed conservation of migratory birds and other native wildlife, increasing shoreline protection, accessing integrity of biological resources, and increasing outreach and partnership efforts. However, two of these commenters specifically mentioned supporting alternative B "without the youth turkey hunt."

Response: Again, we appreciate the support of our Service-preferred alternative. All of the actions mentioned by respondents are included in our final CCP. Please see our response above under **"Hunting – Turkey"** regarding other public comments and our response on the proposed youth turkey hunt.

Alternative C – Mason Neck Refuge
(Letter ID#: 3, 16, 22)

Comment: Several people commented that they preferred alternative C for Mason Neck Refuge because of its proposal to further expand public access. For example, one person wrote, "In the populous northern Virginia, public lands have been rightly preserved, however has also unjustly limited non-intrusive public opportunities within the refuges that have been set up. This leads to fewer opportunities for citizens to enjoy the environment in its more natural settings without having to drive long distances for these experiences…there needs to be more public opportunity within these public resources."

Response: We appreciate the interest in expanding public use opportunities on Mason Neck Refuge. In the draft CCP/EA, chapter 3 for Mason Neck Refuge, under alternative B goal 3, objectives 3.1 to 3.6, we outline a variety of improvements and additions to our current public use program on that refuge. Proposed actions under alternative C expand programs further than alternative B in terms of the number and diversity of programs, and would result in more infrastructure than alternative B. We believe that the public use opportunities we propose under alternative B represent the most reasonable and feasible set of actions given predicted resource impacts and our projected levels of funding and staffing. In summary, and based on our professional opinion, alternative B represents the most balanced approach to conserving and protecting native fish, wildlife, and vegetation, while still providing the American public with a variety of high-quality, wildlife-dependent public use opportunities on Mason Neck Refuge.

Alternative A – Featherstone Refuge
(Letter ID#: 24, 25)

Comment: Two people favored alternative A for Featherstone Refuge, which would keep the refuge closed to the public. Both expressed concern over moving too swiftly to open the refuge. One respondent wrote "I support … continuing our current management of Featherstone Refuge for the next 15 years. [Alternative] A allows for research to be conducted on a case by case basis. While Government is always pressed to "do something," this is not always the prudent decision. In the case of the Featherstone National Wildlife Refuge, there is no compelling reason to open one of the few remaining wild spaces to the public. Let's let nature take its course until we understand it a bit better. We really don't know what the environmental impact and damage will be by allowing more access and activity on Featherstone or any other refuge. I believe continuing to leave this "wild space" alone is a good investment in Prince William County, Virginia and the Nation's future. Moving slowly based upon the results of citizen science and sound research is the prudent path. Nature is running out of room… let's give it a break."

Response: Our response above under **"Opening Featherstone Refuge to Public Access"** explains our rationale for recommending that the refuge be open to public access, what precedent actions would need to take place before opening the refuge, and the measures we would take to conserve and protect resources.

Alternative B – Featherstone Refuge
(Letter ID#: 3, 7, 8, 12, 17, 20, 50, 54, 57, 77, 78)

Comment: Ten respondents favored alternative B for Featherstone Refuge, as they felt it was a measured approach to opening the refuge. Prince William County wrote of the, "existing policies in Prince William County's comprehensive plan support Alternative B. The plan identifies the need for parks accessible to the general public, and by opening the refuge to the public, it would contribute to the broad variety of park lands already available to county residents. The plan encourages the establishment of corridors that connect open spaces and recommends the construction of a comprehensive network of trails. Alternative B would be consistent with the county's goal of having the Potomac Heritage National Scenic Trail open for the use and enjoyment of county residents. The county further supports the actions including coordinating with partners, that would be undertaken regardless of which alternative is selected."

The local elected representative for the Woodbridge District on the County Board of Supervisors urged the Service, "to quickly implement Alternative B in order to open up the refuge to pedestrian access. It is unfortunate that the residents cannot enjoy the wonders of wildlife that reside in their own backyard. Opening up the refuge will serve to further connect the Potomac Heritage National Scenic Trail to the Mason Neck and Occoquan national wildlife refuges. Providing a recreational amenity in the community will allow citizens to enjoy a healthier lifestyle by creating an enhanced walkable community. By opening up the refuge, citizens can also further their research and understanding of the wildlife. Prince William County has many hidden treasures in the refuge. By better utilizing volunteer conservation resources, federal budget needs can be reduced. The FWS is urged to implement a timeline that will lead to the opening of the refuge in 2011."

An individual commenter wrote, "I have lived in Prince William County for 32 years. Since Occoquan Bay Wildlife Refuge opened, I have enjoyed hundreds of hikes there, seeing numerous birds, butterflies, dragonflies, mammals, snakes, etc. I'd like the opportunity to do the same at Featherstone National Wildlife Refuge. I have visited Featherstone twice with special permit groups, and think it's a lovely place. I support Alternative B, and think that the refuge should be opened to the public as soon as possible. The trails seem adequate for use now. I also would like to see an effort to catalog the plant species in the very near future."

Response: Our response above under **"Opening Featherstone Refuge to Public Access"** explains our rationale for recommending that the refuge be open to public access, what precedent actions would need to take place before opening the refuge, and the measures we would take to conserve and protect resources.

Cumulative Effects
(Letter ID#: 13)

Comment: One letter stated, "We applaud your attention to cumulative impacts of increased visitor use and development. We urge you to factor into this impacts by other federal agencies and state and local governments in the nearby areas. For example, the anticipated addition of thousands of new jobs at Fort Belvoir's Main Post could significantly increase traffic and congestion on U. S. 1, which could further degrade the area's air quality."

Response: We note the comment above, but contend that our analysis of direct, indirect, and cumulative impacts on air quality and other resources in the draft CCP/EA, chapter 4, is sufficient to make a determination on the proposed action. In addition, we believe the projected hiring at Fort Belvoir does not relate to the proposed action and the purpose of, and need for, a CCP as stated in chapter 1. In summary, we believe the job forecast at Fort Belvoir and its impact on the region is outside the scope of our analysis.

Comment: A comment from the Fairfax County SWPD expressed concern with George Mason University's proposed ICAR [International Conflict and Resolution] Center near Mason Neck State Park and its impact on water quality. Their comment included the following, "SWPD staff are concerned about George Mason University's proposed ICAR center at the mouth of Thompsons Creek, near the Mason Neck State Park boundary, and the potential impacts to both the state park and the refuge. The university plans to install a sewage treatment system which will discharge wastewater into Thompson Creek at its confluence with Belmont Bay. It appears that, in spite of the requirements for LOT (Limit of Technology) to meet the Chesapeake Bay [Total Maximum Daily Load] TMDL goals, the proposed wastewater treatment facility will not be held to the same or higher discharge standards as discharges from the nearby Norman M. Cole Pollution Control Plant.

The Fairfax County Board of Supervisors recently approved a Watershed Management Plan (WMP) for the combined watersheds of the Lower Occoquan, including the Mill Branch, Kane Creek and High Point watersheds. The lower Occoquan WMP contains several proposed stream restoration projects in the headwaters of Mill Branch and Thompsons Creek which transect the Meadowood Special Recreation Management Area, as well as in the headwaters of Kane Creek which flows through both Mason Neck State Park and the refuge. A buffer restoration project is also proposed in the High Point watershed near Gunston Hall. The SWPD would welcome the opportunity to share its findings and discuss the proposed projects with FWS and its Mason Neck Managers Group partners."

Response: We consider the comment about the George Mason University facility outside the scope of the CCP because it does not relate to the proposed action or the purpose of, or need for, a CCP as stated in chapter 1. However, the refuge manger will present the comment and concerns to the Mason Neck Managers Group for discussion at their next meeting, along with the suggestion that the manager's group meet with the Fairfax County SWPD for an update.

With regard to the second comment, we appreciate the update on Fairfax County's WMP and the proposed restoration projects in the vicinity of Mason Neck Refuge. The suggestion that the county's SWPD meet with the managers group is also a good idea. Similar to our commitment about the George Mason University facility, the refuge manager will bring the idea of a meeting with the Fairfax County SWPD to the managers group to discuss stream restoration proposals.

Attachment 1—Letter ID Numbers and Respondents

Letter ID Number	Name
1	Kendrick Terry
2	Deanna Beacham – Virginia Council on Indians
3	Scott Helberg
4	Ethel Eaton – Virginia Department of Historic Resources
5, 16, 64	Mary Jane Reyes
6, 63	Thomas E. Kennedy
7	Ellie Irons – Virginia Department of Environmental Quality (consolidated response from multiple State agencies)
8	Nancy Wolf
9 (see 10)	Rob Hartwell
10	Kim Hosen – Prince William Conservation Alliance Rob Hartwell – Elizabeth Hartwell Environmental Education Fund Larry Meade – Northern Virginia Bird Club Steven Bruckner – Sierra Club, Virginia Chapter Stella Koch – Virginia Conservation Associate Audubon Naturalist Society
11, 62	Joseph Chudzik
12	Nancy Vehrs
13	Glenda Booth and Bruce Johnson – Audubon Society of Northern Virginia
14	Sally Anderson – Virginia Native Plant Society
15 (see 57)	Charles Smith – Prince William Wildflower Society
17, 25, 46	Alan Alborn
18, 40, 48, 67	James Waggener
19	Eric Peterson
20	James Gallagher
21	Teddy Carr
22	Mike Smith
23	Kevin Black
24	Bob Studholme
26	Diane Behm
27	Wanlace Yates
28	Craig Boke
29	Michael Finazzo
30, 35, 61	Jeff Browning – Northern Virginia Chapter of Delta Waterfowl
31	Eric Lipp
32	Richard Strauss
33	Jill Miller – Audubon Society of Northern Virginia
34	Jean Public

36	Deborah Westbrooke
37	B. Sachau
38	Reverend Roger W. Verley
39 (see 13)	Glenda Booth – Audubon Society of Northern Virginia
41	Ken and Betty Hagedorn
42	Russell Davenport
43	Gerald Lyons
44 (see 10)	Kim Hosen – Prince William Conservation Alliance
45	Greg Lennon
47	Kevin Parker
49	Cheryl Saggers
50	Larry Underwood
51	Linda Johnston – Friends of the Potomac River Refuges
52	Charlie Grymes – Prince William Conservation Alliance
53	Joan Patterson
54	Judy Gallagher – Prince William Conservation Alliance
55	David Brickley
56, 73	Dorothy Estep
57 (see 15)	Charles Smith – Virginia Plant Society
58	Diana Rock
59	Harry Ragon
60	Collin Davenport – Staffer for U.S. Representative Gerald E. Connolly
65	Faith Chudzik
66	Chris Schreiner
68	Mark Crain – Northern Virginia Chapter of Delta Waterfowl
69	Robert Duncan – Virginia Department of Game and Inland Fisheries
70	Gerald E. Connolly, U.S. House of Representatives
71	LeAnn Astinon – Fairfax County Stormwater Planning Division
72	William Litner
74	Jesse R. Baldwin
75	Mary Ann Lawler
76	Donald E. Briggs – Potomac National Scenic Trail, National Park Service
77, 78	Frank J. Principi – County of Prince William
79	Fred Selden – County of Fairfax

Citations

Bureau of Land Management (BLM). 2010. NEPA Web Guide: Examples of Substantive Comments. Accessed at *http://www.blm.gov/wo/st/en/prog/planning/nepa/webguide/document_pages/6_9_2_1__examples.html* on June 14, 2011.

U.S. Postal Service (USPS). 2011. Zip Code Lookup. Accessed at *http://zip4.usps.com/zip4/citytown_zip.jsp* on June 14, 2011.

U.S. Fish and Wildlife Service (USFWS). 1997. Occoquan Bay National Wildlife Refuge, Comprehensive Conservation Plan.

Virginia Department of Game and Inland Fisheries (VDGIF). 2001. Personal communication with Greg Weiler.

Appendix H

Bill Wallen

Heron rookery on Mason Neck Refuge

Finding of No Significant Impact (FONSI)

Finding of No Significant Impact (FONSI)
Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges
Comprehensive Conservation Plan

In December 2010, the U.S. Fish and Wildlife Service (Service, we, our) published the draft Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) for Elizabeth Hartwell Mason Neck National Wildlife Refuge (Mason Neck Refuge) and Featherstone National Wildlife Refuge (Featherstone Refuge). Mason Neck Refuge was established in 1969 to protect the bald eagle. This 2,277-acre refuge is located on the Mason Neck Peninsula near the town of Lorton, Virginia in Fairfax County. In addition to bald eagles, the refuge's forest, tidal marsh, and wetland habitats support a wide variety of waterfowl, shorebirds, marshbirds, landbirds, and other native wildlife species of conservation concern. Featherstone Refuge was established in 1979 to protect wetlands habitat. This 325-acre refuge is located in the town of Woodbridge, Virginia in Prince William County. The refuge's forest, tidal marsh, and riverine habitats also support bald eagles, as well as wading and waterbirds, waterfowl, and other native species of conservation concern. Mason Neck and Featherstone Refuges, along with Occoquan Bay Refuge, compose the Potomac River National Wildlife Refuge Complex (Refuge Complex), with headquarters in Woodbridge, Virginia.

Chapter 1 of the draft CCP/EA identifies the purpose of, and need for, a CCP and summarizes the laws, policies, and other mandates we follow in developing the plan. It describes international, national, and regional conservation plans that were used as references, and defines our project analysis area. Chapter 1 also presents both refuges' purposes, and describes the vision and goals we set for the refuges over the next 15 years. Finally, chapter 1 describes the planning process, including public and partner involvement, and the issues and concerns that are addressed in the plan. Chapter 2 describes the physical, biological, and socioeconomic environments of the refuges and their surroundings. Chapter 3 describes three management alternatives for Mason Neck Refuge and two management alternatives for Featherstone Refuge. The alternatives include a detailed description of their respective objectives and strategies designed to help achieve refuge purposes, vision, and goals, and contribute to the mission of the National Wildlife Refuge System (Refuge System). For both refuges, alternative B is identified as the Service-preferred alternative. Chapter 4 carefully considers and evaluates each alternative's direct, indirect, and cumulative impacts on the environment. Chapter 5 includes a listing of who we consulted and coordinated with during development of the plan. Chapter 6 is a list of document preparers.

The draft plan's six appendixes provide additional information supporting the assessment and specific proposals in the Service-preferred alternative for each refuge. A brief overview of each alternative follows.

Mason Neck Refuge Alternatives

Alternative A (Current Management): The Council of Environmental Quality regulations on implementing the National Environmental Policy Act (NEPA) require this "No Action" alternative, which we define as current management. Alternative A includes our existing programs and activities and serves as the baseline against which to compare and contrast alternatives B and C for Mason Neck Refuge. This alternative would maintain our existing staff of six permanent employees stationed at the Refuge Complex headquarters. Mason Neck Refuge's biological and habitat management priorities would continue to be protecting key Federal trust wildlife species and their habitats and controlling invasive and exotic plant and wildlife species. Focal species for the refuge would include bald eagles, great blue heron, other waterbirds, and waterfowl species. We would maintain our existing public use programs, trails, observation platforms, and interpretive signs. Wildlife observation, nature photography, and interpretation programs would continue along the Joseph V. Gartlan, Jr. Great Marsh and Woodmarsh Trails. We would also continue to manage the white-tailed deer population by offering a fall hunt.

Alternative B (Service-preferred Alternative): This alternative represents the combination of actions we believe would best meet the Refuge System mission and policies, and refuge purposes and goals. It is also the most effective of the alternatives for Mason Neck Refuge in addressing public issues. Under this alternative, our habitat management program would focus on protecting and enhancing the biological diversity, integrity, and health of tidal marsh and forested habitats to benefit bald eagles, waterfowl, forest-dependent migratory birds, and wading and waterbirds, such as great blue heron. We would also improve our program to treat invasive species and expand our mapping, monitoring, and inventorying program to help measure our successes and inform future management decisions. Our visitor services program would be enhanced by improving existing facilities, creating new trails, and building new observation platforms. We would also offer a new youth turkey hunt in addition to our current deer hunt. Finally, we would increase the number of Refuge Complex staff to

help achieve our management goals and objectives. We would pursue adding positions in our biological and visitor services programs, as well as maintenance and law enforcement staff. Our volunteers, partners, and Friends of Potomac River Refuges would be instrumental in helping us achieve our goals.

Alternative C (Enhanced Public Use Management): Under this alternative, we would expand our visitor services and outreach programs the most. The objective of our visitor services program would be to engage more visitors with our conservation message by increasing infrastructure, providing a broader array of accessible opportunities, and providing new, more effective programming while insuring that these increases do not exceed a level at which habitat values would be compromised. Similar to alternative B, we would also improve existing facilities, create new trails, and build new observation platforms. We would maintain our current biological and habitat management program similar to alternative A, with the exception of enhancing our protection of bald eagles and their habitat on the refuge as in alternative B. We would also seek to expand our Refuge Complex staff similar to alternative B.

Featherstone Refuge Alternatives

Alternative A (Current Management): Similar to our description of a "No Action" alternative under Mason Neck Refuge, this alternative serves as the baseline against which to compare and contrast alternative B for Featherstone Refuge. Alternative A would maintain our existing staff of six permanent employees stationed at the Refuge Complex headquarters. The refuge's biological and habitat management priorities would continue to be limited to actions necessary to monitor and protect sensitive nesting areas, or address critical issues, such as a major outbreak of invasive pests, pathogens, invasive plants, or wildlife disease. Under alternative A, the refuge would remain closed to the public due to a lack of parking and safe, legal public access. Law enforcement would be the primary activity conducted on the refuge.

Alternative B (Service-preferred Alternative): This alternative represents the combination of actions we believe would best meet the Refuge System mission and policies, and refuge purposes and goals. It is also the most effective of the alternatives for Featherstone Refuge in addressing public issues. Our biological and habitat management program priorities would focus on monitoring and protecting sensitive areas from human disturbance, such as the refuge shoreline and riparian forest habitats. We would also monitor and control invasive plants, pests, and pathogens. Under alternative B, the Service would continue to pursue options with Prince William County and other stakeholders to secure public parking, and safe, legal public access, which would also facilitate establishing a segment of the Potomac Heritage National Scenic Trail on the refuge. Once public access is secured and funding is available, we would provide opportunities for wildlife observation and nature photography on designated refuge trails and fishing at designated sites. We would also evaluate in detail a proposal to provide opportunities for hunting in cooperation with Virginia Department of Game and Inland Fisheries (VDGIF). Our volunteers, partners, and Friends of Potomac River Refuges would be instrumental in helping us achieve our goals.

We distributed the draft CCP/EA for a 49-day period of public review and comment from January 5, 2011 to February 22, 2011. We received 79 responses, both oral and written, representing individuals, organizations, and Federal, State, and county agencies. Appendix G in the final CCP includes a summary of those comments and our responses to them. After reviewing the proposed management actions, and considering all public comments and our responses to them, I have determined that the analysis in the EA is sufficient to support my findings. I am selecting alternative B for Mason Neck Refuge and alternative B for Featherstone Refuge, as presented in the draft CCP/EA, with the modifications listed below, to implement as the final CCP. Changes or clarifications we made in the final CCP are the following:

1. Upon CCP approval, we would allow non-motorized boat landings at one designated area of Featherstone Refuge's shoreline to facilitate wildlife observation and nature photography. The designated landing site is a portion of tidal beach on Farm Creek (refer to map 4.3 in the final CCP) and corresponds with the proposed location of the southernmost observation deck and fishing platform that we presented in the draft CCP/EA (map 3.3 in the draft CCP/EA). Visitors accessing the refuge at this location by non-motorized boats would be allowed to walk approximately 0.4 miles along an existing footpath (indicated on map 4.3 in the final CCP). Boaters would be confined to this section of footpath until the rest of the refuge is officially open to public use, as described in the draft CCP/EA. No special infrastructure would be constructed to facilitate non-motorized boat access. We predict no short—or long-term impacts to resources given

    - our expectation that less than 200 boat landings per year would occur;

    - the landing site location is primarily on tidal sandy beach that is a dynamic, shifting substrate and has very little vegetation or soils that would be impacted;

- none of the vegetation in the area is of conservation concern, and people would be required to stay on the existing footpath to minimize additional off-trail impacts; and

- our current knowledge of wildlife inhabiting the area indicates no disturbances to nesting or breeding wildlife would occur.

We would monitor to see if any of these conditions change, or unanticipated impacts are occurring, and would adapt management as warranted. We would also conduct regular outreach and enforcement of refuge regulations to insure minimal to no impacts results.

2. For Mason Neck Refuge, we clarify our proposal to open the refuge to a youth turkey hunt. Our proposal assumes a maximum of five youth per day would hunt on refuge lands on three hunt days, which may not be consecutive. The three hunt days would be during the State's spring turkey hunting season and run from sunrise to noontime. Only gobblers would be harvested and only by shotgun. Youth hunt areas would be designated, well distributed, and in areas otherwise closed to the public. Hunters would also be required to complete data forms to document their observations and success. This documentation would allow us to evaluate the program periodically and make changes as warranted. We would work with VDGIF, the National Wild Turkey Federation, and other partners to design and implement the hunt once we have additional staff in place to support this new program. According to VDGIF wildlife biologists and their results from other hunt areas, less than 50 percent of youth turkey hunters are successful. This statistic, coupled with the fact that only males would be taken in the spring after breeding, causes us to predict that there would be no short-term or long-term impact, or cumulative effect, on the viability of the local turkey population (VDGIF personal communication 2011).

3. For Mason Neck Refuge, we clarify our proposal to expand the refuge's deer hunt. For Mason Neck Refuge, in addition to the shotgun season we currently provide, our proposal is to also open the refuge to an archery deer hunt. Similar to the shotgun season, the archery hunt would be cooperatively managed with VDGIF and Mason Neck State Park, and would be consistent with State regulations. With additional staff in place, and with partner support, we would also consider changing the length of the annual refuge shotgun season, the number of hunters, and/or their distribution when declining forest health conditions warrant an increased deer harvest. If we determine major changes to the shotgun hunting program are justified, we would complete all administrative requirements to formally make the changes.

   On Featherstone Refuge, we clarify our position concerning opening the refuge to hunting. We do not currently have a hunt program on the refuge, nor do we have a specific hunting proposal to review and analyze yet. When we have additional staff in place to develop this new program, we would evaluate hunting alternatives, conduct NEPA analysis, and involve the public before making a decision.

4. For both refuges, we clarify our proposal on waterfowl hunting. In the draft CCP/EA, we explain that waterfowl hunting in Mason Neck Refuge waters is not compatible with refuge purposes due to concerns about disturbing breeding and wintering bald eagles and wintering waterfowl. As noted in item #3 above, on Featherstone Refuge, we would develop and evaluate hunting program alternatives when we have additional staff in place.

   We recognize and fully support waterfowl hunting as a traditional and legitimate activity in the region. We plan to fully support VDGIF in ensuring that the public continues to have quality waterfowl hunting opportunities in State waters near the refuge. As part of that cooperation, we identify a strategy to work with VDGIF to evaluate the use of temporary floating blinds to replace fixed blinds as a way to expand opportunities, but otherwise, we have no jurisdiction or intent to mandate this.

5. For both refuges, we clarify our intent with regards to shoreline protection. We received several public comments asking for a more detailed description of what shoreline protection measures we propose to construct under alternative B. At this time, we have no specific design or project in mind. We do not currently have the expertise to determine the best shoreline protection method or design. Instead, our plans are to work with Federal and State agency experts to conduct a risk assessment and evaluate all potential viable protection methods. This will ensure that we select the most appropriate and effective method to reduce shoreline erosion and, in turn, protect important wildlife habitat and cultural resources. We also recognize that before a decision is reached on a specific plan, we would be required to conduct additional NEPA analysis.

6. We corrected all format and typographical errors that were brought to our attention.

I concur that alternative B for both Mason Neck Refuge and Featherstone Refuge, with the above changes and in comparison to the other alternatives, will best fulfill the mission of the Refuge System, best achieve the refuges' purposes, visions, and goals, best maintain and, where appropriate, restore the refuges' ecological integrity, best address the major issues identified during the planning process, and be most consistent with the principles of sound fish and wildlife management.

Specifically, in comparison to the other two alternatives for Mason Neck Refuge, alternative B provides the greatest increase in the diversity, integrity, and health of high quality habitats, through enhanced management and protection of tidal marsh and forested habitats. It also provides the most reasonable and effective improvements to existing public use programs that are in high demand, with minimal impacts to wildlife and habitats. The plans to increase staffing and develop new infrastructure are reasonable, practicable, and would result in the most efficient management of the refuge and best serve the American public. In comparison to alternative A for Featherstone Refuge, alternative B provides an increase in monitoring and protection of the refuge's riverine, tidal marsh, and forested habitats. Alternative B for Featherstone Refuge would also open the refuge to the public and offer wildlife-dependent recreational opportunities. This would allow the American public to visit, enjoy, and learn about the refuge and its wildlife.

This Finding of No Significant Impact includes the EA and its analysis by reference. I have reviewed the predicted beneficial and adverse impacts associated with alternative B for Mason Neck Refuge and for Featherstone Refuge that are presented in chapter 4 of the draft CCP/EA, and compared them to the other alternatives. I specifically reviewed the context and intensity of those predicted impacts over the short and long term, and considered cumulative effects. Socioeconomic, natural resources, cultural resources, and visitor impacts would generally be positive or result in negligible adverse impacts over the long term. My review of each of the NEPA factors to consider in assessing whether there will be significant environmental effects is summarized here (40 C.F.R. 1508.27).

(1) Beneficial and adverse effects—We expect the final CCP management actions to provide far more substantial benefits to the natural and human environment than it will cause adverse effects. Important benefits include improved forest integrity, health, and diversity from measures to reduce deer browse damage to forest understory and control of invasive plants and pests, protection of regionally important tidal marsh habitats, and the protection and restoration of refuge shoreline. Minor adverse effects are predicted from trail projects and other infrastructure. Most of the effects would be incremental in their impacts, as they do not represent any major changes to current management. There should be no significant impacts on the human environment from the implementation of the CCP.

(2) Public health and safety—We expect the good safety record of the refuge to continue under implementation of the final CCP. Public health and safety is a paramount consideration in designing and implementing all activities on the refuge, whether they are in support of habitat or visitor services programs. Adherence to spill prevention plans, pesticide use plans, best management practices, and the protective actions provided in the stipulations of the compatibility determinations for authorized public uses on the refuge will be a priority. There should be no significant impact on public health and safety from the implementation of the CCP.

(3) Unique characteristics of the area—We expect the unique and regionally significant character of the refuges to be maintained under implementation of the final CCP. Mason Neck Refuge provides regionally important habitat for bald eagles and protects the 207-acre Great Marsh, which is one of the largest freshwater marshes in northern Virginia. Great Marsh supports wintering waterfowl, breeding and foraging bald eagles, and foraging marshbirds. Mason Neck Refuge also protects one of the largest great blue heron rookeries in the Mid-Atlantic States. The rookery currently supports approximately 800 nests. Featherstone Refuge provides habitat for breeding and foraging bald eagles and has over 200 acres of tidal freshwater marsh. We expect the management actions outlined in the CCP, such as shoreline protection measures, forest habitat management strategies to benefit bald eagles, and prohibiting public access to sensitive wetland habitats, to benefit these habitats and species. These benefits will be promoted and sustained through specific actions identified in the CCP. Thus, there should be no significant impact on the unique characteristics of the area due to implementation of the CCP.

(4) Highly controversial effects—We do not predict that any highly controversial effects would occur from implementing the final CCP. We have extensive experience on the Refuge Complex in implementing management actions to protect bald eagle nest sites and the heron rookery, conducting forest habitat management, controlling invasive plants and pests, controlling deer populations through hunting, and other activities to support wildlife-dependent recreational uses. The effects of these actions are widely known from past management and monitoring on the Refuge Complex. There is no scientific controversy over what these effects will be. Thus, there is little risk of any unexpectedly significant controversial effects on the quality of the human environment.

(5) Highly uncertain effects or unknown risks—We do not predict any highly uncertain effects or unknown risks with implementing the final CCP. The management actions in the final CCP are mostly refinements of the existing management measures that we have used on the Refuge Complex since the refuges were established. The only action with some uncertainty is the plan to open Featherstone Refuge to public use and access. However, as is true with Mason Neck Refuge, we will increase our outreach and education to refuge visitors, as well as our monitoring program to insure effects fall within our predictions. Monitoring will also help us reassess the effectiveness of each planned improvement. We do not find a high degree of uncertainty or unknown risk that the final CCP will cause any significant impact on the environment based on available data about the impacts of our current management action and our use of education, monitoring, and enforcement to help identify and address any unplanned effects.

(6) Precedent for future actions with significant effects—We developed actions and strategies to support the purpose of the CCP, which is to develop a strategic management plan to best meet the refuges' purposes and goals, and the Refuge System mission for up to 15 years. The effects of management are designed as gradual improvements over the existing conditions, not global or expansive changes. For example, strategies such as controlling invasive plants and allowing an annual deer hunt to help manage the deer population provide small incremental gains with impacts that may take several years to realize any benefits. Thus, we do not expect the actions in the final CCP to set a precedent for future actions that may cause any significant impact on the environment.

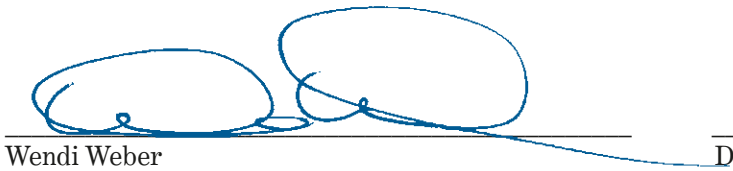
(7) Cumulatively significant impacts—We do not predict that any cumulatively significant impacts would result from implementing the final CCP based on our NEPA analysis that accompanies this plan. However, since the CCP provides 15-year strategic direction for both refuges, there are actions that provide some cumulative benefits when considered along with other past, present, or reasonably foreseeable future actions on or in the vicinity of the refuge. For example, we plan to continue to coordinate with surrounding land managers to promote common goals, such as improving water quality and providing wildlife-dependent recreational uses. Our resource protection and management provides incremental benefits to the larger Chesapeake Bay ecoregion. We do not foresee any of these coordinated activities rising to the level of a significant effect on the environment. Some actions identified in the final CCP, such as pursuing additional shoreline protection measures, will require additional NEPA analysis once a detailed proposal is developed. We will examine the cumulative effects of these subsequent projects before they are approved.

(8) Effects on scientific, cultural, or historical resources—We have developed actions that would benefit archaeological, historical, and cultural resources on both refuges. Increased Refuge Complex staff would be present to interpret the importance of, and foster a greater appreciation for, these resources. Refuge Complex law enforcement would conduct outreach, education, and enforcement to protect cultural resources. They would also monitor known archaeological and historic sites on the refuge to prevent looting and other violations of the Archaeological Resources Protection Act. The Virginia State Historic Preservation Officer reviewed the draft CCP/EA and concurs that alternatives B for Mason Neck and Featherstone Refuges comply with Section 106 of the National Historic Preservation Act. We would continue to consult with the Service's regional archaeologist and the Virginia State Historic Preservation Officer to ensure compliance with Federal and State cultural resource laws. Although there would be some risk that visitors could damage or disturb archaeological and historic resources on the refuges, these risks would be reduced by limiting public access to designated trails and areas only. On Mason Neck Refuge, shoreline protection measures would protect cultural resources at high risk of damage from shoreline erosion. On Featherstone Refuge, the major benefits would be from partnerships to locate and protect cultural resources. We do not anticipate any significant effects on scientific, cultural, or historical resources.

(9) Effects on Endangered Species Act (ESA)-listed species and habitats –We have completed a consultation with the Service's Ecological Services Field Office under Section 7 of the ESA. Their endangered species specialists have concurred in our biological assessment that the planned actions are not likely to adversely affect any of the ESA-listed species that may be present on either refuge, particularly the threatened sensitive joint-vetch *(Aeschynomene virginica)*, and the threatened small whorled pogonia (*Isotria medeoloides*). Neither of these plant species are currently documented on either refuge, but may be present on or near the refuges. There is no ESA-designated critical habitat on the refuge. Our management actions to protect the refuges' wetland habitats, such as prohibiting public access and proposing additional shoreline protection measures, and the refuges' upland habitats, such as restricting public access to designated trails and areas, would reduce potential adverse impacts to both species. Therefore, we do not anticipate any significant effects on these ESA-listed resources.

(10) Threat of violating any environmental law—Our habitat management actions are designed to benefit the environment. They will comply with all applicable laws, such as the Clean Water Act, the Clean Air Act, Coastal Zone Management Act, ESA, and the National Historic Preservation Act. Pursuant to the National Wildlife Refuge System Administration Act (16 U.S.C. § 668dd(e)(3), 668dd(m)), we have coordinated closely with the VDGIF in developing the habitat management plans and the fish and wildlife regulations for the refuge. Our public hunting and fishing programs under the CCP require all participants to comply with State regulations. We do not anticipate a threat that the CCP will violate any environmental law or cause any significant impact on the environment.

Based on this review, I find that implementing alternative B for Mason Neck Refuge and alternative B for Featherstone Refuge will not have a significant impact on the quality of the human environment in accordance with Section 102(2)(c) of NEPA. Therefore, I have concluded that this Finding of No Significant Impact is appropriate and an Environmental Impact Statement is not required.



9/1/16

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