

## Chapter 3



Ecd Gaillard

*Black and white warbler*

## Alternatives

- **3.1 Introduction**
- **3.2 Formulating Alternatives**
- **3.3 Alternatives or Actions Considered but Eliminated From Detailed Study**
- **3.4 Actions Common to Both Alternatives Evaluated in Detail**
- **3.5 Alternative A. Current Management (No Action Alternative)**
- **3.6 Alternative B (Focus on Species of Conservation Concern) (Service-preferred Alternative)**
- **3.7 Comparison of Alternatives**

## 3.1 Introduction

This chapter describes:

- Our process for formulating two management alternatives;
- Actions or alternatives we considered but did not fully develop;
- Actions that are common to both alternatives; and
- Descriptions of the two alternatives we analyzed in detail.

At the end of this chapter, table 3.3 compares how the two alternatives address key issues, support major programs, and achieve refuge goals.

## 3.2 Formulating Alternatives

As we describe in chapter 1, the purpose of a CCP is to develop strategic direction to meet the management goals of the refuge. Other broad purposes are to:

- Best achieve the refuge’s establishment purposes and vision;
- Contribute to the missions of the Service and the Refuge System;
- Contribute to the Refuge System vision implementation document “Conserving the Future” (2011);
- Adhere to Service policies and mandates;
- Address significant issues; and
- Incorporate sound principles of fish and wildlife science.

During the CCP planning process, we have explored a range of feasible alternatives that would help achieve the refuge purposes, vision, and goals. The Council on Environmental Quality (CEQ) establishes regulations and guidance for Federal agencies to follow to comply with NEPA ([http://ceq.hss.doe.gov/ceq\\_regulations/regulations.html](http://ceq.hss.doe.gov/ceq_regulations/regulations.html); accessed April 2012). This includes guidance on the development and analysis of alternatives under NEPA. A full range of alternatives must be developed for analysis for any Federal action. The alternatives should meet the purpose and need as stated in chapter 1, at least to a large degree. Alternatives should also be developed to minimize impacts to environmental resources and be “reasonable.” CEQ has defined reasonable as those alternatives that are economically and technically feasible, and show evidence of common sense. Alternatives that could not be implemented if they were chosen, for economic or technical reasons, or because they do not address the stated purpose and need for action in chapter 1, or that have severe environmental impacts, are not considered reasonable.

### 3.2.1 Relating Goals, Objectives, and Strategies

#### Goals

Refuge goals are intentionally broad, descriptive statements of the desired future condition of refuge resources. They articulate the principal elements of the refuge purposes and our vision statement, and provide a foundation for developing specific management objectives and strategies. By design, they are less quantitative, and more prescriptive, in defining the target of our management. We have developed five goals for the refuge, which are discussed in chapter 1. Both alternatives address these same five goals.

#### Objectives

Objectives are essentially incremental steps toward achieving a goal. They further define management targets in measurable terms. Typically, they vary among the alternatives and provide the basis for determining more detailed strategies, monitoring refuge accomplishments, and evaluating successes. We

followed guidance in “Writing Refuge Management Goals and Objectives: A Handbook” (USFWS 2004c) for writing “SMART” objectives that possess five characteristics:

- 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. The objectives outlined in the alternative selected for the final CCP will guide development of, or revision to, refuge step-down plans, which we describe later in this chapter. We would measure our successes by how well we achieve the objectives. Unless otherwise noted, the objectives and strategies we describe would be implemented by refuge staff.

### Strategies

Strategies are the specific actions, tools, or techniques we may use to achieve the objectives. The list of strategies under each objective represents the potential suite of actions we may implement. We will evaluate most of them further as to how, when, and where we should implement them when we write or revise our refuge step-down plans after the final CCP is approved. Our successes will be measured by how well our strategies achieve our objectives and goals.

### Inventory and Monitoring Activities

For most objectives, we also identify potential inventory and monitoring activities that will help us measure our success toward meeting refuge goals and objectives. The activities listed may be modified or further refined in the refuge’s inventory and monitoring step-down plan.

After considering the refuge’s purposes and evaluating the results of public and partner scoping meetings, our core planning team identified a wide range of possible management objectives and strategies. We then began the process of designing detailed management alternatives. Each alternative was developed as a combination of complementary objectives and strategies designed to meet refuge purposes, vision, and goals, and the Refuge System mission and goals, and respond to the issues and opportunities that arose during the planning process.

After evaluating all of the possible objectives, we grouped together those objectives that seemed to fit together in what we call “alternative themes.” For example, we considered such themes as “no change from current management,” “manage for priority refuge species,” and “manage for natural ecosystem processes.”

In this draft CCP/EA, we fully analyze two alternatives that characterize different ways of managing the refuge over the next 15 years: Alternative A, “Current Management,” and Alternative B, “Focus on Species of Conservation Concern.” These two alternatives are described in detail in this chapter and their impacts are described in chapter 4. In our professional judgment, these two alternatives represent a reasonable range of alternatives given the issues identified, and the scope, and purpose and need of the proposed action. The two alternatives range from current refuge management (alternative A) to an expansion of programs and improvement of facilities that we could reasonably implement during the life of this plan (alternative B). The range of alternatives is narrow for the following reasons:

- The island refuge is relatively remote, small, and unstaffed.
- Options for habitat management and public use are limited due to the logistics of getting people and equipment to the refuge on a regular basis.

## 3.2.2 Developing Alternatives, Including the No Action Alternative

- Additional limits have been placed on certain public use activities by either Secretarial Order or findings of not appropriate to minimize user conflicts with other compatible uses of the refuge.

In section 3.3, we describe a third alternative that was initially thought to be viable, but was dismissed after further consideration by the core planning team. We also describe in that section several specific actions that we eliminated from detailed analysis

#### **Alternative A: Current Management (No Action)**

Alternative A addresses the NEPA requirement of a “no action” alternative, which we define as continuing current management. It describes our existing management priorities, activities, and partnerships, and serves as a baseline for comparing and contrasting alternative B.

Many of the objectives in alternative A do not strictly follow the current guidance in the Service goals and objectives handbook (Adamcik et al. 2004) because we are describing current management decisions and activities that were established prior to Service guidance on developing CCPs. Our descriptions of alternative A activities originate from a variety of formal and informal management decisions and planning documents. Thus, the objectives in alternative A are fewer and more subjective than are those in alternative B.

#### **Alternative B: Focus on Species of Conservation Concern (Service-preferred)**

Alternative B combines the actions we believe would be most effective at:

- Meeting the refuge purposes, vision, and goals;
- Addressing issues and concerns identified throughout the planning process;
- Responding to public comments and inquiries; and
- Being able to feasibly implement in accordance with applicable laws, regulations, policies, and guidance.

This alternative emphasizes the conservation, restoration, and monitoring of specific refuge habitats to support priority refuge species whose habitat needs benefit other species of conservation concern in eastern Virginia, including those identified in the Virginia WAP. In particular, we emphasize protecting, restoring, and monitoring the refuge’s tidal freshwater marsh, and tidal swamp and mixed mesic forest habitats.

We would promote natural forest succession on a portion of refuge land that is currently being managed as grassland. Our activities would include regularly evaluating and adapting our actions in conjunction with monitoring climate change impacts, including sea level rise. We would also increase and enhance opportunities for appropriate and compatible public uses on the refuge through partnerships.

To better understand the scope and context of resources embodied within each alternative, see Chapter 2, “Description of the Affected Environment,” for details on current refuge resources and programs.

Actions that are common to both alternatives are detailed in section 3.4. Refuge habitat acreages differ by alternative (see table 3.1). Visitor services offered annually also differ by alternative (see table 3.2).

We include a habitat map for each alternative to help visualize how refuge vegetation would look under each alternative (maps 3.1 and 3.3). Map 3.2 reflects the public use opportunities under both alternatives.

### **3.2.3 Comparison of the Alternatives**

**Table 3.1. Comparison of Habitat Type Acreages\* to be Managed, by Alternative, on Presquile NWR**

Goal	Habitat	Alternative A: Current Management (No Action)	Alternative B: Focus on Species of Conservation Concern (Service-preferred)
1	Tidal swamp forest	738	738
	Tidal freshwater marsh	189	189
	James River and associated backwaters	101	101
2	Grassland, former croplands and pasture	200	0
	Mature mixed mesic forest	46	46
	Grassland, managed for administrative and educational purposes	23	46
	Transitional mixed mesic forest	20	197
	River escarpment	11	11
	Right-of-way easements	1	1
<b>Total</b>		<b>1,329</b>	<b>1,329</b>

\*Acres estimated from GIS and rounded up to nearest whole number

**Table 3.2. Comparison of Visitor Services Offered Annually, by Alternative, on Presquile NWR**

Goal	Habitat	Alternative A: Current Management (No Action)	Alternative B: Focus on Species of Conservation Concern (Service-preferred)
4	Teacher in-service training	Up to 2	Up to 2
	Virginia Commonwealth University (VCU) summer teacher program	1	Up to 4
	Fulfill requests for programs on-refuge	Up to 2	Up to 2
	Virginia Standards of Learning	Attempt to meet requirements	Meet requirements
	Student participation in environmental education programs on-refuge	Up to 120 students from local and youth groups	Up to 2,000 students from underserved and urban areas
	Environmental education programs and events off-refuge	Up to 2 programs or events	Up to 4 programs or events
5	Interpretive programs conducted on- and off-refuge	400 people	480 people
	Refuge-sponsored pontoon trips	Up to 6	Up to 6
	Volunteer events	Up to 3	Up to 3
	Community and civic events	Up to 2	Up to 4
	Public deer hunting	Up to 120 hunters	Up to 120 hunters
	Deer harvest	Up to 2 per hunter	Up to 2 per hunter
	Number of hunt days	3	5
Wildlife photography and observation permits	Approximately 30	Approximately 30	

### **3.3 Alternatives or Actions Considered but Eliminated From Detailed Study**

As mentioned in section 3.2. above, alternatives should be “reasonable.” Below are alternatives or actions we considered, but determined were not reasonable and, therefore, did not fully develop them in this document.

#### **3.3.1 Detailing a Separate Alternative to Focus on Ecological Integrity and Natural Processes**

Based on public scoping and internal agency discussions, we initially considered a third alternative, which we tentatively called alternative C. This alternative emphasized maintaining ecological integrity and allowing natural processes to continue unimpeded on the refuge. We originally considered it distinctive from alternative B which emphasizes the protection of specific, priority wildlife species.

After further considering actions that would potentially comprise the proposed alternative C, we determined that it was not truly a unique, stand-alone alternative and was mostly duplicative of alternative B. Maintaining and restoring integrity of the refuge’s habitats for priority refuge species (alternative B) would result in the same desired outcomes (e.g., a mature forest) as maintaining and restoring ecological processes (proposed alternative C). The primary difference between the two alternatives was that alternative B would actively manage habitats to promote forest succession and maintain forest health, while the proposed alternative C included only passive management, or “allowing nature to take its course.” In either case, a healthy, mature tidal swamp and mixed mesic forest were the objectives and desired outcome. As such, it seemed reasonable, and less redundant, to incorporate strategies originally considered in alternative C into alternative B.

#### **3.3.2 Refuge Expansion**

The Service, via the Director, has authority to administratively expand a refuge if the addition would significantly enhance our ability to achieve refuge purposes, or contribute to the mission and goals of the Refuge System. The administrative procedures to develop and evaluate a land acquisition proposal can take up to four years. In chapter 2, section 2.10.3, we identify some areas of interest, but have no specific proposal for expanding the refuge in this draft CCP/EA under either alternatives A or B. However, this does not preclude us from evaluating reasonable proposals in the future. Those future considerations would require a separate NEPA analysis, including public involvement, as warranted.

#### **3.3.3 Allowing Access to the Refuge without a Permit**

During the public scoping phase of our planning process, we received comments inquiring about whether a permit would continue to be required for public access to the refuge. As noted in section 3.4.1 below, we list numerous reasons why a permit system is used and enforced. Among those reasons noted below are to enhance safety for children participating in the year round environmental education programs; protect wildlife and cultural resources; and help prevent incompatible or unauthorized uses on this remote, unstaffed island-refuge. This requirement for a permit is further described in appendix B in the compatibility determination for wildlife observation, nature photography, environmental education, and interpretation. Very few permit requests are denied annually, and the denials are typically based on requests for uses determined to be not compatible.

#### **3.3.4 Closing the Refuge to Public Deer Hunting**

The purpose of this CCP is to develop a strategic course of action that achieves the refuge’s goals as presented in chapter 1. Closing Presquile NWR to public deer hunting would not meet Goal 5, “Wildlife-dependent Recreation,” which specifically mentions offering opportunities for hunting.

Hunting is one of the six priority, wildlife-dependent public uses of refuges, each of which receives priority consideration in refuge planning and management. In

accordance with Service policy, these uses shall be facilitated where found to be compatible and ensure that other public uses do not interfere with our ability to provide quality, wildlife-dependent recreational uses. Under section 3.4.4 below, we list other initiatives for allowing hunting on national wildlife refuges.

Public deer hunting is a historical, appropriate, and compatible use on the refuge that has been accounted for in refuge planning documents. The refuge was opened to public deer hunting in 1967 (32 FR 12444, August 26, 1967; codified at 50 CFR 32.11). Proposed changes to the refuge-specific regulation revisions have been published in the *Federal Register* and in Title 50 of the CFR. An updated compatibility determination for public deer hunting is included in this CCP/EA (appendix B).

Past and present refuge management has emphasized that the objectives of the public deer hunting are to maintain the deer population at a level commensurate with the biological carrying capacity (as defined in Smith 1980) of the available refuge habitat and to provide high quality wildlife-oriented recreation (USFWS 1994). Results from the most recent health assessment of the local deer population indicate that deer on the refuge are in poor physical condition, have a high parasite burden, and that the population in the refuge vicinity is higher than optimal for Presquile NWR (Moyer 2004).

The maximum number of deer potentially harvested from the refuge is 240, based on a maximum of 120 hunters permitted who are allowed to take 2 deer. This accounts for a potential harvest of 0.02 to 0.03 percent of Virginia's pre-hunt deer population (estimated to be between 850,000 and 1,000,000 deer) (VDGIF 2012). The Commonwealth's deer management program regulates deer hunting toward maintaining moderate to low population densities, in fair to good physical condition, and below the biological carrying capacity of the habitat (VDGIF 2012).

Public deer hunting occurs in the context of the overall planning objective of protecting natural and cultural resources on the refuge, while providing for priority wildlife-dependent public uses where appropriate. We acknowledge that an updated NEPA review of the refuge's public deer hunt is needed; however, because closing the refuge to public deer hunting does not meet the purpose and need, or goals and objectives of this CCP/EA, and because public deer hunting is a priority public use that is accounted for in refuge plans and policies, closing the refuge to public deer hunting was not carried forward for further analysis.

### **3.4 Actions Common to Both Alternatives Evaluated in Detail**

Both of the alternatives share some common actions. These actions are current practices or policies that would continue under both alternatives. Some of these actions 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 require public review, but that we want to highlight in this public document.

We discuss these common actions in more detail below and have organized our discussion under the following headings:

- Refuge staffing and administration
- Species and habitat conservation
- Cultural resources management
- Visitor services management
- Findings of appropriateness and compatibility determinations
- Special use permits
- Climate change
- Refuge revenue sharing payments
- Special designation areas
- Additional NEPA analysis

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, DC, and regional offices before arriving at field stations. In summary, the actions proposed in this CCP represent our strategic vision for the future of Presquile NWR. Final CCPs do not constitute a Service commitment for staffing increases, or funding for operations, maintenance, or future land acquisition. Implementation must be adjusted annually given the reality of budgets, staffing, and unforeseen critical priorities.

### 3.4.1 Refuge Staffing and Administration

Both alternatives include the following actions related to refuge staffing and administration.

#### **Refuge Staff**

Continue to share staff across the Eastern Virginia Rivers NWR Complex, including the three new positions, visitor services specialist, refuge biologist, and maintenance worker, identified in appendix C of the Rappahannock River Valley NWR draft CCP (USFWS 2009).

#### *Discussion and Rationale*

In 2000, a decision was made by the Regional Chief to administratively group Presquile NWR with Rappahannock River Valley and James River NWRs to form the Eastern Virginia Rivers NWR Complex. In 2003, Plum Tree Island NWR joined the refuge complex. The intent of administratively grouping these refuges was to create management efficiencies, to the extent possible, due to declining budgets. As a result, the refuge complex headquarters was established at Rappahannock River Valley NWR in Warsaw, Virginia and Presquile, James River, and Plum Tree Island NWRs became unstaffed refuges. The refuge manager for the refuge complex is responsible for setting staff priorities and resource distribution across the four refuges.

An analysis of refuge staffing using the National Staffing Model resulted in a proposed increase of three staff, with shared responsibilities among the four refuges in the Refuge Complex (USFWS 2007). Increasing refuge complex staff by three will help support management on Presquile NWR, including increased visitor services opportunities and management of the natural and built resources on the refuge. The three new positions will be allocated across each of the four refuges as needed to ensure efficient operation and management throughout the refuge complex.

#### **Requiring a Permit for Refuge Access**

Continue to require a permit for refuge access not associated with refuge-sponsored programs or planned activities.

#### *Discussion and Rationale*

Since refuge establishment, the refuge has been closed to general public access. Only those visitors engaged in a refuge program or refuge-sponsored event, or who contacted the refuge prior to their visit are allowed access. People interested in visiting the refuge outside of refuge-sponsored programs are required to request permission to access the refuge at least three business days in advance of their visit. If the request is determined to be compatible and is granted, refuge staff will issue a special use permit that visitors are required to carry a copy of while on the refuge. This policy will continue under all alternatives. It has worked well because it:

- Proactively prevents incompatible or unauthorized uses from occurring on the refuge;
- Minimizes wildlife disturbance on the refuge by stipulating in the permit that access is in designated areas only;
- Minimizes cultural resource disturbances by requiring people to stay in designated areas;
- Enhances safety for the children that are participating in the environmental education programs offered year round;
- Allows for stricter monitoring of who is on the refuge and why;
- Minimizes conflicts between user groups (e.g., bird watchers and deer hunters) for safety purposes and supports high quality experiences;
- Protects the visitor experience of being immersed in nature in a secluded and remote area; and
- Provides a mechanism for law enforcement to prevent people from beaching their boat on the fragile shoreline and engaging in other unauthorized uses.

Permit availability (i.e., the number of permits issued) is not a concern and is not predicted to be over the next 15 years. Very few permit requests are denied annually and the denials are typically based on requests for uses determined to be not compatible.

Additional details about this permit requirement are provided in the approved compatibility determination for “Wildlife Observation, Photography, Environmental Education, and Interpretation” in appendix B.

#### **Refuge Step-down Plans**

Continue to complete key refuge step-down plans according to the identified schedule; the habitat management plan (HMP), inventory and monitoring plan, and visitor services plan are priorities for completion.

#### *Discussion and Rationale*

The Service uses step-down plans to detail the “how, where, and when” we will accomplish the goals and objectives developed during the CCP process. Step-down plans will be prepared in accordance with Service guidance, handbooks, and the refuge’s final CCP. The following three step-down plans are a priority for completion on Presquile NWR. Under each description, we identify a timeline for their completion.

Habitat Management Plan: An HMP for the refuge is the requisite first step to achieving the objectives of goals 1 and 2 for either alternative. We will complete an HMP within two years of CCP approval. The HMP will provide more details on the habitat management strategies we would use to accomplish CCP goals and objectives over the next 15 years. In particular, the HMP will detail the specific areas and habitat types we will manage for, as well as the tools and techniques we will use and the timing of our management actions. Additional analysis of the impacts of specific methods may be necessary to comply with NEPA. The HMP will also incorporate the results of appendix B, which identifies how we derived priority refuge species and habitats for the refuge.

In this CCP, the goals, objectives, and strategies identify how we intend to manage habitats on the refuge. Both the CCP and HMP are based on current resource information, published research, and our own field experiences. Our

methods, timing, and techniques will be updated as new, credible information becomes available. To facilitate our management, we will regularly maintain our databases, including GIS data, documenting any major vegetation changes on at least a five-year basis.

Inventory and Monitoring Plan:

The inventory and monitoring plan will outline and prioritize inventorying and monitoring activities for the refuge based on the priorities identified in the alternative selected for the final CCP and detailed in the HMP. The inventory and monitoring plan will be completed within three years of CCP approval (within one year from the completion of the HMP). We will use our inventory and monitoring program to assess whether our original assumptions and proposed management actions are supporting our habitat and species objectives.



Meghan Carfioi/USFWS

*Little Creek*

The results of inventories and monitoring will provide us with more information on the status of our natural resources and allow us to make more informed management decisions. The inventory and monitoring plan will incorporate recommendations from the “Strategic Plan for Inventories and Monitoring on National Wildlife Refuges: Adapting to Environmental Change” (USFWS 2010a) to ensure a coordinated approach to inventory and monitoring across refuges.

Visitor Services Plan: A visitor services plan is required by Service policy (605 FW 1, Section 1.8.A). Exhibit 1 of that policy includes an outline for the plan. The visitor services plan will further detail strategies to help meet the visitor services goals and objectives contained in the refuge’s CCP over the next 15 years. We will complete a visitor services plan within two years of CCP approval. Additional analysis of the impacts of specific activities may be necessary to comply with NEPA.

**Existing Facilities Maintenance and Planned New Construction**

Continue to maintain and renovate existing facilities as needed, and pursue energy efficiencies and sustainable designs in maintenance and planned new construction.

*Discussion and Rationale*

Periodic maintenance and renovation of existing facilities will continue to ensure safety and accessibility for staff and visitors. The refuge’s existing facilities

are described in chapter 2. Construction and maintenance projects currently listed in the Refuge Operating Needs System (RONS) and Service Asset Maintenance Management System (SAMMS) databases will be undertaken in accordance with the regional and refuge rankings for each project (see appendix C). Other proposed projects will be new additions to the respective databases as indicated in appendix C. As we undertake these projects, we will conduct further consultations, as warranted, to ensure compliance with Federal laws such as the Coastal Zone Management Act of 1972, the Endangered Species Act, and National Historic Preservation Act.

The Council on Environmental Quality guidelines for implementing NEPA also require examining energy requirements and conservation potential in environmental documents. For both alternatives, we will meet these guidelines by incorporating principles of sustainability in the design, construction, and operation of facilities on refuges.

The objectives of sustainability are to:

- Design structures to minimize adverse impacts on natural and cultural values;
- Reflect their environmental setting;
- Maintain and encourage biodiversity;
- Construct and retrofit facilities using energy-efficient materials and building techniques;
- Operate and maintain facilities to promote their sustainability; and
- Illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use of natural resources.

The planned new bunkhouse and renovations to existing refuge facilities (see chapter 2, section 2.10.4), to the maximum extent practicable, will be LEED-compliant. This means they will:

- Be constructed with sustainable materials;
- Employ best management practices and green technologies during construction and for waste management, such as self-composting toilets, graywater processing systems, stormwater collection units, and solar panels; and
- Have interpretive materials to illustrate sustainable design and function.

Planned construction and maintenance projects currently listed in RONS and SAMMS databases will be taken in accordance with the rankings for each project (see appendix C). The refuge will consult with other Federal, State, and local government agencies with jurisdiction and authority to ensure that activities are consistent, to the maximum extent practicable, with the enforceable policies of the Commonwealth's Coastal Management Program; to acquire required permits prior to commencing with projects; and to ensure that appropriate and required mitigation measures are employed by the Service and its agents during project implementation.

#### **Transportation Study**

Continue to evaluate options presented in the 2012 transportation study report to maintain or improve administrative and visitor access to the refuge. Conduct additional detailed planning under NEPA, as warranted.

*Discussion and Rationale*

In 2011, we used funds awarded from the Paul S. Sarbanes Transit in Parks Program (49 U.S.C. 5320) to hire Vanasse Hangen Brustlin, Inc., to initiate a transportation study for the refuge. The purpose of the study was to investigate ways to maintain or improve access to the island refuge for both refuge staff and visitors. The scope of the study includes an evaluation of the refuge's existing and future needs for transporting equipment and facilities, staff, volunteers, and the public, including but not limited to consideration of piers, ferry docks, the use of the existing cable ferry system or an updated version, the use of pontoon boats, outboard motor boats, trailers, and island storage structures (existing and potential), their maintenance, and related equipment. The study will estimate disposal value and/or cost to repair, restore, renovate, or redesign for reuse of transportation equipment and facilities. The transportation study will result in a 2012 report that identifies a range of feasible transportation system improvement options. The report will be available from the Eastern Virginia Rivers NWR Complex headquarters. Findings of the study will be used to inform the development of a reasonable range of alternatives to be considered in a subsequent transportation plan/EA. Neither the transportation study nor this CCP/EA includes the necessary level of NEPA analysis to assess the site-specific impacts associated with each of the transportation system improvement options. Therefore, additional NEPA analysis will be completed prior to implementation of any of the transportation system improvement options.

**Cable Ferry**

Continue to maintain the cable ferry in safe working condition to support administrative activities such as equipment transportation.

*Discussion and Rationale*

Until the transportation study is completed, the cable ferry is still needed in the short-term to transport equipment to the refuge. Alternative modes of transporting equipment, such as helicopter, are not feasible or reasonable.

**Rights-of-Way Easements**

Continue to maintain the two right-of-way easements.

*Discussion and Rationale*

Under both alternatives we will maintain the two right-of-way easements to support essential refuge operations, including refuge administrative access and maintaining facilities on the refuge. The Service has a right-of-way easement on private lands to the south (at ferry launch site) and a utility easement to the east. The USACE also has a right-of-way on both sides of the Turkey Island Cutoff to maintain this channel and, if necessary, deposit dredge materials on pre-designated areas of the refuge. This easement will continue to be maintained by USACE in perpetuity.

**3.4.2 Species and Habitat Conservation**

Both alternatives include the following actions related to species and habitat conservation.

**Adaptive Management**

Continue to employ an adaptive management approach for improving our resource decisions and management.

*Discussion and Rationale*

Both alternatives will employ an adaptive management approach for improving resource management by better understanding ecological systems through iterative learning.

The Department of the Interior's technical guidebook to assist managers and practitioners in adaptive management ("Adaptive Management: The U.S.

Department of Interior, Technical Guide”) provides the following definition for adaptive management (<http://www.doi.gov/initiatives/AdaptiveManagement/documents.html>; accessed April 2012):

“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, increases 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 continuous learning. This approach recognized that we can never achieve perfect understanding of the natural world and that we must implement management in the face of uncertainty. At the refuge level, adaptive management is an integral part of management planning, research design, and monitoring. Uncertainties about ecological systems are addressed through targeted monitoring of resource response to management actions and predictive models that mimic the function of the natural world.

Adaptive management gives the refuge manager flexibility to adjust management action or strategies if they do not meet goals or objectives. Significant changes from what we present in our final CCP may warrant additional NEPA analysis and public comment. Minor changes from what we present in our final CCP may not warrant additional NEPA analysis and public comment, but we will document them in our project evaluation or annual reports. Implementing an adaptive management approach supports all refuge goals. Furthermore, adaptive management is all the more compelling in light of climate change concerns.

### **Invasive Species Control**

Continue to control invasive species on refuge lands as funding, staffing, and equipment logistics allow, with particular attention to controlling Johnsongrass and Canada thistle.

#### *Discussion and Rationale*

The Service identifies an invasive species as a species that is nonnative to an ecosystem, and whose introduction causes, or is likely to cause, harm to the economy, environment, or human health (Executive Order 13112). The unchecked spread of invasive plants threatens the biological diversity, integrity, and environmental health of all refuge habitats. In many cases, invasive species out-compete native species and become the dominant cover. This situation reduces the availability of native plants as food and cover for native wildlife. Over the past several decades, government agencies, conservation

*Nonnative, invasive hibiscus*



Cyrus Brame/USFWS

organizations, and the public have become more aware of the negative effects of invasive species. One report estimated the economic cost of invasive species in the U.S. at \$137 billion every year (Pimentel et al. 2000). Up to 46 percent of the plants and animals federally listed as threatened and endangered have been negatively impacted by invasive species (Wilcove et al. 1998, National Invasive Species Council 2001).

The Service's Northeast Region initiated an effort to systematically identify, locate, and map invasive plant species occurring on refuge lands, leading to an effective integrated management plan. Presquile NWR has begun identifying and mapping locations of invasive species on the refuge as time and resources allow. Johnsongrass and Canada thistle are the biggest concerns on the refuge currently. We will use this information to guide the development of monitoring, control, and eradication projects. When control is deemed necessary, the refuge will use the most effective combinations of mechanical, biological, and chemical controls to achieve long-term control or eradication. Only herbicides approved by the regional contaminants coordinator will be used, and only in accordance with the approved rate and timing of application. Currently, the refuge uses the following chemicals to treat invasive species, when resources allow: Garlon 4, Glypro, and Plateau.

Under both alternatives, we will continue to implement the following strategies related to invasive species control:

- Follow the national guidance on invasive species provided in the Service Manual (620 FW 1.7G).
- Complete the inventory and mapping of invasive plant species and prioritize invasive species to be controlled or eradicated.
- Implement controls using biological, ecological, mechanical, prescribed fire, or chemical techniques, as needed.

### 3.4.3 Cultural Resource Management

Both alternatives include the following actions related to cultural resource management.

#### **Protection and Maintenance Recommendations**

Continue to implement the short-term recommendations to protect and maintain the refuge's cultural resources identified in the 2009 Archaeological Overview Study for the refuge.

#### *Discussion and Rationale*

To better understand the archaeological and cultural resources present at the refuge, and to help ensure impacts to those resources are avoided, the Service retained John Milner Associates, Inc. to conduct an overview study to determine the potential presence of known and predicted archaeological resources at the refuge. John Milner Associates, Inc. confirmed that the refuge has a high potential for preserved significant archaeological resources, including sites associated with American Indian settlement and subsistence, initial settlement of the James River by Europeans beginning in 1607, plantation society, military history, and post-Civil War rural agriculture.

After consulting with our Regional Historic Preservation Officer (RHPO) and SHPO, we have begun implementing several short-term recommendations identified in the overview report because these actions are in accordance with applicable laws, regulations, and policies. The long-term recommendations in the report are included under alternative B only (see discussion under alternative B, goal 4). The short-term recommendations in the report pertain to archaeological sites on the refuge and include:

- Ensuring that all cultural resource researchers acquire the required Archaeological Resource Protection Act permit before conducting investigations. The Service has already developed standards for this permitting process that are in agreement with the Virginia Department of Historic Resources and U.S. Department of the Interior guidelines. Stipulations in the permit require producing a report of all findings within one year from when the permit was issued, including artifact inventories, as well as a curation plan. Researchers are also required to fill in their excavation units after the investigations are completed.
- Conducting a controlled surface collection in areas where refuge maintenance requires plowing, using an archaeologist approved by our RHPO, before plowing activities occur.

#### **National Historic Preservation Act Section 106 Compliance**

Continue to comply with Section 106 of the National Historic Preservation Act through consultation with the RHPO and SHPO when ground-altering activities are proposed that could potentially impact cultural resources.

#### *Discussion and Rationale*

We will continue to make a concerted effort to comply with Section 106 of the National Historic Preservation Act to conduct archaeological surveys in areas of the refuge where ground-altering activities are proposed. By partnering with RHPO and SHPO, we will increase our potential to conduct those activities and prevent, or mitigate, the loss of significant archaeological resources.

#### **Outreach and Communications**

Continue to actively communicate with Virginia Tribal organizations and descendant communities to discuss proposed refuge activities and share periodic progress reports on refuge activities.

#### *Discussion and Rationale*

Presquile NWR is one of the few indigenous cultural landscapes in the James River east of the Fall Line that is still intact enough to demonstrate the resources the Appamattuck Indians used prior to the arrival of the English and during their trading with Captain John Smith (<http://www.2016parksummit.org/pdf/the-indigenous-cultural.pdf>; accessed April 2012).

Today there are six North American Indian Tribes represented in the area surrounding the refuge: Chickahominy, Mattaponi, Nansemond, Pamunkey, Rappahannock, and Upper Mattaponi (<http://livinglandscapeobserver.net/living-landscapes/featured-landscapes>; accessed April 2012). All of these tribes are actively seeking Federal recognition. Consequently, Presquile NWR provides an ideal place to demonstrate to the public how an appreciation of indigenous values regarding stewardship of land and wildlife can enhance public and personal attachment to the James River watershed. We will continue to actively communicate with Virginia Tribal organizations and descendant communities with regard to identification, education, and interpretation efforts on the refuge to ensure information is shared about how the refuge's various natural resources were part of the lifeways of the Appamattuck Indians.

### **3.4.4 Visitor Services Management**

Both alternatives include the following actions related to visitor services management.

#### **Refuge Partnership with James River Association**

Continue to implement the established partnership with the JRA, fulfilling the MOU to operate the Ecology School, including providing classroom facilities and allowing overnight accommodations in support of school programs.

*Discussion and Rationale*

In December 2007, the Service and JRA entered into a MOU to formalize a partnership to encourage the public to develop an appreciation for, and stewardship ethic toward, the protection and conservation of natural and cultural history at Presquile and James River NWRs. The MOU outlines the terms under which JRA may use the properties for the purposes of environmental education as specified and delineated in a special use permit, and includes the creation of the Ecology School program. In November 2011, the Service and JRA issued an EA that evaluated the feasibility of enhancing overnight accommodations for the Ecology School by constructing a permanent bunkhouse on the refuge. As stated in the EA, in the absence of this partnership, it is unlikely that the Service would solely be able to financially support and administer the Ecology School at Presquile NWR.

In February 2012, the Northeast Regional Director approved a FONSI and the construction of overnight accommodations to support the Ecology School in partnership with JRA. That approved FONSI and EA are incorporated into this draft CCP/EA by reference (USFWS 2012b).

**Chesapeake Bay Partnerships**

Continue to participate in partnerships with communities and partners in the Chesapeake Bay watershed to implement the Strategy for Protecting and Restoring the Chesapeake Bay Watershed (EO Strategy) at the refuge, with an emphasis on land conservation and public access, and citizen stewardship.

Also, continue to implement the established partnership with the NPS, fulfilling the MOU in regards to the promotion of the Captain John Smith Chesapeake NHT and CBGN, at the refuge by enhancing place-based interpretation, providing public access, and fostering conservation and restoration of natural and cultural resources related to the Chesapeake Bay through programming, outreach, and citizen involvement.

*Discussion and Rationale*

Executive Order 13508, "Protection and Restoration of the Chesapeake Bay" (signed May 2009), outlines actions for the Federal government to take to make progress toward restoring the health of the Chesapeake Bay. The Federal Leadership Committee was created for the Chesapeake Bay, which in September 2010 issued the EO Strategy, outlining specific efforts to undertake. As part of the James River watershed, actions at Presquile NWR are related to the overall health of the Chesapeake Bay. Of the nine goals in the EO Strategy, the refuge is most directly connected to the goals of conserving land and increasing public access, in addition to expanding citizen stewardship.

Conserving Land and Increasing Public Access: In October 2010, the Service and NPS signed a MOU regarding cooperation and collaboration on a variety of efforts within the Chesapeake Bay Watershed. Among these efforts is implementation of the Captain John Smith Chesapeake NHT and CBGN. During 2011, the Service actively participated in the planning process for implementing the Captain John Smith Chesapeake NHT on the James River. Presquile NWR has been identified as a key site for interpretation and education. Through continued collaboration, the Service and NPS will ensure that Captain John Smith Chesapeake NHT-related activities proposed to occur at Presquile NWR are implemented in a manner that is compatible with the purpose and intent of the refuge.

A fiscal year 2011 CBGN matching grant was used to help JRA partner with the Service to construct a boardwalk on the refuge to facilitate visitor access to the refuge, offer unique opportunities to study the ecology of the James River, and help visitors develop a greater appreciation for the need to protect the health of this beautiful and historic natural resource.

**Citizen Stewardship:** The JRA partnership above also helps achieve the citizen stewardship goal of the EO Strategy. This partnership provides unique environmental education opportunities for students at Presquile NWR through the creation of new, overnight educational facilities using green infrastructure concepts, coupled with onsite lessons about sustainability, recycling, energy conservation, and creating habitat.

#### **Wildlife Observation, Photography, Environmental Education, and Interpretation**

Continue to support wildlife observation, photography, interpretation, and environmental education on the refuge by maintaining quality facilities, offering quality programs, and supporting the MOU with JRA.

#### *Discussion and Rationale*

Wildlife observation, photography, environmental education, and interpretation are four of the six priority public uses for refuges identified in the 1997 Refuge Improvement Act. Priority public uses are to receive enhanced consideration while developing a refuge's CCP. In 2011, the Regional Chief of the Refuge System approved a compatibility determination for these uses on Presquile NWR. Existing facilities are detailed in the compatibility determination, as are planned programs and other activities to support these priority public uses. This approved compatibility determination is included in appendix B and would be implemented under both alternatives. Please refer to that compatibility determination for details as to where and how these uses will be implemented on the refuge, including stipulations and access permit requirements.

#### **Deer Hunting**

Continue to support a quality, public deer hunt on the refuge.

#### *Discussion and Rationale*

The Refuge System recognizes hunting as a healthy, traditional outdoor pastime, deeply rooted in our American heritage. 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."

The following are the guiding principles of our hunting program which are based in 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.

Public hunting opportunities have been on the decline in the region as development pressures increase. Deer hunting has been allowed on the refuge since 1967 and the existing, permit-only shotgun hunt has been very popular and reasonable to manage based on the limited staff and resources available. As such,

under both alternatives, we will continue to offer a quality, three-day, shotgun deer hunt on the refuge.

**Waterfowl Hunting Closure**

Continue to maintain and enforce the existing waterfowl hunting closure area, established by Secretarial Order in 1954. Work with VDGIF to promote opportunities for waterfowl hunting in nearby waters, as allowed by Federal and State regulations.

*Discussion and Rationale*

The 1954 Secretarial Order establishes the waterfowl hunting closure area to protect the concentrations of waterfowl that migrate through and winter here. The closure is also in accordance with the deed under which the Federal government acquired the land.

**Shoreline Fishing Closure**

Continue to maintain a closure for fishing from the refuge shoreline. Work with VDGIF to promote opportunities for public fishing in waters off refuge lands, as allowed by State regulations.

*Discussion and Rationale*

Since refuge establishment, we have worked to protect, maintain, and restore the ecological integrity of the refuge’s upland, wetland, and aquatic habitats for the benefit of wildlife. Due to the potential to disturb nesting, roosting, and wintering wildlife, we limit activities along the refuge’s shoreline to allow only those activities that support management of wildlife habitat and refuge access. For example, we control nonnative, invasive plant species along the river escarpment to protect native vegetation and wildlife habitat. We have also planted native trees on 20 acres of the refuge’s western boundary in an effort to stabilize the eroding river escarpment and improve nesting habitat for bald eagles and other wildlife.



Cyrus Brame/USFWS

*Native trees planted along Turkey Island cutoff*

We manage refuge visitors to ensure they spend very little time along the shoreline, thereby minimizing disturbance to wildlife. We have designated locations for refuge access, which serve to funnel visitors directly to upland areas that can support compatible refuge uses (i.e., wildlife observation, photography, environmental education, interpretation, and public deer hunting) and where disturbance to nesting birds is avoided.

### 3.4.5 Findings of Appropriateness and Compatibility Determinations

This closure for fishing, along with other shoreline access restrictions, has been in place since refuge establishment and has not been controversial. Over the last nine years since current staff have been in place, they have not received any requests for fishing. We believe the public understands that fishing from the refuge shoreline would conflict with our efforts to protect, maintain, and restore the refuge's wildlife habitat (603 FW 2). In addition, we believe they recognize and are satisfied with the fact that there are ample opportunities for fishing in State and other public waters (where authorized) in the refuge vicinity.

Chapter 1 describes the requirements for findings of appropriateness and compatibility determinations on existing and proposed refuge uses. Uses are evaluated based on whether or not they contribute to meeting refuge purposes, goals, and objectives. Appendix B includes the draft appropriateness and compatibility determinations consistent with implementing alternative B, the Service-preferred alternative. Our final CCP will include all approved findings of appropriateness and compatibility determinations for the alternative selected.

Both alternatives include the following actions related to findings of appropriateness and compatibility determinations. See appendix B for additional details.

#### Activities Allowed

Continue to support wildlife observation, photography, environmental education and interpretation, hunting, and research conducted by non-Service personnel, according to approved compatibility determinations.

#### *Discussion and Rationale*

Please refer to sections 3.4.4 and 3.4.7 for details on these programs.

#### Activities Not Allowed

Continue to prohibit certain activities on the refuge that were determined by the refuge manager to be not appropriate.

#### *Discussion and Rationale*

We occasionally receive requests for refuge uses and activities that are prohibited by the Code of Federal Regulations (50 CFR 25- 26) or Service policy. Other activities are not allowed because the refuge manager has determined that the activities do not contribute to, or support, the purposes for the refuge, and may be provided elsewhere nearby on other ownerships. These activities will continue to be prohibited on refuge lands under all alternatives:

- Collecting natural products
- Cross-country skiing, snowshoeing, and sightseeing
- Dog walking
- Geocaching
- Picnicking
- Swimming and sunbathing

### 3.4.6 Special Use Permits

Both alternatives include the following actions related to special use permits.

#### Permitting Process

Continue to implement 50 CFR Part 26 and Service policy (603 FW 2) which require the refuge manager to evaluate activities that require a special use permit for their appropriateness and compatibility on a case-by-case basis.

#### *Discussion and Rationale*

All research, commercial, and economic uses, and visitors unaccompanied by Service staff require special use permits. In the past, the refuge manager has issued special use permits for wildlife inventories, research, hunting,

and partner-led educational programs. See section 3.4.7 below for additional information on research. We describe some of the activities that have been allowed under a permit in chapter 2. Also, refer to section 3.4.1 for specific details on issuing permits for general public access.

### 3.4.7 Research

Continue to support compatible research and investigations on the refuge by non-Service personnel that help further our knowledge of refuge resources, or which address regional conservation concerns to the Service.

#### *Discussion and Rationale*

Compatible research on the refuge will continue under special use permit when it can inform our management or Service priorities. For example, VCU has been conducting prothonotary warbler nesting and population research for more than 20 years resulting in over 20 publications in peer-reviewed journals readily accessed by the greater conservation community.

Research can be important in monitoring the effects of refuge management, or in evaluating regional conservation concerns. Data from the refuge may be used as a reference indicator to compare against other natural areas within the James River region. Establishment and maintenance of long-term data sets on refuge lands will also be important to understand when long-term change is occurring and when an event is an annual or short-term natural variation.

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

- To promote new information and improve the basis for, and quality of, refuge and other Service management decisions
- To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of the natural resources, appropriate resource management, and environmental health
- To provide the opportunity for students and others to learn the principles of field research

In 2006, the Service Manual provided further guidance on the appropriateness of conducting research on refuges in part 603, the appropriate refuge uses policy. It states that:

“We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority 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 must be determined in writing to be both appropriate and compatible, unless we determine it to be an administrative activity. Research projects must contribute to a need identified by the refuge or the Service. In the past we have conducted many research projects on the refuge and expect additional research opportunities to arise under all the alternatives we proposed in this draft CCP. Non-Service personnel conducting research of the refuge must provide the Service with a copy of all data collected and/or reports. The research organization/agency in conjunction with the Service will retain the use and ownership of all data and reports. In determining the appropriateness

and compatibility of future research activities, we will follow Service policy guidance and employ the following programmatic objectives:

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

The biological research efforts detailed in section 2.11.5 that would continue to be supported under both alternatives are

- Christmas Bird Count conducted by the Hopewell Chapter of the National Audubon Society;
- American black duck research conducted by VDGIF;
- Prothonotary warbler research conducted by VCU; and
- Amphibian and reptile survey and health assessments conducted by the VHS.

#### **3.4.8. Climate Change**

Continue to address climate change through the maintenance and restoration of healthy, connected, and genetically diverse wildlife populations and ecological communities, monitoring those conditions over the long-term, and through promoting energy efficient practices and promoting other carbon reduction activities.

##### *Discussion and Rationale*

There is consensus among the scientific community that global climate change, occurring in part as a result of emissions of carbon dioxide and other greenhouse gases from human activities, will lead to significant impacts across the U.S and the world (Joint Science Academies' Statement 2005, <http://www.nationalacademies.org/onpi/06072005.pdf>; accessed April 2012). This includes sea level rise adding stress to coastal communities and ecosystems (Wigley 2004). The effect of climate change on wildlife and habitats is expected to be variable and species-specific, with a predicted general trend of species ranges and vegetation communities shifting northward and higher in elevation.

Uncertainty about the future effects of climate change requires refuge managers to use adaptive management to maintain healthy ecosystems in light of unpredictability (Inkley et al. 2004). This involves improving or adjusting policies and practices based on the outcomes of monitoring or management activities and may result in changes to regulations, shifts in active habitat management, or changes in management objectives. A few recommendations relevant to Presquile NWR made by Inkley et al. (2004) include the following:

- Prepare for diverse and extreme weather conditions (e.g., drought and flood).
- Maintain or restore healthy, connected, and genetically diverse wildlife populations to increase resiliency in wildlife and habitats; and

Our planned restoration activities, with priority to the most degraded sites, would help promote healthy and resilient habitats. We will continue to restore native vegetation and control invasive plants on impacted areas. On the refuge, we will also contribute to regional efforts in monitoring climate change impacts and predicting the long-term effects of global climate change. At the refuge level, it will be increasingly important to understand how the refuge and its habitats and communities respond to potential changes, such as sea level rise and changes in temperature.

We would also reduce the carbon footprint of facilities, vehicles, and our refuge operations by using energy efficient equipment, where feasible, and maintaining and constructing facilities using sustainable green building technologies. The new bunkhouse is a good example of sustainable design.

**3.4.9. Refuge Revenue Sharing Payments**

Continue to issue annual refuge revenue sharing payments to counties in accordance with law and annual Congressional appropriations.

*Discussion and Rationale*

National wildlife refuges contribute to the revenues of local governments through shared revenue payments. Federally owned lands are not taxable, but under the provisions of the Refuge Revenue Sharing Act, the municipality or other local unit of government receives an annual refuge revenue sharing payment to offset the loss of property taxes that would have been collected if the land had remained in private ownership. In addition, federally owned land requires few services from municipalities, yet it provides valuable recreational opportunities for local residents. As we describe in chapter 2, we pay annual refuge revenue sharing payments based on the acreage and the appraised value of refuge lands. The annual payments are calculated by formula determined by, and with funds appropriated by, Congress. Under both alternatives, 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.

**3.4.10. Special Designation Areas**

Both alternatives include the following actions related to special designation areas.

**Regional and State Special Area Designations**

Continue to protect and maintain the characteristics on refuge lands that contributed to the area's special designation as the Lower James River Important Bird Area, as well as its contribution to other State natural and cultural resource area designations.

*Discussion and Rationale*

In chapter 2, we describe the various special area designations that include the refuge. Most relate to significant natural and cultural resources in the region, and the unique opportunities the area affords to protect and interpret these resources. Our existing and proposed activities on the refuge will be consistent with, or not detract from, those special area designations.

**Wilderness**

Continue to conduct wilderness reviews every 15 years as required by Service policies (602 FW 1 and 3, and 610 FW 4).

*Discussion and Rationale*

A wilderness review is the process we follow to identify and recommend for congressional designation Refuge System lands and waters that merit inclusion in

the National Wilderness Preservation System. Wilderness reviews are a required element of CCPs, and we follow the planning process outlined in 602 FW 1 and 3.

The wilderness review process has three phases:

- 1) Inventory. We identify lands and waters that meet the minimum criteria for wilderness. These areas are called wilderness study areas.
- 2) Study. We evaluate wilderness study areas to determine if they are suitable for wilderness designation.
- 3) Recommendation. We use the findings of the study to determine if we will recommend the area for designation as wilderness in the final CCP. We report our wilderness recommendations from the Director through the Secretary of the Interior and the President, to Congress, in a wilderness study report.

We conducted phase 1, the inventory, for Presquile NWR and determined that it does not meet all the minimum criteria for wilderness. Size, naturalness, and solitude or primitive and unconfined recreation, are the minimum criteria established in the Wilderness Act. We found that the refuge did not meet the naturalness criterion. Our wilderness review results are included as appendix D.

### 3.4.11 Additional NEPA Analysis

This draft CCP/EA has been developed with sufficient detail to account for the greatest potential impacts that could result from the proposed actions identified under both alternatives. However, additional NEPA analysis will be necessary for certain types of actions, even once we adopt a final CCP. Where decisions have not been made in this CCP, but must be made later, we analyze a possible range of impacts in this document, but may need to supplement this analysis later.

Examples of proposed actions that may require further analysis include:

- Shoreline stabilization projects involving construction
- Transportation/alternative access improvements involving construction
- Expansions to the hunting program

*The cable ferry*



Daniel Lay

### **3.5 Alternative A. Current Management (No Action Alternative)**

As noted earlier in section 3.2.2, alternative A satisfies the NEPA requirement of a no-action alternative, which we define as “continuing current management.” It presents current, planned, and approved management activities; describes projects planned, funded, or underway; and serves as a baseline for comparing and contrasting alternative B. Map 3.1 depicts the habitat configuration that would result under alternative A management; map 3.2 depicts the public use infrastructure that would be supported.

In addition to the actions detailed in section 3.4 as common to both alternatives, the following describes what other activities would occur under alternative A.

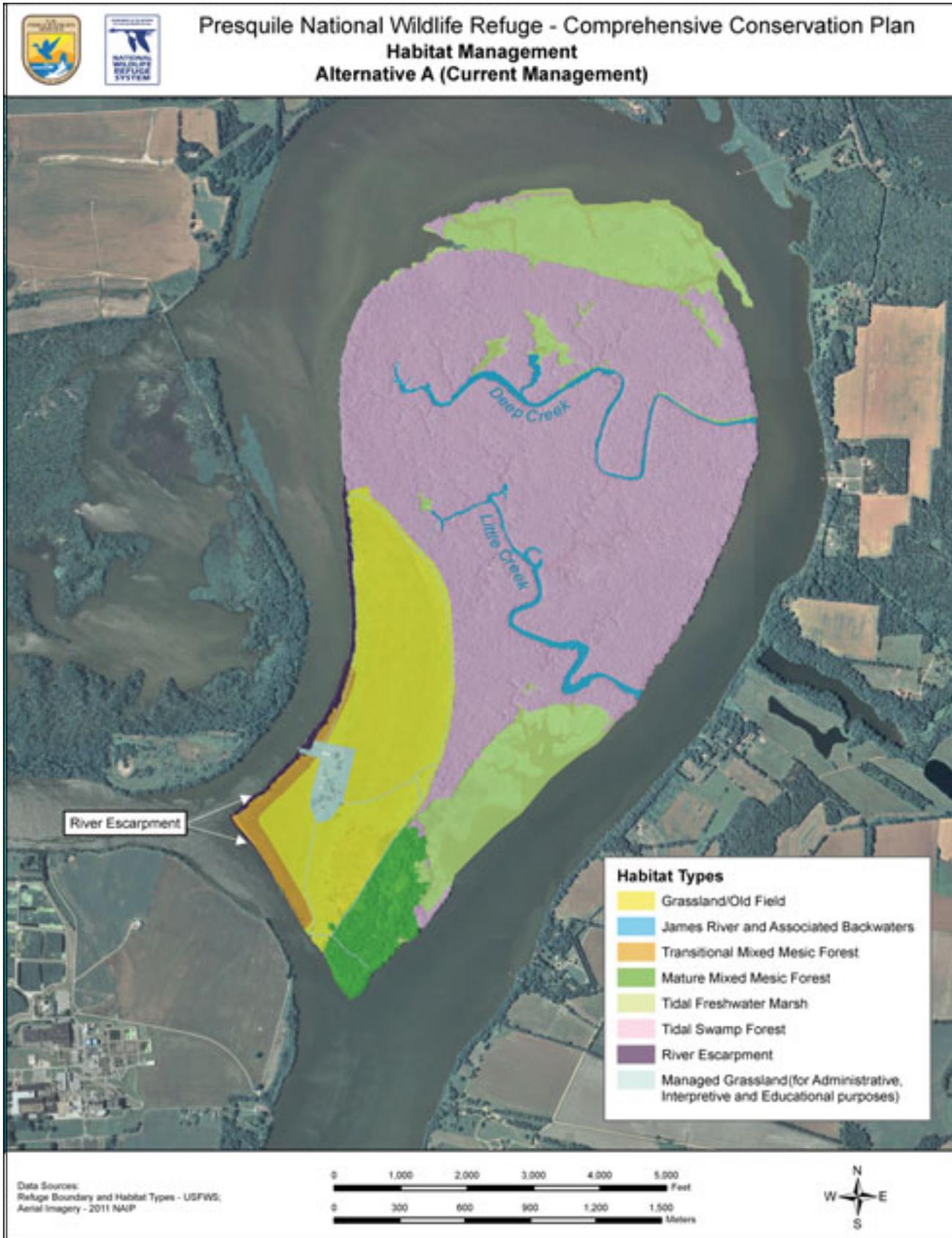
We would continue to protect tidal swamp forest and marsh habitats for priority refuge resources of concern, such as the bald eagle, prothonotary warbler, American black duck and other waterfowl, and the federally threatened sensitive joint-vetch. This would be accomplished through continued partnerships with universities and VDGIF, limited public access, and informal refuge staff monitoring. For James River aquatic resources, we would continue to improve riparian habitat, work with JRA on water quality monitoring, and support efforts by VCU, our Office of Fisheries Assistance, and other partners to restore sustainable, healthy populations of the federally endangered Atlantic sturgeon. The tree planting we are conducting, including over 18 native species, along the southwest border of the refuge would continue as would tree protection (e.g., netting to prevent browse damage) and invasive species control, as necessary. We would continue to maintain, as time and resources allow, approximately 200 acres of grassland habitat for breeding and migrating songbirds. The river escarpment habitat that is eroding would be addressed by continuing to pursue opportunities to maintain native vegetation and remove invasive tree species. We would also continue to discuss with the USACE possible long-term actions to take regarding erosion along the Turkey Island Cutoff.

For cultural resources, we would continue to protect known cultural resources from degradation from public use and natural processes. We would continue to attempt to prevent both direct and unintended degradation of the resources by refuge visitors. We would also continue management actions to minimize the potential for degradation from natural processes, such as tree planting in consultation with SHPO; tree planting would stabilize riverbanks and reduce erosion, helping to preserve archaeological resources.

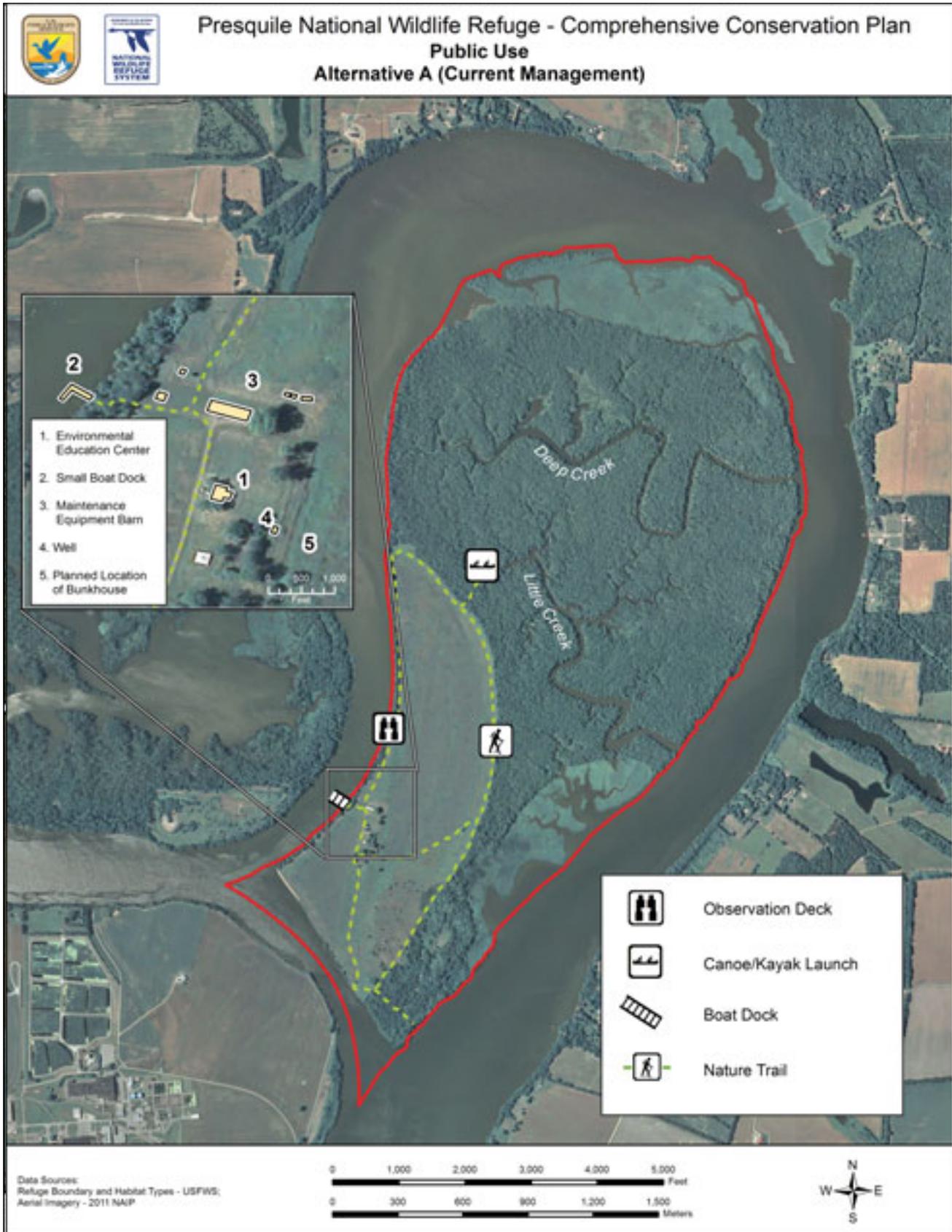
Our environmental education program would continue to be a combination of on- and off-refuge efforts. We would continue to provide programs for teachers and students and work with local groups. As noted in section 3.4.4 of this chapter, our 2007 MOU establishing our partnership with JRA would be kept current and we would continue to support their efforts to provide environmental education programming on the refuge. In partnership with JRA, we would seek to maintain the participation of up to 120 students per year in on-refuge environmental education programs. We would also continue to seek opportunities both on and off the refuge where we could promote our environmental education program, such as participating in local community events like Earth Day celebrations. Environmental education programming off-refuge would continue to be limited by refuge staff availability.

We would continue to support wildlife-dependent recreation on the refuge in designated areas and use a permit system for any visitors not involved with a refuge-sponsored event. Self-guided wildlife observation and photography would continue under that permit system. Our interpretative programs would include conducting several pontoon boat tours around the refuge each year, holding volunteer events, and working with individual groups to provide interpretive programming on a case-by-case basis. We would continue to participate in interpretive events off-refuge in cooperation with partners and local groups, and participate in several civic events each year. The three-day fall deer hunt would

Map 3.1. Alternative A, Current Habitat Types on Presquile NWR.



Map 3.2. Alternative A, Current Public Use Facilities on Presquile NWR.



be maintained at the current level. The refuge would continue to be closed to waterfowl hunting and fishing.

The following text outlines the goals, objectives, and strategies proposed under alternative A. Because the basic justification for both alternatives A and B is the same, we refer you to alternative B, the Service-preferred alternative, for each objective's rationale, which reduces redundancy in the document. The only exception to this is the rationale under goal 2, objective 2.3.

### 3.5.1 Goals, Objectives, and Strategies under Alternative A

#### GOAL 1.

#### Forested and Emergent Wetlands and Aquatic Resources

Protect, maintain, and restore the integrity of the refuge's tidal swamp forest and tidal freshwater marsh to sustain native plants and wildlife, including species of conservation concern, and benefit aquatic resources of the James River watershed and Chesapeake Bay.

#### Objective 1.1 Tidal Forest Swamp

Over the 15-year life of the plan, continue to protect approximately 738 acres of tidal swamp forest to maintain large, contiguous tracts (larger than 200 acres) and enhance habitat for wildlife of conservation concern (e.g., prothonotary warbler, bald eagle) and migrating and wintering waterfowl.

#### Discussion and Rationale

See discussion and rationale under alternative B, goal 1, objective 1.1.

#### Strategies

*Continue to:*

- Plant green ash and bald cypress trees where gaps occur and when resources allow.
- Maintain and enforce public access closures on the refuge to reduce disturbance to breeding birds and habitat.

#### Inventory and Monitoring Activities

- Support VCU's long-term (20+ years) research study to evaluate prothonotary warbler nesting success and productivity in nest boxes.
- Work with VDGIF to study large-scale movement patterns (including migration routes, timing of migration, staging and stopover areas, winter habitat use, and breeding grounds affiliations) of American black ducks.

#### Objective 1.2 Tidal Freshwater Marsh

Over the 15-year life of the plan, continue to protect approximately 189 acres of tidal freshwater marsh to benefit migrating and wintering waterfowl and waterbirds such as American black duck and wood duck.

#### Discussion and Rationale

See discussion and rationale under alternative B, goal 1, objective 1.2.

#### Strategies

*Continue to:*

- Protect populations of federally threatened sensitive joint-vetch as opportunities arise.
- Prohibit general public access within the tidal freshwater marsh to minimize disturbance to sensitive habitats.

- Maintain public access closures on the refuge to reduce disturbance to habitat and breeding birds.

**Inventory and Monitoring Activities**

- Conduct informal monitoring of invasive species as opportunities arise.
- Conduct informal monitoring of sensitive joint-vetch populations as opportunities arise.

**Objective 1.3 Aquatic Resources**

Over the 15-year life of the plan, continue to assist partners in promoting James River watershed protection and health, and contribute to the recovery of species of conservation concern, such as the federally endangered Atlantic sturgeon.

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 1, objective 1.3.

**Strategies**

*Continue to:*

- Implement best management practices to minimize potential for refuge actions (e.g., trail and facility work) to increase sediment load and deposition in the James River.
- Plant and maintain vegetated riparian areas and natural habitats.
- Support partner efforts to restore federally listed Atlantic sturgeon habitat.

**Inventory and Monitoring Activities**

*Continue to:*

- Work with partners (e.g., James Riverkeeper, JRA, VDEQ) to monitor water quality stations in the vicinity of the refuge.
- Support partner efforts to monitor federally listed Atlantic sturgeon habitat.

**GOAL 2**

**Upland Habitats**

Protect, restore, and enhance the refuge’s upland habitats, with emphasis on the mixed mesic forest ecological community, to sustain plants and wildlife native to the James River area, in particular those species of conservation concern.

**Objective 2.1 Mature Mixed Mesic Forest**

Over the 15-year life of the plan, continue to manage approximately 46 acres of mature mixed mesic forest to benefit migratory birds of conservation concern, such as scarlet tanager and wood thrush, as well as pollinators and other native wildlife.

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 2, objective 2.1.

**Strategies**

*Continue to:*

- Passively manage this habitat, which includes restricting public access to designated routes to avoid impacts to vegetation.

**Inventory and Monitoring Activities**

*Continue to:*

- Conduct informal invasive species monitoring as opportunities arise.

**Objective 2.2 Transitional Mixed Mesic Forest**

Over the 15-year life of the plan, continue to manage the existing 20 acres of transitional mixed mesic forest to benefit migratory birds of conservation concern, such as prairie warbler and field sparrow, and other native wildlife.

### **Discussion and Rationale**

See discussion and rationale under alternative B, goal 2, objective 2.2.

### **Strategies**

*Continue to:*

- Plant native trees (up to 18 different species) along the area within 300 feet of the western border (up to 22 acres).
- Protect planted trees with tubes for up to five years or as growth warrants.
- Work with partners, volunteers, and student groups to aid in the reforestation efforts on the refuge.

### **Inventory and Monitoring Activities**

None is being conducted.

## **Objective 2.3 Grassland**

Over the 15-year life of the plan, continue to maintain approximately 200 acres of grassland and old field habitat on the refuge to provide habitat for migratory birds of conservation concern, such as grasshopper sparrow, as well as pollinators and other native wildlife.

### **Discussion and Rationale**

Grasslands, similar to shrub habitats, were historically uncommon within the regional landscape prior European settlement (Watts 1999). Grassland openings in the forest were primarily maintained American Indian activities. Grassland-dependent birds species present in the region today may be due to expanded ranges that occurred when the grassland and open habitat increased due to land clearing for agricultural development (Watts 1999). As grassland habitat decreased as agricultural areas were reforested or converted to urban areas, grassland bird species have decreased. The BCR 30 Plan suggests that grassland birds are of moderate concern for conservation and that management for grassland birds should be implemented when practical (ACJV 2007).

The 200 acres of grasslands on the refuge were originally created to support agriculture, including row crops and pasture for cattle. When farming stopped on the refuge, fields cultivated for corn and soybeans became overgrown with invasive species, such as Canada thistle, Johnsongrass, and crabgrass. These areas are now dominated primarily by introduced cool-season grasses, such as orchard grass and fescue, clover, and the invasive plants. The grasslands provide some marginal breeding and migratory habitat for grassland birds, such as grasshopper sparrow, and provides habitat for pollinators, and other native species. The grasslands also provide habitat for a variety of invertebrates and reptiles, although our limited surveys to date probably under-represent the full suite of species using the refuge.

Grassland and old field habitat requires active and regular maintenance to provide continued benefit to species and we have found it challenging in recent years to maintain grasslands due to reduced budgets and staff. Mowing, herbicides, and prescribed fire are management techniques we have tried in the past to maintain grasslands. We have equipment on the refuge to mow the area, but the relatively large size of the grassland (approximately 200 acres) has made mowing a time-consuming and expensive effort. These concerns are also the same with using herbicides.

Use of prescribed fire (fire conducted under specific weather and site conditions to achieve habitat goals and minimize impacts to surrounding resources) has been relatively unsuccessful at the refuge. Changing weather conditions, the proximity of roads and industries downwind of prevailing wind directions, and

logistical obstacles associated with getting prescribed fire equipment and staff to the refuge makes burning within a prescription difficult.

Recently, we have considered improving habitat conditions by converting the introduced, cool season grasses to a mixture of native warm season grasses and forbs. However, we subsequently determined that we do not have the resources to do the required extensive site preparation in the near term, such as multiple herbicide applications, seeding, and mowing to control invasive species and establish native vegetation, so those plans are on hold.

As such, under alternative A, we will continue to maintain the approximately 200 acres of grassland and old field habitat through a mix of prescribed fire, mowing, and herbicide application as staff and resources allow.

#### Strategies

*Continue to:*

- Mow trails and around refuge facilities to reduce the establishment or spread of early successional tree and shrub species, and invasive, nonnative grass species.
- Control Johnsongrass by various means, such as mowing and herbicide application.

#### Inventory and Monitoring Activities

- *Conduct invertebrate and reptile monitoring programs with partners as opportunities arise.*

### Objective 2.4 River Escarpment

Over the 15-year life of the plan, continue to reduce the accelerated loss of the 11 acres of river escarpment through planting native vegetation and controlling invasive plants.

#### Discussion and Rationale

See discussion and rationale under alternative B, goal 2, objective 2.4.

#### Strategies

*Continue to:*

- Discuss with USACE strategies for solving erosion problems.
- Control invasive plants (e.g., privet and tree-of-heaven) using herbicides and mechanical treatments.

#### Inventory and Monitoring Activities

Informally monitor actively eroding areas as funding and staffing allows.

### GOAL 3.

#### Cultural Resources

Protect and conserve the refuge's cultural resources and landscape, and seek opportunities to increase knowledge and appreciation of the refuge's history as part of the James River region.

### Objective 3.1 Cultural Resource Protection

Over the 15-year life of the plan, continue to protect known archaeological sites to avoid unintended impacts.

#### Discussion and Rationale

See discussion and rationale under alternative B, goal 3, objective 3.1.

#### Strategies

*Continue to:*

- Prevent public access to locations of the refuge where cultural resources are susceptible to degradation through natural causes or human-induced impacts.

- Protect cultural resources through outreach and enforcement.

**Inventory and Monitoring Activities**

None is being conducted.

**Objective 3.2 Cultural Resource Conservation/Heritage**

Over the 15-year life of the plan, continue to increase our knowledge and understanding of the refuge's cultural resources and history.

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 3, objective 3.2.

**Strategies**

*Continue to:*

- Maintain partnerships with local, regional, and State experts on the history of the area.
- Maintain museum collections and archival materials.

**Inventory and Monitoring Activities**

None is being conducted.

**GOAL 4.**

**Environmental Education**

Provide environmental educational experiences for visitors to inspire appreciation and stewardship of the refuge in relation to the James River watershed, the Chesapeake Bay Estuary, and the Refuge System.

**Objective 4.1 Environmental Education—On Refuge**

Over the 15-year life of the plan, continue to conduct and support environmental education programs on the refuge that attempt to meet State standards of learning and that discuss the purpose of the refuge, as well as the mission of the Service and Refuge System.

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 4, objective 4.1.

**Strategies**

*Continue to:*

- Partner informally with JRA, local schools, the local Audubon chapter, Virginia Master Naturalist Program, and VDGIF educators.
- Conduct teacher in-service training.
- Support VCU summer teacher program by hosting programs on the refuge.
- Fulfill requests to offer environmental education programs on the refuge approximately once or twice a year.

**Inventory and Monitoring Activities**

None is being conducted.

**Objective 4.2 Environmental Education—Student Participation**

Over the 15-year life of the plan, continue to provide environmental education opportunities for up to 120 individuals (primarily local school and youth groups) annually using existing refuge facilities.

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 4, objective 4.2.

**Strategies**

*Continue to:*

- In partnership with the JRA, maintain an annual enrollment of approximately 120 students engaged in environmental education programs on the refuge.

**Inventory and Monitoring Activities**

None is being conducted

**Objective 4.3 Environmental Education—Off-refuge**

Over the 15-year life of the plan, continue to conduct environmental education programs and events off-refuge, approximately twice a year, in response to requests from schools or as part of community events.

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 4, objective 4.3.

**Strategies**

*Continue to:*

- Fulfill requests to offer environmental education programs off-refuge approximately once or twice a year.
- Participate in community events (e.g., Earth Day event at Fort Lee).

**Inventory and Monitoring Activities**

None is being conducted

**GOAL 5.**

**Wildlife-Dependent Recreation**

Provide wildlife-dependent recreational opportunities (interpretation, wildlife observation, nature photography, and hunting) for visitors to enjoy and connect with nature and develop an enhanced appreciation for and understanding of the refuge's natural and cultural resources.

**Objective 5.1 Interpretation**

Over the 15-year life of the plan, continue to conduct annual interpretive programs, and maintain displays and materials, emphasizing the natural and cultural resources of the refuge. Continue to reach approximately 400 people each year, conducting programs both on- and off-refuge.

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 5, objective 5.1.

**Strategies**

*Continue to:*

- Maintain existing refuge interpretive programs (up to six pontoon boat trips per year) and materials (e.g., signs, brochure, and Web site).
- Advertise volunteer events in the James River Days brochure (two to three events per year).
- Work with individual groups on events on a case-by-case basis.
- Conduct up to four community and civic events per year.
- Fulfill requests for interpretive information on a case-by-case basis.
- Maintain partnerships with local groups to provide interpretive support to co-sponsored events.
- Restrict visitors to the designated trails to protect sensitive areas.

**Inventory and Monitoring Activities**

None is being conducted.

**Objective 5.2 Hunting**

Over the 15-year life of the plan, continue to implement the annual 3-day shotgun deer hunt in the fall for a maximum of 120 hunters (40 hunters per day).

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 5, objective 5.2.

**Strategies**

*Continue to:*

- Manage the annual 3-day, fall deer hunt on approximately 1,000 acres of the refuge, following State regulations and a few, more strict refuge-specific regulations (e.g., boat docking locations, safety measures). Provide hunters with refuge-specific regulations and hunt map to encourage compliance.
- Allow hunters to scout hunting location for four days prior to quota hunter selection and hunting days.
- Require hunters to follow State reporting requirements since refuge does not operate a check station at or near the refuge.
- Receive voluntarily-provided feedback from hunters to improve hunting-related communications for upcoming year.
- Maintain waterfowl hunting closure.

**Inventory and Monitoring Activities**

- Acquire hunt data from the State's database and review for trend information.
- Annually conduct hunt monitoring on the refuge to assess quality of the hunt, distribution of hunters, and overall compliance of hunters with State and refuge-specific regulations.

**Objective 5.3 Wildlife Photography and Observation**

Over the 15-year life of the plan, continue to provide visitors with the opportunity to engage in wildlife observation and photography on the existing 3.5-mile trail system, observation platform, and 550-foot boardwalk; through pre-arranged, Service-led pontoon boat tours; and at the visitor contact station.

**Discussion and Rationale**

See discussion and rationale under alternative B, goal 5, objective 5.3.

**Strategies**

*Continue to:*

- Allow visitation for wildlife observation and photography, primarily by self-guided tours, if they pre-arrange (three business days in advance) to obtain a permit. Require people to stay in designated areas.
- Maintain partnerships to provide support for refuge and partner-sponsored events.
- Offer periodic Service-led pontoon boat tours in the James River alongside the refuge.

**Inventory and Monitoring Activities**

None is being conducted.

### **3.6 Alternative B (Focus on Species of Conservation Concern) (Service-preferred Alternative)**

This alternative combines the actions we believe would best achieve the purposes, vision, and goals of Presquile NWR, and responds to issues raised during the public scoping period. For these reasons, we have identified it as the Service-preferred alternative. Map 3.3 depicts the habitat configuration that would result under alternative B management. Public use infrastructure under alternative B would be the same as that for alternative A, depicted on map 3.2.

In addition to the actions detailed in section 3.4 as common to both alternatives, the following describes what other activities would occur under alternative B.

Alternative B emphasizes the management of specific refuge habitats to support priority refuge species whose habitat needs benefit other species of conservation concern that are found around the refuge and in the larger landscape of the lower James River. In particular, we would emphasize habitat for priority birds identified in BCR 30, such as migratory waterfowl, waterbirds, mature forest-dependent birds, as well as other priority refuge resources of concern, including the federally endangered Atlantic sturgeon and federally threatened sensitive joint-vetch.

We would emphasize maintaining and restoring the forest integrity of tidal freshwater marsh, tidal swamp forest, the James River and associated backwater habitats, and mature mixed mesic forest habitats through increased monitoring and data collection, and a more aggressive response to habitat changes associated with invasive species, global climate change, or storm events. We would also increase efforts to conduct scientific research regarding habitat and wildlife population monitoring through partnerships with other government agencies, organizations, and academic institutions.

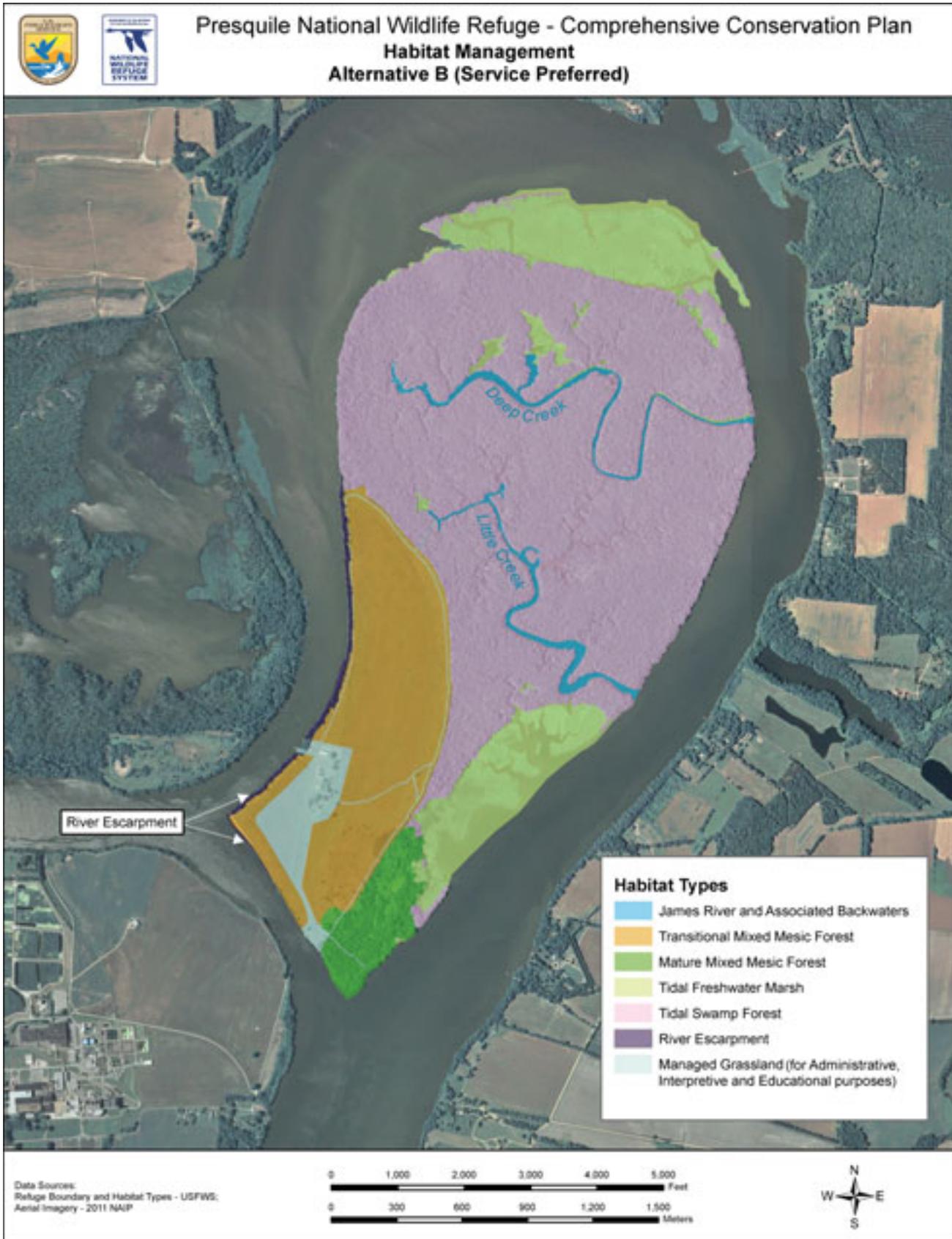
We would convert over the long-term, primarily through allowing natural succession to occur, the approximately 200 acres of grassland habitat to mature mixed mesic forest. Over the next 10-15 years, however, it would provide transitional mixed mesic forest habitat that would be initially be dominated by shrubs and early successional tree species. This transitional habitat would benefit migratory bird species, such as American woodcock, northern bobwhite, prairie warbler, and field sparrow.

Under alternative B, we would maintain approximately 46 acres of managed grasslands for administrative, interpretive, and educational purposes. This would be primarily maintained around refuge facilities and would not serve as quality habitat for grassland species. The only exception would be a planned pollinator garden, less than 5 acres, to be developed as a demonstration area. Other purposes for the managed grasslands would be to provide an opportunity to interpret the landscape representative of the historic land use.

We would manage the 11 acres of river escarpment habitat under alternative B to the maximum extent practicable. We would strive to maintain and restore the integrity of this habitat for the benefit of bald eagles; great blue herons and other wading and waterbirds; and migratory landbirds. In partnership with others, we would improve natural and cultural resource condition monitoring along the shoreline, assess the potential to slow bank erosion and reduce sediment loading into the James River, and develop shoreline management and improvement projects.

We would increase our efforts to protect cultural resources on the refuge, as well as expand our understanding of the refuge's resources and their role in the area's cultural history. Implementation of the recommendations from the Archaeological Overview (Goode et al. 2009) would be supplemented by our active pursuit of partnership opportunities to improve and promote understanding of Presquile NWR's extensive cultural history.

Map 3.3. Habitat Management Proposed Under Alternative B (Service-preferred)



We would expand our on-refuge environmental education program through our partnership with JRA and bring an increased number of students to the refuge to participate in environmental education programs that meet Virginia State Standards of Learning requirements. We would continue to collaborate with existing partners to promote off-refuge environmental education, as well as propose to create a Friends group or develop new partnerships with other organizations in support of off-refuge environmental education.

An expanded on-refuge environmental education program would also allow us to increase the interpretive program. Improved interpretative materials would allow us to provide a consistent message to visitors to the refuge along with users associated with the Ecology School and the Captain John Smith Chesapeake NHT.

We propose to continue the current three-day deer hunting program; however, under alternative B we would consider extending the season length by approximately two days to provide a higher quality hunt experience. The extra days would allow us to better disperse the same number of hunters in space and time. Monitoring the deer herd on a regular basis is proposed under alternative B to protect the integrity of forested habitats from degradation due to deer browse. Under alternative B, we also propose to evaluate, within five years, opportunities to open the refuge to a turkey hunt and/or initiate a program for youth hunters if there is interest and resources are available. Before these uses could be implemented, additional NEPA analysis and public involvement would occur.

**3.6.1 Goals, Objectives, and Strategies under Alternative B**

**GOAL 1.**

**Forested and Emergent Wetlands and Aquatic Resources**

Protect, maintain, and restore the integrity of the refuge's tidal swamp forest and tidal freshwater marsh to sustain native plants and wildlife, including species of conservation concern, and benefit aquatic resources of the James River watershed and Chesapeake Bay.

**Objective 1.1 Tidal Forest Swamp**

Over the 15-year life of the plan, protect, maintain, and restore, as warranted, approximately 738 acres of mature, contiguous tidal swamp forest to ensure the integrity of the forest is maintained or increased, and to benefit priority breeding birds of concern (e.g., prothonotary warbler, bald eagle, Louisiana waterthrush), migrating and wintering waterfowl, and other native wildlife.

**Discussion and Rationale**

Tidal swamp forest makes up approximately 56 percent of the refuge. It is a fairly large, contiguous block located in the north central part of the refuge surrounded by tidal freshwater marsh to the north and east and upland habitats to the south. As discussed in chapter 2, this area is composed of mature green ash, black gum, bald cypress, and red maple trees with a sparse, poorly developed understory. It provides critical habitat for multiple species of priority refuge resources of concern, including bald eagle, prothonotary warbler, and Louisiana waterthrush breeding, migratory, and overwintering habitat. See chapter 2 for a more detailed description.

Presquile NWR supports breeding, migratory, and overwintering habitat for bald eagles. Currently there are two active nests on the refuge. The large, mature trees of the tidal swamp forest, along with refuge's river escarpment habitat, provide perching sites for bald eagles foraging along the James River, as well as bald eagle overwintering habitat, and habitat during spring and fall migration. The refuge is within a designated winter concentration area for bald eagles (VDGIF 2008). The abundance and presence of the overwintering bald

eagles provided the foundation for the inclusion of the refuge in the Lower James River Important Bird Area (Audubon 2007).

Destruction of forested bottomland habitats, such as tidal swamp forest, and the degradation of habitat through silviculture activities, has led to a decline in the prothonotary warbler population throughout much of their historical range. The prothonotary warbler is the only eastern wood warbler species that uses cavities in trees and other artificial structures for nesting. Nests are located over and near water in wooded areas. They require sparse understory and avoid forest habitats less than 250 acres (Petit 1999). The tidal swamp forest of Presquile NWR provides breeding habitat for this priority refuge resource of concern. VCU has been maintaining an artificial nest box program on the refuge since 1987 which has resulted in over 25 publications that have contributed to the understanding of the biology of this declining species. Many of the studies have focused on understanding the reproductive and nesting characteristics of the species. The abundance of prothonotary warblers found on the refuge also helped to contribute to the designation of this portion of the lower James River as an Audubon Important Bird Area (Audubon 2007). As we look to the future of this long-term study, refuge staff will become more involved in identifying research questions that will contribute to the mission of the Refuge System and the refuge purposes and goals.

Louisiana waterthrush is another species of high conservation concern that use forested habitat located near flowing water, such as the tidal creeks through the refuge (Mattsson et al. 2009), for breeding and migration (Mattsson et al. 2009). It is a high priority species of conservation concern for BCR 30 (ACJV 2007).

Tidal swamp forest habitat along with the tidal freshwater marsh (objective 1.2) and James River and tidal creeks (objective 1.3) provide critical migratory and overwintering habitat for waterfowl along the Atlantic Flyway. Between 1997 and 2006, 30 species of waterfowl were observed during the annual Hopewell Christmas Bird Count including American black duck, mallard, Canada goose and wood duck. See chapter 2 for additional information. Maintenance of this habitat, in the form of protection and conservation, along with monitoring, will be important for the refuge to fulfill its purpose for migratory birds, including waterfowl, and to sustain populations during the migratory and wintering seasons.

Most of the management strategies under alternatives A and B involve maintaining and protecting existing habitat. Currently, much of the tidal swamp forest habitat is ecologically and hydrologically intact, with minimal presence of invasive species. As a result, this area requires minimal management to provide beneficial habitat. Access to the tidal swamp forest is limited due to dense vegetation and water, which makes potential management activities difficult.

Under alternative B, we would conduct a rigorous inventory and monitoring program to collect data about existing and future conditions to identify potential changes and trends in habitat conditions or species populations. We would plan to use the inventory and monitoring program to inform us on the outcomes of our management decisions and direct our future management actions. By making informed management decisions, we will be better able to maintain or restore resiliency, which is the ability for an ecosystem to return to a stable state following change, in the tidal swamp forest habitat.

As discussed in chapter 2, under different global climate change scenarios, up to 76 percent of the tidal swamp forest habitat could be altered as a result of rising sea levels. Additionally, invasive species, such as emerald ash borer, have the potential to negatively impact tidal swamp forest habitat. Creating an inventory and management program will allow us to detect these changes, rapidly

respond to them, understand the effects of the management, and make informed decisions. Adaptive management will be important for protecting the tidal swamp forest in the future.

### Strategies

*Continue to:*

- Plant green ash and bald cypress trees where gaps occur and when resources allow.
- Maintain and enforce public access closures on the refuge to reduce disturbance to breeding birds and habitat.

*Within 5 years of CCP completion:*

- Work with The Nature Conservancy (TNC) and VDCR Natural Heritage Program to identify reference sites at the refuge that can be used as regional indicators of quality tidal swamp forest.
- Develop an index of forest integrity to establish what habitat features should be inventoried, monitored, and maintained in this habitat type on the refuge, and to serve as a baseline for future management.
- Identify and prioritize additional locations for potential restoration plantings to offset loss of refuge lands due to erosion or catastrophic storm events.
- Partner with VDGIF to evaluate additional opportunities to enhance migrating and wintering waterfowl habitat on and adjacent to the refuge (assuming landowner is willing) by planting native vegetation. Establish partnership agreements with landowners if opportunities arise.
- Work with VDGIF to identify State waters, within or adjacent to the refuge boundary, where access to sensitive areas could be closed during specific seasons to protect resources.

### Inventory and Monitoring Activities

- Support VCU's long-term (20+ years) research study to evaluate prothonotary warbler nesting success and productivity in nest boxes. Within two years, establish an annual coordination meeting with the VCU researchers to determine how future study design can address questions of interest to refuge management, the potential impacts of climate change, and to support other regional North Atlantic landscape conservation cooperatives and Service inventory, monitoring, and research priorities.
- Work with VDGIF to study large-scale movement patterns (including migration routes, timing of migration, staging and stopover areas, winter habitat use, and breeding grounds affiliations) of American black ducks.
- Include in an inventory and monitoring plan:
  - \* A list of integrity index features to inventory and monitor
  - \* A schedule for baseline inventory of plant species and composition to refine the existing vegetation cover map
  - \* Strategies to monitor the emerald ash borer (pest)
  - \* An early detection and rapid response program to address degradation of plant and animal communities caused by climate change and invasive species, especially those potentially stand-replacing, invasive species, such as phragmites

- ✱ Strategies to establish long-term monitoring stations to evaluate effects of climate change, including tidal elevations, changes in species composition, and tree mortality
- Pursue partnership opportunities to implement the inventory and monitoring plan and expand inventory and monitoring efforts.

**Objective 1.2 Tidal Freshwater Marsh**

Over the 15-year life of the plan, protect, maintain, and restore, as warranted, approximately 189 acres of tidal freshwater marsh to ensure the integrity of the marsh is maintained or increased, and to benefit priority species of concern, such as the federally threatened sensitive joint-vech, migrating and wintering waterfowl, such as American black duck and wood duck, and waterbirds, such as American bittern and king rail.

**Discussion and Rationale**

Tidal freshwater marsh comprises approximately 14 percent of Presquile NWR. It is primarily located along the northern edge and southeastern corner of the refuge. In addition, there are scattered pockets of tidal freshwater marsh habitat along the interior tidal creeks. As discussed in chapter 2, the northern tidal freshwater marsh area is composed primarily of rice cut grass and other grass species, while the southeastern corner has more open water with wild rice, salt marsh cordgrass, and arrow arum as the dominate plants. There are populations of the federally threatened sensitive joint-vech in the northern tidal freshwater marsh and along an interior tidal creek. Marsh senna, which has a Virginia ranking of “vulnerable,” also has a population in the northern marsh. Tidal freshwater marsh habitat is important for migratory and wintering waterfowl, including American black duck and wood duck, and breeding and wintering waterbirds, such as American bittern, and king rail. See chapter 2 for a more detailed description.

As discussed in the previous objective, tidal freshwater marsh habitat along with tidal swamp forest and the James River are integral to providing breeding, migratory, and overwintering habitat for a variety of waterfowl, waterbirds, and shorebirds. American black duck, which is designated as the highest conservation priority for BCR 30 in both tidal freshwater marsh and tidal swamp forest habitats (ACJV 2007), has been observed on the refuge during spring and fall migration and during the overwintering period. Tidal habitats in the Mid-Atlantic are essential overwintering habitat for this species (Longcore et al. 2000). Waterbird species, such as king rail and American bittern, use tidal freshwater marsh habitat with its dense vegetation during migration.



*Waterfowl at Presquile National Wildlife Refuge*

Sensitive joint-vetch is an annual legume that is found on the lower edge of the intertidal freshwater marsh zone that receives inundation twice daily (VDCR Natural Heritage Factsheet, [http://www.dcr.virginia.gov/natural\\_heritage/documents/fsaevi.pdf](http://www.dcr.virginia.gov/natural_heritage/documents/fsaevi.pdf); accessed April 2012). It is found in areas with high plant diversity and requires bare or sparsely vegetated substrates to grow, such as those created by muskrat activity or in depositional zones. Invasive species that create monocultures and reduce the open areas is a significant threat to this species. Marsh senna can be confused with sensitive joint-vetch because it has a similar appearance and is found in similar habitats. It is listed as a watch species for Virginia by VDCR (Townsend 2009).

Currently, much of the tidal freshwater marsh habitat is ecologically and hydrologically intact, with minimal presence of invasive species. As a result, this area currently requires minimal management to provide beneficial habitat. Access to the tidal freshwater marsh is limited due to dense vegetation and water, which makes potential management activities difficult.

Under alternative B, we will conduct a similar rigorous inventory and monitoring program as outlined in objective 1.1 to collect data about existing and future conditions, to identify potential changes and trends in habitat conditions or species populations. The adaptive management approach outlined in the previous objective may be extremely helpful to identify and respond to existing and new observations of invasive plant species. Invasive species, such as purple loosestrife and phragmites, have not yet been found on the refuge, but along with marsh dewflower which is currently present on the refuge, they represent a potential threat to the tidal freshwater marsh habitat.

### Strategies

*Continue to:*

- Protect populations of federally threatened sensitive joint-vetch as opportunities arise.
- Prohibit general public access within the tidal freshwater marsh to minimize disturbance to sensitive habitats.
- Maintain public access closures on the refuge to reduce disturbance to habitat and breeding birds.

*Within 5 years of CCP completion:*

- Work with TNC and VDCR Natural Heritage Program to identify reference sites that can be used as regional indicators of quality tidal freshwater marsh.
- Develop an index of marsh integrity to establish what habitat features should be inventoried, monitored, and maintained in this habitat type on the refuge, and to serve as a baseline for future management.
- Identify and prioritize additional locations for potential restoration plantings to offset loss of refuge lands due to erosion or catastrophic storm events.
- Partner with VDGIF to evaluate additional opportunities to enhance migrating and wintering waterfowl habitat on and adjacent to the refuge (from willing landowners and partners with easements) by planting native vegetation. Establish partnership agreements with landowners if opportunities arise.
- Work with VDGIF to identify State waters adjacent to the refuge where access to sensitive areas could be closed during specific seasons.
- Conduct a survey for rare, threatened, and endangered species and natural communities.

### **Inventory and Monitoring Activities**

- Conduct monitoring of invasive species to the extent funding and staffing allow.
- Work with the Virginia Field Office and recovery team to conduct monitoring of federally listed sensitive joint-vetch populations as funding and staffing allows and given support by partners.
- Include in an inventory and monitoring plan:
  - ✱ A list of integrity index features to inventory and monitor
  - ✱ A schedule for baseline inventory of plant species and composition to refine the existing vegetation cover map
  - ✱ An early detection and rapid response program to address degradation of the plant and animal communities caused by climate change and invasive species, especially those potentially stand-replacing, invasive species, such as phragmites, marsh dewflower, and purple loosestrife
  - ✱ Strategies to establish long-term monitoring stations to evaluate effects of climate change including tidal elevations, changes in species composition, and tree mortality
- Strategies for working with VDGIF and other partners to monitor for breeding wood duck and black duck
- Plans for a secretive marsh bird survey following regional protocols
- A formal protocol for sensitive joint-vetch
- Pursue partnership opportunities to implement the inventory and monitoring plan (e.g., universities, non-governmental organizations, and State agencies) and expand inventory and monitoring efforts.

### **Objective 1.3 Aquatic Resources**

Over the 15-year life of the plan, contribute to the protection of the refuge's tidal creeks and the James River main stem for the benefit of aquatic resources of concern, including the federally endangered Atlantic sturgeon, river herring, American shad, and freshwater mussels, and as foraging and resting habitat for waterfowl, waterbirds, and bald eagles.

### **Discussion and Rationale**

The James River and its associated backwater habitats, including tidal creeks, are important spawning habitats for resident and migratory fish, such as the federally endangered Atlantic sturgeon, American shad, freshwater mussels, and as foraging and resting habitat for migratory and overwintering waterfowl, waterbirds, and bald eagles. Baseline information about species and habitat conditions is needed to inform step-down and project-specific refuge management plans, such as a shoreline management plan. The recent listing of Atlantic sturgeon and the construction of an experimental reef immediately adjacent to the refuge underscore this need to know more about the refuge's aquatic habitats and its ability to support species of concern, like the sturgeon.

Prior to 1890, it was believed that the Chesapeake Bay and its tributaries contained over 20,000 adult female Atlantic sturgeon. From 1950s to the mid-1990s, a large commercial fishery harvested approximately 100,000 to 250,000 lbs/year of Atlantic sturgeon (NOAA 2010). In 1998, a moratorium on commercial fishing was enacted. Currently, there is an existing spawning population in the James River estimated at 300 individuals (NOAA 2012) that migrate upriver in the spring to spawn in deep, moderately flowing water over hard substrate (<http://www.nmfs.noaa.gov/pr/species/fish/atlanticsturgeon.htm>;

accessed April 2012). Fertilized eggs will develop into larval fish, which will then migrate downstream to develop and mature in the marine waters of the coast.

In 2010, an artificial spawning reef, targeted to benefit the Atlantic sturgeon, was installed on the southeastern corner of the refuge near the confluence of the Turkey Island Cutoff and the oxbow, immediately adjacent to the refuge. The project is a collaboration among the Service, JRA, USACE, and VCU. Since it was created, no Atlantic sturgeon has been observed spawning on it; however, American shad, river herring, and other fish species have been documented spawning on the reef indicating its value to a wide diversity of James River aquatic life (JRA 2010). In 2012, the Atlantic sturgeon was federally listed as endangered. With the recent listing, we anticipate our role in supporting the recovery of this species will increase as we work with our partners.

Similar to Atlantic sturgeon, American shad spend a significant portion of their life in marine waters and migrate to freshwater to spawn. As discussed in chapter 2, the Virginia Marine Resources Commission issued a moratorium on American shad harvest in the Chesapeake Bay and its tributaries due to concerns with overfishing, habitat degradation such as pollution, dams, and land use changes. Information about the specific spawning and nursery habitat characteristics required for American shad in Virginia's rivers is incomplete (Bilkovic et al. 2002). At a minimum, the refuge can work with partners to protect and enhance aquatic habitat within and around Presquile NWR to facilitate the presence of shad in the James River and to create and maintain spawning habitat.

Besides migratory fish, the tidal creeks of Presquile NWR are relatively intact and may provide habitat for freshwater mussels and other non-migratory fish species, such as bridle shiner, alewife, and blueback herring (collectively referred to as river herring), and gizzard shad. The adjacent marsh provides potential nursery habitat for fish that can use the larger James River and Chesapeake Bay system.

Under alternatives A and B, management of the James River and associated backwaters habitats, including tidal creeks, is fairly minimal. Protecting these intact habitats and maintaining healthy populations of native species require a proactive approach to detecting changes and assessing threats. The tidal creeks are ecologically and hydrologically intact with minimal presence of invasive species. The James River watershed is approximately 10,432 square miles. It is difficult for a 1,329-acre refuge to make a significant impact in improving water quality or providing habitat that benefits species for the whole system. However, under alternative B, we would engage in activities that would maximize our contribution to the James River watershed, such as implementing best management practices on refuge lands to minimize sedimentation to the James River.

Under alternative B, the inventory and monitoring program may support additional efforts to restore Atlantic sturgeon and American shad habitat elsewhere in the James River system. Data collected can provide tools to continue and improve habitat restoration. Monitoring of tidal creeks and aquatic habitats may provide critical reference information as other aquatic resources outside of the refuge are affected by global climate change and land use changes.

### Strategies

*Continue to:*

- Implement best management practices to minimize potential for refuge actions (e.g., trail and facility work) to increase sediment load and deposition in the James River.
- Plant and maintain vegetated riparian areas and natural habitats.

- Support partner efforts to restore federally listed Atlantic sturgeon habitat.

*Within 3 years of CCP completion:*

- Consult with the Service's Virginia Fisheries Coordinators Office for technical assistance regarding survey techniques, tools, and funds available to assess and prioritize potential biological threats to aquatic habitats and species.
- Develop plans to support Virginia Field Office, the Virginia Fisheries Coordinators Office, and other partners in efforts to restore and monitor Atlantic sturgeon, shad, and mussel habitat

#### **Inventory and Monitoring Activities**

- Work with partners (e.g., James Riverkeeper) to monitor the two water quality stations.
- Support partner efforts to monitor the federally listed Atlantic sturgeon habitat.
- Include in an inventory and monitoring plan:
  - \* Work with refuge partners (e.g., Chesapeake Bay Foundation Grasses for the Masses program) and others to evaluate potential to expand water quality and submerged aquatic vegetation monitoring efforts
  - \* Strategies to monitor aquatic macroinvertebrate communities that indicate food quality, water quality, and ecological integrity
  - \* Strategies to monitor conditions surrounding existing infrastructure to determine how much it may contribute sedimentation to the James River

## **GOAL 2.**

### **Upland Habitats**

Protect, restore, and enhance the refuge's upland habitats, with emphasis on the mixed mesic forest ecological community, to sustain plants and wildlife native to the James River area, in particular those species of conservation concern.

#### **Objective 2.1 Mature Mixed Mesic Forest**

Over the 15-year life of the plan, maintain the biological integrity, diversity, and health of the refuge's 46 acres of contiguous, mature mixed mesic forest to provide breeding and migratory habitat for forest interior dwelling birds of conservation concern, including scarlet tanager and wood thrush, as well as to sustain other native plants and wildlife.

#### **Discussion and Rationale**

Mature mixed mesic forest comprises approximately three percent of Presquile NWR. It is located along the southeastern corner of the refuge, bordered by tidal freshwater marsh to the north and upland habitats to the west. As discussed in chapter 2, this area is composed primarily of red cedar and black locust. Under alternative B, we would improve forest diversity by actively restoring the habitat to a greater mix of native mixed mesic species.

Mixed mesic forest habitats are important for bird conservation. They provide breeding and stopover habitat for neotropical migrants and represent the second highest number of priority conservation species in BCR 30 (ACJV 2007). Similar to forested wetlands, such as tidal swamp forest, these forested habitats have been destroyed, altered, and fragmented through development and changes in land use in the region. From 1957 to 2006, approximately 24 percent or close to 55,000 acres of the forested habitat in Chesterfield County was converted to other land uses (Reuse 2006). Today only 8 percent of the Chesterfield County's forested habitat is in public-ownership. Although the mature mixed mesic forest

comprises only 46 acres on the refuge, management to maintain the integrity of the forest and the diversity of this habitat in conjunction with the management of other habitats on the refuge will help to reduce forest fragmentation and contribute to the overall landscape's ability and the refuge's mission to support migratory birds.

Two of our refuge resources of concern for mature mixed mesic forest, the wood thrush and scarlet tanagers, represent bird species that require conditions that we can provide on the refuge and may also use portions of other habitats on the refuge at some point during their life history. Both species also represent regional conservation priorities. Wood thrush is designated as the highest conservation priority within mixed mesic (upland) forested habitats in BCR 30 (ACJV 2007). It breeds in forest stands varying from less than 2 acres to over 1,200 acres (Watts 1999) with a diverse mix of tree species with moderate mid-level canopy structure and shrub density (Evans et al.2011). The Mid-Atlantic Coastal Plain Partners in Flight Conservation Plan identified wood thrush as one of the best indicators of the entire gradient of forest types (transition from hardwood-dominated stands away from the coast to pine-dominated stands near the coast) within the region (Watts 1999). It is believed providing habitat conditions for wood thrush will support the habitat requirements of other priority bird species. Scarlet tanagers breed in a variety of forest types including mature mixed mesic forests that are at least 30 acres in size with a closed canopy (Mowbray 1999). Because they use the upper portion of the canopy of mature, large trees for nesting, they are influenced by the condition of the upper canopy (Watts 1999).

Under alternative B, we would conduct a similar rigorous inventory and monitoring program as outlined in previous objectives to collect data about existing and future conditions to identify potential changes and trends in habitat conditions or species populations. The adaptive management approach outlined previously would be extremely helpful to identify the outcomes of any forest stand management actions. Data could also be used to improve restoration techniques for the transitional mixed mesic forest objective.

### **Strategies**

*Continue to:*

- Restrict public access to designated routes to avoid impacts to vegetation.

*Within 5 years of CCP completion:*

- Develop an index of forest integrity to establish what habitat features should be inventoried, monitored, and maintained, and to serve as a baseline for future management.
- Restore the area of early successional forest in the southeastern corner of the refuge (now dominated by black locust) to encourage transition to mixed mesic native hardwood forest. Consult forest experts to determine if active management is feasible, practicable, and desirable. Implement actions if determined reasonable.

### **Inventory and Monitoring Activities**

- Conduct invasive species monitoring as often as funding and staffing allow.
- Include in inventory and monitoring plan:
  - ✱ A list of integrity index features to inventory and monitor
  - ✱ A schedule for baseline inventory of plant species and composition to refine the existing vegetation cover map

- ✱ An early detection and rapid response program to address degradation of the plant and animal communities caused by climate change and invasive species, especially those that are potentially stand-replacing, invasive species
- ✱ Strategies to establish long-term monitoring stations to evaluate effects of climate change including tidal elevations, changes in species composition, and tree mortality
- Strategies for working with VDGI and other partners to monitor deer populations and assess their impact on forest regeneration, and develop management options as warranted.
- Land bird monitoring according to regional protocols using Service and citizen science partnerships.
- Pursue partnership opportunities to implement the inventory and monitoring plan and expand inventory and monitoring efforts.

### **Objective 2.2 Transitional Mixed Mesic Forest**

Over the 15-year life of the plan, promote native forest succession on approximately 197 acres of the refuge's existing grassland and shrub habitat to further enhance the biological integrity, diversity, and health of the refuge's mature mixed mesic forest and associated species of conservation concern (re: objective 2.1). While in transition to mature forest, these acres will contribute to breeding and migrating habitat for birds of conservation concern that use early successional forest habitat, including prairie warbler, field sparrow, American woodcock, and northern bobwhite, as well as to sustain other native plants and wildlife. In the short-term, active management will focus on invasive plant control, namely for Johnsongrass, and planting native trees where forest succession is inhibited due to site conditions and/or past land use practices.

#### **Discussion and Rationale**

Shrub habitat, which is also known by several other names, such as scrub-shrub, shrubland, or early successional forest, represents a transitional or temporary state between open grassland and forested habitats. Historically, this habitat type likely comprised less than 10 percent of the BCR 30 and was the result of disturbance, such as fire, storms, and beaver impoundments in low areas, which created openings in the forest (ACJV 2007). Over the last 50 years, land use changes, such as urban development, forest management, and the increase in the intensity of agricultural operations, have decreased the amount of early successional habitat (Norman and Puckett, <http://www.dgif.virginia.gov/wildlife/quail/action-plan/quail-action-plan.pdf>; accessed April 2012).

The 197 acres we are proposing to convert to mixed mesic forest presently exists as old field/grassland. Under current management, as outlined in alternative A, we are managing against the process of woody vegetation invasion primarily through periodic mowing. If we stopped managing the area, as discussed above, it would naturally transition to an early successional forest over the next 15 years, and ultimately become a mature forest after 50 years. Over the next 15 years, under alternative B, we would encourage this succession process and assist it as much as possible through planting native tree and shrub species and controlling invasive species.

Providing 197 acres of shrub habitat (transitional mixed mesic forest) will benefit both migratory and breeding habitat for priority refuge resources of concern that are considered to be moderate to highest priority species in BCR 30 (ACJV 2007). Prairie warbler, one of the highest priority species, may potentially use the shrub habitat for breeding and during migration (Nolan et al 1999). They prefer shrub habitat with an open canopy that has a low amount of vegetation. Conservation priority species, such as northern bobwhite and

American woodcock, may use the shrub habitat as security cover (Keppie and Whiting 1994). Northern bobwhite is a non-migratory bird of particular concern in Virginia. It has decreased by 4 percent annually in abundance from 1966 to 2007 in Virginia resulting in a loss of nesting cover and brood range (Norman and Puckett date unknown). Also benefitting from shrub habitat would be breeding and migrating wood thrush and scarlet tanager, which also potentially use shrub habitat during the post-fledging period (Evans et al.2011, Mowbray 1999).

We have associated the term “transitional” to the early successional forest habitat because the long-range objective is to have this habitat transition through time from grassland and shrub into mature mixed mesic forest habitat. This will occur at a rate beyond the lifetime of this CCP. Forest block size and connectivity to existing forested habitats (tidal swamp forest and mature mixed mesic forest) will increase as a result of establishing contiguous, native mature forest habitat under alternative B. Both of these factors are important to several of the current priority refuge resources of concern in objectives 1.1 and 2.1.

During the transition from grassland to mature mixed mesic forest, the area will undergo changes in habitat characteristics with a concurrent change in species present. As woody vegetation becomes established, stem density will increase, reducing open habitat and ground cover. The canopy will be become closed and through time, as the trees grow, stem density will be reduced through competition. During the 15-year span of this CCP, species that use shrubby, early successional forest habitat for either breeding or migratory stopover habitat will benefit. It is likely that at the end of this CCP there will be a different suite of species utilizing early successional forest habitat than at the start. This transition will provide benefits for up to 20 years to the early successional species noted above. For example, field sparrow, which is a high priority BCR 30 species, will use habitats within one to two years after grassland management stops and shrubs begin to become established and will use the habitat for up to 10 years before local use declines due to increased woody cover (Carey et al. 2008). Conversely, gray catbird use will increase with increasing shrub density that will likely result during the second half of the lifetime of this CCP (Smith et al. 2011). Beyond the timeframe of this CCP, the eventual conversion to mature forest will benefit a different suite of breeding and migrating bird species that prefer interior forest habitat, such as scarlet tanager and wood thrush. Our objective over the long-term is to create a self-sustaining mature mixed mesic forest.

### Strategies

*Within 5 years of CCP completion:*

- Allow natural succession of native species to continue unabated on 200 acres currently in grasslands/old field.
- Encourage the establishment of native vegetation by planting native trees and shrub species where native forest succession is inhibited by site conditions or past land use practices.
- Protect trees from wildlife browsing using tubes or other techniques.
- Use volunteers, partners, and student groups in reforestation efforts.
- Expand the current area where native mixed mesic hardwood tree species have been planted in the riparian zone (approximately 22 acres).
- Maintain communications with county, State, and Federal agricultural agencies to stay current with the latest techniques and best management practices to control Johnsongrass, and other invasive species established on the refuge, including mechanical, chemical, prescribed fire, or biological control treatments. Implement those that may be feasible and appropriate on the refuge when resources allow.

### **Inventory and Monitoring Activities**

#### ■ Include in an inventory and monitoring plan:

- ✱ Land bird monitoring according to regional protocols using Service and citizen science partnerships
- ✱ An early detection and rapid response program to address degradation of the plant and animal communities caused by climate change and invasive species, especially those that are potentially stand-replacing invasive species

### **Objective 2.3 Grassland**

No grasslands or old field habitat would be managed under alternative B.

### **Discussion and Rationale**

Under alternative B, this objective would reduce grasslands over the long term, instead promoting contiguous, mature mixed mesic forest into the future and focusing on enhancing the integrity of the refuge's forest to benefit several interior forest species of conservation concern identified in the forest objectives above. Maintaining a mature forest is more in keeping with the historic natural condition of the area because prior to European settlement, this area was likely forested with openings maintained primarily through anthropogenic processes (Watts 1999).

Notwithstanding the intent of this objective to allow grasslands to transition to forest, under alternative B, we would continue to maintain approximately 46 acres of grasslands on the refuge primarily for administrative, public use, or educational purposes. We regard this as only incidental habitat of low value to grassland birds due to its proximity to administrative sites, and/or because it exists as a narrow linear feature (e.g., mowed trails) where public use is concentrated diminishes its habitat quality and value to grassland birds.

### **Strategies**

None.

### **Inventory and Monitoring Activities**

None.

### **Objective 2.4 River Escarpment**

Over the 15-year life of the plan, enhance and protect the biological integrity, diversity, and health of the refuge's 11 acres of river escarpment to benefit resources of conservation concern, including nesting and perching bald eagles, great blue heron and other wading birds, as well as to protect cultural resources and reduce the volume of sediment delivered to the James River.

### **Discussion and Rationale**

River escarpment habitat is important for the refuge because it links the aquatic habitat of the James River to the upland habitats. It is a corridor for wildlife species utilizing both the aquatic habitats and terrestrial habitats. Trees along the river escarpment can provide perching and nesting habitat for the bald eagle, great blue heron, great egret and other wading birds, and other bird species that use the aquatic-terrestrial interface.

The Lower James River Important Bird Area, which includes Presquile NWR, has the densest concentration of bird species that eat fish as part of their diet in Virginia (Audubon 2007). This includes bald eagles, great blue herons and great egrets using the river escarpment area as staging areas for feeding and overwintering activities.

Erosion of the river escarpment is occurring along the Turkey Island Cutoff. Based on aerial photography interpretation, the average channel width was approximately 550 feet in 1968. By 2009, the average channel width from bank

to bank was approximately 820 feet. A right-of-way easement was placed outside of the channel in anticipation that the cut would expand through erosion and naturally stabilize (S. Powell, personal communication). Today, trees are slumping into river and sediment is entering the James River watershed. Over time, this habitat is becoming degraded. There is potential that cultural resources will become exposed and lost as more soil sloughs away from the bank. Additionally, sediment originating from the escarpment that ends up in the river continues to contribute to the James River failing to meet EPA-set sediment reduction goals (JRA 2011).



Cyrus Brame/USFWS

*Erosion at Turkey Island Cutoff*

Partnerships that address the erosion issues along the river escarpment will be a key to finding a solution. We anticipate meeting with stakeholders (e.g., USACE and VDEQ) to investigate shoreline management options. Among the information we need are: sediment sources, rate of sedimentation of the oxbow, shoreline erosion rate, engineering solutions if any, and the USACE's management plans and strategies affecting this channel. Our discussions and investigations with these partners will also include the implications to the long-term future of the oxbow, or original river channel. We are concerned with the possibility that this area will silt in over time, making access challenging and affecting its use and enjoyment.

USACE maintains jurisdiction of the right-of-way through the channel. They have been monitoring erosion along the channel and have expressed that it is not a concern as it relates to maintaining navigation within the right-of-way (S. Powell, personal communication). If the erosion threatens to migrate outside of the right-of-way, then USACE would likely be receptive to working with us to assess how to mitigate further losses. Determining the right-of-way boundary will continue to be a challenge since USACE audit maps are not geo-referenced; however, maintaining a partnership and regular communications between the Service and USACE will facilitate resource protection and maintenance of the navigation channel.

The bank on the south side of the river channel on private property is experiencing similar erosion. During the boundary identification phase, we would attempt to partner with the appropriate landowner so they can understand how erosion has affected their property boundary. Our hope is that they would stay engaged during the process and be able to address the other bank at the same time we are working with the USACE to reduce or eliminate erosion and sediment deposits in the James River watershed.

We anticipate meeting with stakeholders (e.g., USACE, VDEQ, and the Virginia Institute of Marine Science) to investigate shoreline management options and potential impacts on water quality, wildlife habitat, and aquatic species resulting from erosion of the shoreline and deposition of sediments in the oxbow. Additional information would be needed to accurately assess the affected environment, including an assessment of erosion rates along the river banks, sediment source locations, sediment transport rate, sediment fate, the USACE's management

plans and strategies affecting this channel, and an overview of potentially viable management options.

Investigating and implementing feasible solutions to stabilize the eroding escarpment will also include protecting cultural resources, improving important habitat features, and reducing sediment inputs to the James River and Chesapeake Bay system. During the process of evaluating feasible solutions, options may vary on what are the appropriate techniques. We will include in our evaluation a review of stabilization projects that have occurred in rivers that are similar. The best approach will balance long term stability and protecting resources with meeting the needs of the involved parties. As much as possible, a solution will incorporate a biotechnical approach that provides the necessary stability and incorporates elements of habitat improvement and ecological function. If re-vegetation is part of the plan, only native vegetation will be used.

### Strategies

*Continue to:*

- Control invasive plants (e.g., privet and tree-of-heaven) using herbicides and mechanical treatments.

*Within 5 years of CCP completion:*

- Work with TNC and the VDCR Natural Heritage Program to identify reference sites for river escarpment.
- Partner with the USACE and local industry to investigate ways to stabilize the actively eroding river escarpment and the existing bulkhead. The area of primary concern is along the refuge's south and west borders.
- Develop and implement a shoreline management plan if feasible options are identified. Additional NEPA review, public involvement, and National Historic Preservation Act compliance may be required prior to implementation.

### Inventory and Monitoring Activities

- Include in an inventory and monitoring plan:
  - \* An early detection and rapid response program to address degradation of the plant and animal communities caused by climate change and invasive species.
  - \* Strategies to establish long-term monitoring stations to evaluate effects of climate change including tidal elevations changes in species composition, and tree mortality.
  - \* Pursue partnership opportunities to implement the inventory and monitoring plan and expand inventory and monitoring efforts.

## GOAL 3

### Cultural Resources

Protect and conserve the refuge's cultural resources and landscape, and seek opportunities to increase knowledge and appreciation of the refuge's history as part of the James River region.

#### Objective 3.1 Cultural Resource Protection

Over the 15-year life of the plan, improve cultural resource protection throughout the refuge to avoid unintended impacts.

#### Discussion and Rationale

The management and protection of cultural resources is an integral element in fulfilling refuge goals. Service-initiated actions likely to affect archaeological and historic sites are routinely reviewed and assessed under the provisions of

Section 106 of the National Historic Preservation Act. To date, projects requiring such review on the refuge have been limited; therefore, refuge lands have never had a systematic archaeological survey in their entirety.

We suspect prehistoric archaeological sites on the refuge have been severely damaged by shoreline erosion, and some may have previously eroded into the James River. Our regional archaeologist is concerned that continued shoreline erosion may threaten unknown archaeological sites on the refuge (Wilson, personal communication 2011). Shoreline protection efforts we plan under objective 2.4 would also serve cultural resource protection; however, development and implementation of restoration plans would likely take more than five years to adequately prevent further shoreline erosion.

At the same time, some of the shoreline protection efforts, such as tree planting, and the promotion of forest succession on the refuge, could negatively impact archaeological sites; for example, the growing roots of trees could severely damage intact cultural levels and features (E. Eaton, personal communication 2012). The development of a proactive National Historic Preservation Act Section 110 initiative, as described in the strategies under this objective, prior to the implementation of these management activities, would help ensure that vulnerable archaeological sites are identified and appropriate management actions are developed for the sites.

The John Milner Associates, Inc. archaeological investigations report included several long-term recommendations for action which we include as strategies below.

### **Strategies**

*Continue to:*

- Prevent public access to locations of the refuge where cultural resources are susceptible to degradation through natural causes or human-induced impacts.
- Protect cultural resources through outreach and enforcement.

*Within 5 years of CCP completion:*

- Designate public access and use areas where cultural resource impacts can be avoided. Signage at the refuge should include a statement saying that, under the Archaeological Resources Protection Act, it is illegal to disturb, collect, or remove cultural resources from refuge property.
- Work with RHPO to develop and sponsor a proactive, National Historic Preservation Act Section 110 initiative at the refuge, which involves identifying and investigating vulnerable archaeological sites and other cultural resources.
- Partner with SHPO, Tribal representatives, USACE, and other stakeholders with cultural resource interests and Federal trust responsibilities to develop strategies that emphasize prevention and mitigation of significant cultural resource loss, if a significant site is present and is at risk of natural or human-made degradation.
- Integrate cultural resource protection efforts into other refuge programs, such as cultural resource interpretation and education.
- Complete a formal Phase I field investigation involving surface collections, shovel testing, geophysical surveys, or metal detection to identify and define the boundaries of archaeological resources within the refuge, including the former farm complex and the cemetery. These investigations should ground-truth the projected location of resources based on the historic map research.

- Conduct a walkover survey of the entire refuge with the goal of evaluating ground surfaces, locate landscape features (fence lines or roads), evidence related to pre-contact and post-contact settlements, structures, and military activity.
- Promote, through signage and publications, the significant cultural resources associated with American Indian settlement and subsistence, initial settlement of the James River by Europeans, plantation society, military history, and post-Civil War rural agriculture that survives at the refuge. Interpretive trails could be developed that would enhance the visitor experience.
- Conduct a landscape study to record the rural landscape of refuge lands prior to Service acquisition. Information obtained will inform cultural resource outreach, education, and interpretation programs.

#### **Inventory and Monitoring Activities**

- Monitor known sites on a regular basis for looting and trespass.

### **Objective 3.2 Cultural Resource Conservation/Heritage**

Over the 15-year life of the plan, protect, conserve, and research the refuge's cultural resources to expand our understanding of the area's rich cultural history.

#### **Discussion and Rationale**

In addition to the rationale provided under objective 3.1, the Service's Northeast Region is actively promoting the importance of connecting people with nature (<http://www.fws.gov/northeast/cpwn/>; accessed April 2012). Interpretation of cultural resources can instill a conservation ethic among the public and others who encounter or manage them, especially when told by persons of American Indian heritage and descendant community representatives. Under this objective, we are seeking to:

- 1) Translate the results of cultural research into media that can be understood and appreciated by a variety of publics;
- 2) Engender an appreciation for the Virginia Indian cultures and perspectives about natural resources;
- 3) Relate the connection between cultural and natural resources and the role of humans in the environment; and
- 4) Instill an ethic for the conservation of our cultural heritage.

Conserving the refuge as an indigenous cultural landscape is one way that the refuge can encourage a conservation ethic and visitors' attachment to nature. This means conserving the full landscapes in which American Indian culture existed prior to, and for some decades after, European contact, as opposed to preserving specific archaeological sites. Since American Indian culture has widespread appeal for the American public who is eager to learn about what life was like for Indians, this approach could encourage refuge visitation and help promote visitors' attachment to nature and the refuge. This approach could also enhance efforts to protect the refuge's natural resources because it reemphasizes the American Indian values toward natural resources (Beacham 2011).

Under alternative A, we are opportunistically collecting cultural history information to increase our understanding. With alternative B, we are placing a greater focus on formalizing the collection of cultural history information. We also seek to strengthen partnerships with other organizations and agencies.

### **Strategies**

*Continue to:*

- Maintain partnerships with local, regional, and State experts on the history of the area.
- Maintain museum collections and archival materials.

*Within 5 years of CCP completion:*

- Protect and conserve museum collections and archival materials in accordance with applicable standards.
- Collaborate with RHPO and Tribal representatives to develop and sponsor a proactive National Historic Preservation Act Section 110 initiative at the refuge for improved inventory of archaeological resources.
- Consult with the SHPO, Tribal representatives, and other stakeholders with cultural resource interests to explore opportunities to partner for the preservation, conservation, and research of the refuge's artifacts and museum properties collections and to develop interpretive experiences (e.g., trail walks in evocative indigenous cultural landscapes) that offer the indigenous perspective.
- Discuss the Service's responsibility to protect cultural resources in required documentation and in publicly available media (e.g., Web site, maps, signage, and interpretive brochures) and encourage cultural resource stewardship.
- Coordinate with local law enforcement offices to develop effective management, communications, and documentation protocols.
- Evaluate the current museum properties collection to assess potential to include artifacts or reproductions into interpretive exhibits or educational programs.
- Explore potential partnership opportunities with institutions that would allow loan of artifacts for research or educational purposes.
- As opportunities arise, record oral histories from individuals that have a relevant relationship to the area and the refuge.

### **Inventory and Monitoring Activities**

- Ensure an inventory list of museum properties is filed at the refuge headquarters and at the Northeast Regional office with the regional archaeologist.

## **GOAL 4.**

### **Environmental Education**

Provide environmental educational experiences for visitors to inspire appreciation and stewardship of the refuge in relation to the James River watershed, the Chesapeake Bay Estuary, and the Refuge System.

#### **Objective 4.1 Environmental Education—On Refuge**

Over the 15-year life of the plan, provide quality environmental education programs on the refuge with specific learning objectives and diverse opportunities that:

- 1) Meet Virginia State Standards of Learning requirements;
- 2) Promote conservation and restoration priorities of the refuge and Chesapeake Bay watershed;

- 3) Support the mission of the Service and Refuge System; and
- 4) Provide stewardship opportunities to participants.

### **Discussion and Rationale**

Environmental education is one of the six priority wildlife-dependent recreational uses to be facilitated in the Refuge System. The majority of visitors, students, and youth groups using Presquile NWR for environmental education will be participants of the Ecology School. We describe the history of this program in more detail in chapter 2.

Currently the lack of staff resources at the refuge limits our ability to maintain a large environmental education program. To provide environmental education to the public within current resource allocation levels, we have entered into partnerships with other agencies and organizations. In December 2007, the Service signed a 20-year MOU with the JRA to develop the Ecology School at Presquile NWR. The Ecology School programming is designed to provide meaningful outdoor experiences that connect people with nature; promote an appreciation for the refuge, the Chesapeake Bay, and the James River watershed; and is consistent with Virginia Standards of Learning requirements (<http://www.doe.virginia.gov/testing/index.shtml>; accessed April 2012). In accordance with the MOU, JRA will recruit participants and coordinate the administration of the Ecology School with general oversight by the Service. The Service and JRA will cooperatively develop an annual environmental education plan that lists the dates and outlines participant activities. Overnight accommodations (i.e., tent camping or indoor lodging) on the refuge will continue to be permitted for the Ecology School upon approval of an environmental education plan and human health and safety plan. Onsite group leaders will ensure adherence to safety policies for each visiting group.

In 2012 the Northeast Regional Director approved a FONSI for the EA “Overnight Accommodations in Support of the Ecology School on Presquile NWR.” That FONSI and EA, available from refuge headquarters, provide additional details on the Ecology School.

### **Strategies**

*Within 5 years of CCP completion:*

- Work with JRA to develop and implement environmental education programs through the Ecology School that integrate Virginia State Standards of Learning requirements, as appropriate by age group; convey the refuge purposes, vision, and goals for management; and promote the Captain John Smith Chesapeake NHT and CBGN, in conjunction with our MOU with the NPS.
- Develop, with JRA, the Ecology School to provide meaningful outdoor experiences that connect people with nature, with programs focused on the Refuge System, the refuge, and its resources, the Chesapeake Bay and James River watershed. Also, as part of the Ecology School program:
  - \* Conduct teacher in-service training up to 2 times/year
  - \* Formalize partnerships with local schools, local Audubon chapter, Virginia Master Naturalist Program, and VDGIF educators; promote other potential educational partnerships that would meet the mutual goals between the Service and JRA
  - \* Develop an Office of Management and Budget-approved instrument to evaluate whether participants are learning objectives

- ✱ Develop formal environmental education plans that would be reviewed annually by Service and other peer educators to ensure that programs to be offered meet stated goals
- Support VCU summer teacher program by hosting programs on the refuge.
- Fulfill requests to offer environmental education programs on the refuge, approximately one to two times per year, which may not be associated with the Ecology School.

#### **Inventory and Monitoring Activities**

- Include monitoring activities in a visitor services plan to assess:
  - ✱ Visitor use, numbers, and impacts
  - ✱ Visitor satisfaction
  - ✱ Capacity limits

#### **Objective 4.2 Environmental Education—Student Participation**

Over the 15-year life of the plan, increase environmental education opportunities for up to 2,000 students (primarily from underserved and urban areas) annually using existing and new facilities on and adjacent to the refuge.

#### **Discussion and Rationale**

This objective builds on objective 4.1, focusing specifically on the Ecology School, which is also described in detail in chapter 2. The Ecology School seeks “to connect Virginia’s children to nature” and aims to annually serve up to 2,000 middle and high school students in Virginia. In particular, the Ecology School focuses on providing programming to students from underserved and urban schools. With their residential environmental education center, the Ecology School is able to hold programs nine months of the year and host middle and high school students from all over Virginia for a three-day, two-night experience on Presquile NWR. As noted under objective 4.1, all programming will be consistent with Virginia Standards of Learning requirements and focus on a variety of Chesapeake Bay and James River watershed conservation topics. For more information about the Ecology School, visit the Web site, <http://www.jamesriverassociation.org/what-we-do/education-center/> (accessed April 2012).

#### **Strategies**

*Within 5 years of CCP completion:*

- Develop an outreach plan with JRA to peak interest from urban and underserved schools that would benefit from programs offered.
- Through the Ecology School, aim to provide students with opportunities to engage in meaningful, hands-on, outdoor experiences that will:
  - ✱ Improve academic achievement;
  - ✱ Inspire self-confidence;
  - ✱ Encourage environmental leadership in the region’s schools; and
  - ✱ Empower the next generation of environmental stewards.
- Develop and maintain classroom facilities and overnight accommodations that are safe, accessible, well-maintained, and reasonably comfortable for students, many of whom may be unaccustomed to outdoor, overnight experiences. Collaborate with JRA on the administration of the program, including the renewal of the annual permit, maintenance, and all operations of the Ecology School and its facilities.

### **Inventory and Monitoring Activities**

- Include monitoring activities in a visitor services plan to assess:
  - \* Visitor use, numbers, and impacts
  - \* Visitor satisfaction
  - \* Capacity limits
  - \* Visitor understanding and support for Refuge System and refuge purposes; and whether that leads to stewardship actions

### **Objective 4.3 Environmental Education—Off Refuge**

Over the 15-year life of the plan, assist other agencies and organizations in their environmental education programs and events off-refuge, up to four times per year, where there are opportunities to reach large and/or diverse audiences, raise awareness of the Refuge System, and emphasize the refuge's resources and its contribution to conserving the James River watershed and Chesapeake Bay Estuary.

### **Discussion and Rationale**

Off-refuge environmental education presently occurs as opportunities arise and if staff is available. We describe some of our off-refuge activities in more detail in chapter 2. Current off-refuge programming includes general information about Presquile NWR and its resources. A printed brochure has not been updated for several years and does not describe the refuge's relationship to the larger watershed context, including the Chesapeake Bay. To help expand this informal program with limited staff resources, the best opportunities include updating printed materials, strengthening existing partnerships with other agencies and organizations, and forming new relationships, to participate in events that these agencies and organizations sponsor. We would focus our efforts on events where topics are directly aligned with the refuge's vision, such as water quality in the James River or the potential impact of climate change, such as sea level rise, on bird habitat.

### **Strategies**

*Within 5 years of CCP completion:*

- Explore opportunities to create a refuge Friends group that can support the expanded off-refuge environmental education program.
- Coordinate and collaborate with the NPS through the Captain John Smith Chesapeake NHT and CBGN, participating in the development of environmental education materials that discuss the refuge's natural and cultural resources, land conservation, public access, and citizen stewardship.
- Participate in workshops, seminars, and field trips as invited and staff resources allow.
- Develop a series of traveling educational exhibits that explain the unique biological and cultural resources and historic landscape of the refuge.

### **Inventory and Monitoring Activities**

- Include in a visitor services plan:
  - \* Refuge resources to respond to off-refuge requests and a decisionmaking tool to allow for proper allocation of resources.

**GOAL 5**

**Wildlife-Dependent Recreation**

Provide wildlife-dependent recreational opportunities (interpretation, hunting, and wildlife observation, nature photography) and for visitors to enjoy and connect with nature and develop an enhanced appreciation for and understanding of the refuge's natural and cultural resources.

**Objective 5.1 Interpretation**

Over the 15-year life of the plan, enhance existing interpretive programs, displays, and materials to emphasize the unique natural and cultural resources on the refuge, the refuge's contribution to the regional conservation lands network, the implications of land use and climate change, and the importance of landscape connections

along the James River and into the Chesapeake Bay. Provide additional quality programming to increase participation by approximately 20 percent over existing levels, resulting in approximately 480 annual participants.

**Discussion and Rationale**

Interpretation is one of the six priority wildlife-dependent recreational uses to be facilitated in the Refuge System. A Service-led visitor services review (USFWS 2010b) recommended that the refuge expand opportunities for interpretation. Ideally, expanded interpretation activities conducted on Presquile NWR would positively contribute to appreciation and protection of migratory birds and their habitats, both on- and off-refuge. Interpretive programming would be integrated into the environmental education programming and materials, enhancing the experience for all visitors, in particular students involved in the Ecology School. Emphasis would be placed on the refuge within the lower James River system and how wildlife species may use the entire landscape, helping to expand the public understanding about habitat, migration, and ecosystems.

Interpretive materials would be developed that would connect the site to the past, providing information about the refuge prior to, during, and after European settlement and the importance of the refuge's natural resources to indigenous cultures. Information will also connect to the future, discussing issues, such as climate change, and how the refuge can serve as a reference point for altered systems or a sentinel of change.



*Bald eagle*

Steve Maslowski/USFWS

### Strategies

*Continue to:*

- Maintain existing refuge interpretive programs (up to six pontoon boat trips per year) and materials (e.g., signs, brochure, and Web site).
- Advertise volunteer events in the James River Days brochure (two to three events per year).
- Work with individual groups on events on a case-by-case basis.
- Conduct up to four community and civic events per year.
- Fulfill requests for interpretive information on a case-by-case basis.
- Maintain partnerships with local groups to provide interpretive support to co-sponsored events.
- Restrict visitors to the designated trails to protect sensitive areas.

*Within 5 years of CCP completion:*

- Improve trail interpretive infrastructure, self-guided trail system materials, and refuge-sponsored tours to ensure messages are consistent about the refuge, its resources, and conservation role at local, regional, and landscape levels.
- Focus on group programs, led by the Service or partner, to better monitor where visitors go and to minimize impacts to refuge resources.
- Participate in developing interpretive and educational materials sponsored by the NPS and other partners that incorporate information about the refuge and its role in the landscape.

Off-refuge programs will depend on staff or partner availability and relationship to refuge's goals and objectives.

### Inventory and Monitoring Activities

- Include monitoring activities in a visitor services plan to assess:
  - \* Visitor use, numbers, and impacts
  - \* Visitor satisfaction
  - \* Capacity limits
  - \* Visitor understanding and support for Refuge System and refuge purposes, and whether that leads to stewardship actions

### Objective 5.2 Hunting

Over the 15-year life of the plan, maintain the current shotgun deer hunt, accommodating approximately 120 hunters annually, but include the flexibility to adjust the total number of hunt days from the current 3 days to 5 days each year to allow for better distribution of hunters over time and space. Coordinate with VDGIF to conduct periodic evaluations of habitat condition and deer herd health and modify hunt program as warranted by results. Also, evaluate opportunities to open the refuge to turkey hunting and initiate a program for youth hunters.

### Discussion and Rationale

The current hunt occurs over a 3-day period, with up to 120 hunters allowed (40 hunters per day). The hunt program is popular and successful. Very rarely we hear concerns with overcrowding; however, with 1,000 acres of huntable and

accessible land, safe spacing for 40 hunters is not a concern. Occasionally, hunters will group around certain locations, but we take all opportunities to advise them to spread out.

Providing the opportunity to increase the number of days for the hunt, as proposed under alternative B, may allow staff to improve the deer hunting experience by better dispersing hunters in time and space. The number of permits issued would remain at 120, effectively reducing the number of hunters per day but spreading them over a slightly longer hunting season. We would coordinate with VDGIF to conduct periodic evaluations of habitat conditions and deer herd health to better understand the impacts of the deer herd on the refuge, as well as modify the hunt accordingly as part of a management strategy.

Two other potential hunting opportunities on the refuge include opening the refuge to turkey hunting and promoting opportunities for youth to hunt. Presently, a turkey hunting program does not exist at the refuge. We recognize that there is public interest in these hunting opportunities; however, we do not currently have quality information on the turkey population. In cooperation with VDGIF, we would acquire information necessary to explore the potential to open the refuge to turkey hunting. Additional NEPA analysis and public involvement would be required before a new hunt could be implemented.

We propose to explore creating hunting opportunities for youth, assuming there is local interest and a local partner identified that is willing to provide mentors, resources, and transportation to the island. Under those conditions, we would support developing deer and/or turkey hunting opportunities for youth. This program could also be integrated into the overall environmental education program, as well as into wildlife observation and interpretation activities. We would also consider offering hunter education programs, including archery.

### **Strategies**

#### *Continue to:*

- Manage the annual 3-day, fall deer hunt on approximately 1,000 acres of the refuge, following State regulations and a few, more strict refuge-specific regulations (e.g., boat docking locations, safety measures). Provide hunters with refuge specific regulations and hunt map to encourage compliance.
- Allow hunters to scout hunting location for four days prior to quota hunter selection and hunting days.
- Require hunters to follow State reporting requirements since refuge does not operation a check station at or near the refuge.
- Receive voluntarily-provided feedback from hunters to improve hunting-related communications for upcoming year.
- Maintain the waterfowl hunting closure.

#### *Within 5 years of CCP completion:*

- Coordinate with VDGIF to conduct a browse study and/or deer herd health evaluation, as well as making modifications to the deer hunting program based on the information acquired.
- Each year, after the refuge hunt, staff will determine whether to extend the deer hunt by two days, for a total of five days, during the regular State season to provide flexibility to improve program implementation.
- Coordinate with VDGIF to acquire turkey population data and evaluate opening the refuge to turkey hunting.

- Evaluate potential opportunities with partners for, and gauge local interest in, offering deer and/or turkey hunting opportunities for youth.
- Evaluate potential opportunities with partners for, and gauge local interest in, offering youth hunter education programs on the refuge.
- Modify hunt program to include either activity, if support and interest warrants level of effort.

#### **Inventory and Monitoring Activities**

- Acquire hunt data from the State's database to monitor hunter access and deer population trends on the refuge.
- Annually conduct hunt monitoring on the refuge to assess quality of the hunt, distribution of hunters, and overall compliance of hunters with State and refuge specific regulations.
- Include monitoring activities in a visitor services plan to assess:
  - \* Hunter satisfaction
  - \* Capacity limits

#### **Objective 5.3 Wildlife Photography and Observation**

Over the 15-year life of the plan, continue to provide visitors with the opportunity to engage in wildlife observation and photography on the existing 3.5-mile trail system, observation platform, and 550-foot boardwalk, through pre-arranged, Service-led pontoon boat tours and at the visitor contact station.

#### **Discussion and Rationale**

Wildlife photography and observation are two of the six priority wildlife-dependent recreational uses to be facilitated in the Refuge System. A Service-led visitor services review (USFWS 2010b) recommended that the refuge expand opportunities for wildlife observation and photography. Ideally, expanded wildlife photography and observation activities conducted on the refuge would positively contribute to appreciation and protection of migratory birds and their habitats, both on- and off-refuge. Many of the same visitors who engage in group programs under objective 5.1 also participate in wildlife observation and photography.

We will partner with NPS to connect with visitors using the Captain John Smith Chesapeake NHT, to expand their wildlife observation opportunities. Visitors will be permitted to use the newly installed boardwalk, which will help minimize impacts. There may be short-term disturbance to common plants and wildlife during some refuge-authorized, off-trail activities, but the use will be monitored by staff and partners for potential impacts and may result in closures to ensure the effort does not result in long-term disturbance to the resource. The visitor services plan will outline methods and measures to track the potential impact of visitors to the refuge.

#### **Strategies**

*Continue to:*

- Allow visitation for wildlife observation and photography, primarily by self-guided tours, if they prearrange (three business days in advance) to obtain a permit. Require people to stay in designated areas.
- Maintain partnerships to provide support for refuge and partner-sponsored events.

*Low impact boardwalk  
through the tidal  
swamp forest*



- Offer periodic, Service-led pontoon boat tours in the James River alongside the refuge.

*Within 5 years of CCP completion:*

- Install a spotting scope to enhance the existing wildlife viewing platforms.
- Partner with NPS to support and enhance compatible wildlife viewing opportunities on the refuge through the Captain John Smith Chesapeake NHT and CDBG.
- Investigate development of wetland observation platform.
- Develop signage that communicates the significance of using designated access points and staying on designated trails for the protection of refuge resources

#### **Inventory and Monitoring Activities**

- Include monitoring activities in a visitor services plan to assess:
  - ✱ Visitor use, numbers, and impacts
  - ✱ Visitor satisfaction
  - ✱ Capacity limits
  - ✱ Visitor understanding and support for Refuge System and refuge purposes; and whether that leads to stewardship actions

### **3.7 Comparison of Alternatives**

Table 3.3 highlights the actions that distinguish alternatives A and B that we present in detail in this chapter. The table is organized to show how the objectives and strategies proposed under each alternative relate to refuge goals, resources, programs, and key issues to allow easy comparison of the alternatives. Also, see table 3.1 at the beginning of this chapter for a summary of the acreage comparisons.

**Table 3.3. Summary Comparison of Alternatives**

“Actions Common to Both Alternatives A and B” (section 3.4) describes many important actions that are not discussed in the table below. Table 3.3 highlights those actions that distinguish the alternatives, how they relate to our goals, and how they address the key issues identified in chapter 1. Please refer to the glossary to interpret any acronyms.

Resource or Program	Alternative A Current Management	Alternative B Service-preferred Alternative
<b>Tidal Swamp Forest</b>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Protect approximately 738 acres of tidal swamp forest for wildlife of conservation concern and migrating and wintering waterfowl.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Plant green ash and bald cypress trees where gaps occur and when resources allow.</li> <li>● Maintain and enforce public access closures on the refuge to reduce disturbance to breeding birds and habitat.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Protect, maintain, and restore approximately 738 acres of tidal swamp forest for priority breeding birds of concern, migrating and wintering waterfowl, and other native wildlife.</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Work with TNC and VDCR Natural Heritage Program to identify reference sites that can be used as regional indicators of quality tidal swamp forest.</li> <li>● Develop an index of forest integrity.</li> <li>● Identify and prioritize additional locations for restoration plantings to promote ecological resiliency.</li> <li>● Partner with VDGIF and refuge neighbors to enhance waterfowl habitat.</li> <li>● Work with VDGIF to identify State waters where access to sensitive areas may be closed during specific seasons.</li> </ul>
<b>Tidal Freshwater Marsh</b>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Protect approximately 189 acres of tidal freshwater marsh to benefit the federally threatened sensitive joint-vetch, priority migrating and wintering waterfowl, and waterbirds.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Prohibit general public access within the tidal freshwater marsh to minimize disturbance to sensitive habitats.</li> <li>● Maintain public access closures on the refuge to reduce disturbance to habitat and breeding birds.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Protect, maintain, and restore approximately 189 acres of tidal freshwater marsh to benefit the federally threatened sensitive joint-vetch, priority breeding and wintering waterfowl, and waterbirds.</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Work with TNC and VDCR Natural Heritage Program to identify reference sites that can be used as regional indicators of quality tidal freshwater marsh.</li> <li>● Partner with VDGIF and refuge neighbors to enhance waterfowl habitat.</li> <li>● Work with VDGIF to identify State waters where access to sensitive areas may be closed during specific seasons.</li> <li>● Identify and prioritize additional locations for potential restoration plantings to promote ecological resiliency.</li> <li>● Survey for rare, threatened, and endangered species and natural communities.</li> </ul>

Resource or Program	Alternative A Current Management	Alternative B Service-preferred Alternative
<b>Aquatic Resources</b>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Help partners promote James River watershed protection and health, and contribute to the recovery of species of conservation concern.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Implement best management practices to minimize potential for increasing sediment load and deposition in the James River.</li> <li>● Plant and maintain vegetated riparian areas and natural habitats.</li> <li>● Support partner efforts to restore federally listed Atlantic sturgeon habitat.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Protect the refuge's tidal creeks and the James River mainstem to benefit aquatic resources of concern and as foraging and resting habitat for waterfowl, waterbirds, and bald eagles.</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Consult with the Service's Virginia Fisheries Coordinators Office for technical assistance regarding survey techniques, tools, and funds available to assess and prioritize potential biological threats to aquatic habitats and species.</li> </ul>
<b>Mature Mixed Mesic Forest</b>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Passively manage approximately 46 acres of mature mixed mesic forest to benefit migratory birds of conservation concern, pollinators, and other native wildlife.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Restrict public access to designated routes to avoid impacts to vegetation.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Actively maintain approximately 46 acres of mature mixed mesic forest to provide breeding and migratory habitat for forest interior dwelling birds of conservation concern and other native wildlife.</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Restore the area to mixed mesic native hardwood forest by controlling invasive species and planting native trees.</li> <li>● Consult forest experts to determine if active management is feasible, practicable, and desirable to enhance conditions. Implement actions if determined reasonable.</li> </ul>
<b>Transitional Mixed Mesic Forest</b>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Manage existing 20 acres of transitional mixed mesic forest to benefit migratory birds of conservation concern and other native wildlife.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Plant native trees along the area 300 feet within the western border.</li> <li>● Protect planted trees with tubes for up to 5 years or as growth warrants.</li> <li>● Work with partners, volunteers, and student groups to aid in the reforestation efforts on the refuge.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Promote native forest succession on approximately 197 acres of existing grassland and shrub habitat which will result in transitional mixed mesic forest over the 15-year life of the CCP.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Allow natural succession of native forest species to continue unabated in grasslands/old field.</li> <li>● Plant native trees and shrub species where native forest succession is inhibited by site conditions or past land use practices and using tubes or other techniques to protect trees.</li> <li>● Expand the current area where native mixed mesic hardwood tree species have been planted in the riparian zone by approximately 22 acres.</li> <li>● Communicate with county, State, and Federal agricultural agencies to stay current with the latest techniques and best management practices to control invasive species, and implement those best management practices that may be feasible and appropriate on the refuge when resources allow.</li> </ul>

Resource or Program	Alternative A Current Management	Alternative B Service-preferred Alternative
Grassland	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Maintain approximately 200 acres of grassland and old field habitat on the refuge to provide habitat for migratory birds of conservation concern and other native wildlife.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Reduce the establishment or spread of early successional tree and shrub species, and invasive, non-native grass species, by mowing trails and around refuge facilities.</li> <li>● Control Johnsongrass by various means.</li> </ul>	<ul style="list-style-type: none"> <li>● No grasslands habitat would be managed for wildlife under alternative B.</li> <li>● Approximately 46 acres of grasslands would be maintained for administrative, interpretive, or educational purposes and would be concentrated around refuge facilities. These grasslands would have limited habitat value for wildlife.</li> </ul>
River Escarpment	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Protect 11 acres of river escarpment from further erosion.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Discuss with USACE strategies for solving erosion problems.</li> <li>● Plant native vegetation and control invasive plants using herbicides and mechanical treatments.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Enhance and protect 11 acres of river escarpment to benefit species of conservation concern, as well as to protect cultural resources and reduce erosion.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Partner with the USACE and local industry to investigate ways to stabilize the actively eroding river escarpment and the existing bulkhead, primarily the area along the refuge's south and west borders.</li> <li>● Work with TNC and VDCR Natural Heritage Program to identify reference sites for river escarpment.</li> <li>● Develop and implement a shoreline management plan if feasible options are identified, and perform additional NEPA review, public involvement, and National Historic Preservation Act compliance if required.</li> </ul>
Cultural Resource Protection	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Protect known archaeological sites to avoid unintended impacts.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Prevent public access to locations of the refuge where cultural resources are susceptible to degradation.</li> <li>● Protect cultural resources through outreach and enforcement.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Provide increased cultural resource protection throughout the refuge to avoid unintended impacts.</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Work with RHPO to develop and sponsor a proactive, National Historic Preservation Act Section 110 initiative at the refuge.</li> <li>● Partner with the SHPO, Tribal representatives, USACE, and other stakeholders with cultural resource interests and Federal trust responsibilities to develop strategies that emphasize prevention and mitigation of significant cultural resource loss.</li> <li>● Integrate cultural resource protection efforts into other refuge programs, such as cultural resource interpretation and education.</li> <li>● Complete a formal Phase I field investigation and conduct a walkover survey of the entire refuge to evaluate ground surfaces for historic landscape features and record the rural landscape of refuge lands prior to Service acquisition.</li> <li>● Promote the significant cultural resources through signage and publications and consider developing interpretive trails to enhance the visitor experience.</li> </ul>

Resource or Program	Alternative A Current Management	Alternative B Service-preferred Alternative
<p><b>Cultural Resource Conservation/Heritage</b></p>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Increase our knowledge and understanding of the refuge’s cultural resources and history.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Maintain partnerships with local, regional, and State experts on the history of the area.</li> <li>● Maintain museum collections and archival materials.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Protect, conserve, and research the refuge’s cultural resources to expand our understanding of the area’s rich cultural history.</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Protect and conserve museum collections and archival materials in accordance with applicable standards.</li> <li>● Collaborate with RHPO and Tribal representatives to develop and sponsor a proactive National Historic Preservation Act Section 110 initiative for improved inventory of archaeological resources.</li> <li>● Consult with the SHPO, Tribal representatives, and other stakeholders with cultural resource interests to explore opportunities to partner for the preservation, conservation, and research of the refuge’s artifacts and museum properties collections and to develop interpretive experiences that offer the indigenous perspective.</li> <li>● Evaluate the current museum properties collection to assess potential to include artifacts or reproductions into interpretive exhibits or educational programs.</li> <li>● Explore potential partnership opportunities with institutions that would allow loan of artifacts for research or educational purposes.</li> <li>● Coordinate with local law enforcement offices to develop effective management, communications, and documentation protocols.</li> </ul>
<p><b>Environmental Education – On-Refuge</b></p>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Conduct and support on-refuge environmental education programs that attempt to meet State standards of learning and that discuss the purpose of the refuge and the mission of the Service and Refuge System.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Partner informally with JRA, local schools, the local Audubon chapter, VA Master Naturalist Program, and VDGIF educators.</li> <li>● Conduct up to two teacher in-service training events and support VCU summer teacher program by hosting one program on the refuge annually.</li> <li>● Fulfill requests to offer environmental education programs on the refuge approximately up to two times per year.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Provide quality environmental education programs on the refuge with specific learning objectives and diverse opportunities that (1) meet State standards of learning, (2) promote conservation and restoration priorities of the refuge and Chesapeake Bay watershed, (3) support the mission of the Service and Refuge System, and (4) provide stewardship opportunities to participants.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Work with JRA to establish the James River Ecology School, to develop and implement environmental education programs that integrate Virginia State Standards of Learning requirements, as appropriate by age group; convey the refuge purposes, vision, and goals for management; and promote the Captain John Smith Chesapeake NHT and CBGN, in conjunction with our MOU with the NPS.</li> <li>● Conduct up to two teacher in-service training events and support VCU summer teacher program by hosting up to four programs on the refuge annually.</li> <li>● Fulfill requests to offer environmental education programs on the refuge, up to two times per year, which may not be associated with the Ecology School.</li> </ul>

Resource or Program	Alternative A Current Management	Alternative B Service-preferred Alternative
<p><b>Environmental Education – Student Participation</b></p>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Provide environmental education opportunities for up to 120 individuals (primarily local school and youth groups) annually using existing refuge facilities.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● In partnership with the JRA, maintain an annual enrollment of approximately 120 students engaged in environmental education programs on the refuge.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Increase environmental education opportunities for up to 2,000 students (primarily from underserved and urban areas) annually using existing and new facilities on and adjacent to the refuge.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Develop an outreach plan with JRA to expand interest from urban and underserved schools.</li> <li>● Develop and maintain classroom facilities and overnight accommodations that are safe, accessible, well-maintained, and reasonably comfortable for students, many of whom may be unaccustomed to outdoor, overnight experiences.</li> </ul>
<p><b>Environmental Education – Off-Refuge</b></p>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Conduct environmental education programs and events off-refuge, approximately two times per year, in response to requests from schools or as part of community events.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Participate in community events as relevant.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Expand the off-refuge environmental education programs and events to up to four times per year, working with other agencies and organizations.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Explore opportunities to create a refuge Friends group that can support the expanded off-refuge environmental education program.</li> <li>● Coordinate and collaborate with the NPS through the Captain John Smith Chesapeake NHT and CBGN, participating in the development of environmental education materials that discuss the refuge’s natural and cultural resources, land conservation, public access, and citizen stewardship.</li> <li>● Participate in workshops, seminars, and field trips as invited and staff resources allow.</li> <li>● Develop a series of traveling educational exhibits that explain the unique cultural resources and historic landscape of the refuge.</li> </ul>
<p><b>Interpretation</b></p>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Reach approximately 400 people each year through on- and off-refuge interpretive programs that emphasize the natural and cultural resources of the refuge.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Maintain existing refuge interpretive programs and materials. Fulfill requests for interpretive information on a case-by-case basis.</li> <li>● Work with individual groups on events on a case-by-case basis.</li> <li>● Restrict visitors to the designated trails to protect sensitive areas.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Enhance existing interpretive programs, displays, and materials to increase participation to 480 people each year (approximately 20 percent over existing levels).</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Improve trail infrastructure, self-guided trail system materials, and refuge-sponsored tours to ensure messages are consistent about the refuge, its resources, and role at local, regional, and landscape levels.</li> <li>● Focus on group programs, led by the Service or partners, to better monitor where visitors go and minimize impacts to refuge resources.</li> <li>● Participate in developing interpretive and educational materials sponsored by the NPS and other partners that incorporate information about the refuge and its role in the landscape.</li> </ul>

Resource or Program	Alternative A Current Management	Alternative B Service-preferred Alternative
<p><b>Hunting</b></p>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Implement the annual 3-day shotgun deer hunt in the fall for a maximum of 120 hunters (40 hunters per day) on approximately 1,000 acres of the refuge, following State regulations and refuge-specific regulations.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Require hunters to follow State reporting requirements.</li> <li>● Receive voluntarily-provided feedback from hunters to improve hunting-related communications for upcoming year.</li> <li>● Maintain waterfowl hunting closure.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Accommodate the same number of hunters (120) annually, but provide flexibility for the total number of hunt days to be increased to five days each year to allow for better distribution of hunters over time and space.</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Coordinate with VDGIF to conduct periodic evaluations of habitat condition and deer herd health and modify hunt program based on the information acquired.</li> <li>● Coordinate with VDGIF to acquire turkey population data and evaluate opportunities to open the refuge to turkey hunting.</li> <li>● Evaluate potential opportunities with partners for, and gauge local interest in, offering deer and/or turkey hunting opportunities for youth, and youth hunter education programs.</li> <li>● If support and interest warrants level of effort, modify hunt program to include either activity.</li> </ul>
<p><b>Wildlife Photography and Observation</b></p>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Provide visitors with the opportunity to engage in wildlife observation and photography on the existing 3.5-mile trail system, observation platform, and 550-foot boardwalk through pre-arranged, Service-led pontoon boat tours, and at the visitor contact station.</li> </ul> <p><u>Strategies:</u></p> <ul style="list-style-type: none"> <li>● Allow self-guided tours for visitors with permits. Require people to stay in designated areas.</li> <li>● Maintain partnerships to provide support for refuge and partner-sponsored events.</li> <li>● Offer up to six periodic Service-led pontoon boat tours in the James River.</li> </ul>	<p><u>Objective (abbreviated):</u></p> <ul style="list-style-type: none"> <li>● Provide visitors with the opportunity to engage in wildlife observation and photography on the existing 3.5-mile trail system, observation platform, and 550-foot boardwalk through pre-arranged, Service-led pontoon boat tours, and at the visitor contact station.</li> </ul> <p><u>Strategies (in addition to alternative A):</u></p> <ul style="list-style-type: none"> <li>● Install a spotting scope to enhance the existing wildlife viewing platforms.</li> <li>● Partner with NPS to support and enhance compatible wildlife viewing opportunities on the refuge through the CAJO and CBTN.</li> <li>● Investigate development of wetland observation platform.</li> <li>● Develop signage that communicates the significance of using designated access points and staying on designated trails for the protection of refuge resources.</li> </ul>