

## Chapter 3



Cyrus Brame/USFWS

*Bald eagle nest tree*

## Alternatives

- 3.1 Introduction**
- 3.2 Formulating Alternatives**
- 3.3 Actions Common to All Alternatives**
- 3.4 Alternative A. Current Management (No-action Alternative)**
- 3.5 Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)**
- 3.6 Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities**
- 3.7 Comparison of Alternatives**

## 3.1 Introduction

This chapter describes:

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

At the end of this chapter, table 3.3 compares how the three 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” (USFWS 2011a).
- Adhere to Service policies and mandates.
- Address key issues.
- Incorporate sound principles of fish and wildlife science.

Different approaches to meeting refuge management goals are explored through the CCP development process. Through this process, we explore a range of reasonable alternatives that may allow a refuge to achieve its purpose and goals, as well as the Refuge System mission.

The Council on Environmental Quality (CEQ) has provided 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,” which CEQ has defined as those that are economically and technically feasible, and show evidence of common sense. Alternatives or elements of alternatives that could not be implemented, if they were chosen, for economic or technical reasons or do not resolve the need for action and fulfill the stated purpose in taking action to a large degree, are therefore 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. All alternatives address these same goals, which are first presented in chapter 1.

#### Objectives

The objectives we developed are incremental steps toward achieving a goal. Objectives 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 2004d) for writing “SMART” objectives that possess five characteristics:

- Specific.
- Measurable.
- Achievable.
- Results-oriented.
- 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 would guide development of refuge step-down plans, described 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 would evaluate most of them further as to how, when, and where we should implement them when we write our refuge step-down plans. We would measure our successes by how well our strategies achieve our objectives and goals.

#### Inventory and Monitoring Activities

For most objectives, we also identify inventory and monitoring activities that would help us measure our success toward meeting refuge goals and objectives. The activities listed would be further refined in the refuge’s inventory and monitoring plan to be developed after final CCP approval.

### 3.2.2 Developing Alternatives, Including the “No-action” Alternative

In this chapter, we fully analyze three alternatives that characterize different ways of managing the refuge over the next 15 years. We believe they represent a reasonable range of alternative proposals for achieving the

refuge purpose, vision, and goals, as well as addressing the issues described in chapter 1. Unless otherwise noted, refuge staff would implement all actions. The three alternatives are summarized in a matrix at the end of this chapter (table 3.3).

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

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. Our descriptions of those 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 alternatives B and C. Both alternatives B and C were developed in accordance with current and applicable laws, regulations, and Service policy manuals and guidance handbooks, as described in chapter 1. Both alternatives B and C also incorporate the principles of strategic habitat conservation and priority species management, as both reflect the most recent advances in the fields of conservation science and delivery of conservation actions on the ground by the Service.

Alternatives B and C involve different approaches to achieve refuge purpose, vision, and goals, and respond to public needs. We defined both alternative B and C following the selection of priority refuge species and habitats. Appendix A describes how we selected the priority refuge species and habitats, including how we considered Federal and State endangered and threatened species, as well as Virginia WAP species.

### 3.2.3 Comparison of the Alternatives

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 all alternatives are detailed in section 3.3.

Under alternative A, we would continue to maintain the 2,653 acres of pine-dominated forest on the refuge. The management focus would remain on protecting this habitat for nesting and roosting bald eagles and other native species that use this habitat. Minimal maintenance of the refuge’s moist hardwood forest, floodplain forest, freshwater marsh and shrub, aquatic, and erosional bluff habitats would occur. We would continue to maintain 13 acres of non-forested upland for administrative purposes. Deer hunting would continue to be the primary public use on the refuge, and we would not open the refuge to other hunting opportunities or recreational fishing. Persons or groups interested in visiting the refuge would continue to be encouraged to participate in planned refuge- or partner-sponsored programs or required to acquire a permit to visit the refuge three business days in advance of the planned visit date. We would continue to work with existing refuge partners.

Under alternative B, we would work toward transforming the majority of the

refuge from a pine-dominated forest towards a mature pine savanna, providing an open midstory and savanna understory to support cavity nesting and ground nesting species that are dependent on pine savanna habitat. We would expand public use opportunities to provide more deer hunting opportunities, open the refuge for turkey hunting, and provide for youth deer, turkey, and waterfowl hunting. We would open the refuge for fishing at two designated locations. We would also designate a public use area to allow more open visitor access for wildlife observation, photography, environmental education, and interpretation, including expanding the current nature trail into a 3-mile nature trail. To support expanded public uses and biological research opportunities, we would work to expand current partnerships and form new ones.

Under alternative C, we would promote the transition of the majority of the refuge from a pine-dominated forest towards a dry hardwood forest composed of oak, hickory, and pine trees, providing habitat for species dependent on dry hardwood forest habitat features. We would expand non-forested upland acres to provide habitat for grassland-dependent bird species. Under alternative C, we would expand public use opportunities to provide more deer hunting opportunities, open the refuge for turkey hunting, and provide for youth deer, turkey, and waterfowl hunting. Because thinning and prescribed burns would not be conducted in the long term under alternative C, more refuge area would be available for public uses, expanding the locations for where these opportunities would occur. We would allow for fishing at three designated locations. We would also designate public use areas to allow more open visitor access for wildlife observation, photography, environmental education, and interpretation. In addition to expanding the current nature trail into a 3-mile nature trail, we would also open a 2-mile wildlife drive in the southeast portion of the refuge. To support expanded public uses and biological research opportunities, we would work to expand current partnerships and form new ones.

Table 3.1 compares the acreages of the habitat types under the different alternatives. We include a habitat and public use maps for each alternative to illustrate the similarities and differences among the three alternatives (maps 3.1 through 3.9).

Table 3.2 compares the visitor services offered annually under the different alternatives.

**Table 3.1 Comparison of Habitat Type Acreages<sup>1</sup> to be Managed, by Alternative, on James River NWR**

Habitat Type	Alternative A	Alternative B	Alternative C
Pine-dominated Forest	2,653 acres	2,651 acres	0 acres
Transitional Dry Hardwood Forest	0 acres	0 acres	2,609 acres
Moist Hardwood Forest	775 acres	775 acres	775 acres
Floodplain Forest	633 acres	633 acres	633 acres
Freshwater Marsh and Shrub Swamp	82 acres	82 acres	82 acres
Aquatic Habitats	17 acres	17 acres	17 acres
Erosional Bluff	3 shoreline miles	3 shoreline miles	3 shoreline miles
Non-forested Upland	13 acres	15 acres	57 acres
<b>Total Habitat Acres</b>	<b>4,173 acres</b>	<b>4,173 acres</b>	<b>4,173 acres</b>
<b>Total Refuge Acres</b>	<b>4,324 acres</b>	<b>4,324 acres</b>	<b>4,324 acres</b>

<sup>1</sup> Acreages estimated from Geographic Information System (GIS) and rounded up to nearest whole number. The difference in

habitat acres and total refuge acres occurs because boundaries that were used for habitat mapping project are not identical with the data held in our reality files. Total habitat acreages do not include 2 acres of developed lands (e.g., roads, buildings) because they are not considered habitat.

**Table 3.2 Comparison of Visitor Services Offered Annually, by Alternative, on James River NWR**

Visitor Services Offered		Alternative A	Alternative B	Alternative C
Public Deer Hunting	Number of Hunter Use Days Accommodated Annually			
	Archery	950	950	1,200
	Muzzleloader	140	210	280
	Shotgun	280	280	280
	Fall - Youth	none	20	20
Public Turkey Hunting	Number of Hunter Use Days Accommodated Annually			
	Spring - Adult	none	60	240
	Spring - Youth	none	20	20
	Fall - Adult	none	1,160	1,480
	Fall - Youth	none	20	20
Waterfowl Hunting	Youth	none	40	40
Fishing	Designated Locations	none	Two locations along Powell Creek to accommodate up to 1,460 anglers annually	Three locations along Powell Creek to accommodate up to 2,190 anglers annually
Wildlife Observation, Photography, Environmental Education, and Interpretation	Designated Public Use Areas	One area: 0.5-mile trail along Powell Creek, including kiosk at trailhead (near Rt. 639)	One area: 3-mile trail along Powell Creek	Three areas: - 3-mile trail along Powell Creek - Northern terminus of Rt. 640 - 2-mile wildlife drive on Hunter Circle Rd
	Permits	Required with three business days' notice	Required with three business days' notice until further notice. Completion of infrastructure improvements is a prerequisite to eliminating permit requirement for designated public use area from sunrise to sunset. Permit required for all other areas.	Required with three business days' notice until further notice. Completion of infrastructure improvements is a prerequisite to eliminating permit requirement for designated public use area from sunrise to sunset. Permit required for all other areas.
	Refuge- or partner-sponsored boat trips	Infrequent (one in last 5 years)	Up to two annually	Up to four annually
	Interpretive programs conducted on- and off-refuge	Opportunistic participation as staff allows (two on-refuge annually and two off-refuge annually)	Opportunistic participation as staff allows (up to three on-refuge annually and three off-refuge annually)	Opportunistic participation as staff allows (up to three on-refuge annually and three off-refuge annually)

### 3.2.4 Service-preferred Alternative

In accordance with CEQ guidance to do so, we identified in this draft CCP and EA that one of our alternatives would best fulfill our agency's statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors. We identified alternative B as the Service-preferred alternative because it 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 feasibly implemented in accordance with applicable laws, regulations, policies, and guidance.

### 3.2.5 Alternatives or Elements Considered but Eliminated from Detailed Study

As mentioned previously, alternatives to be analyzed should be reasonable. Unreasonable alternatives or elements of alternatives may be those that cannot be implemented for technical or logistical reasons; that do not meet mandates; that are inconsistent with carefully considered, up-to-date refuge statements of purpose and significance or management objectives; that have severe environmental impacts; or are unreasonably expensive.

We considered the following suggestions from public comments but dismissed them from further consideration.

#### **Close the Refuge to Public Hunting**

Public comments suggested that refuges, such as James River NWR, be closed to public deer hunting and not offer any other public hunting opportunities.

As detailed in chapter 2, public deer hunting is a historic, appropriate, and compatible use on the refuge that has been accounted for in refuge planning documents and refuge-specific regulation revisions published in the *Federal Register* and in Title 50 of the CFR. Closing the refuge to hunting would also conflict with the Refuge Improvement Act which provides that hunting is an appropriate and priority use of the Refuge System, shall receive priority consideration in refuge planning and management, mandates that hunting opportunities should be facilitates when feasible, and directs the Service to administer the Refuge System so as to “*provide increased opportunities for families to experience wildlife-dependent recreation, particularly opportunities for parents and their children to safely engage in traditional outdoor activities, such as fishing and hunting.*” Thus, closing the refuge to public deer hunting was not carried forward for further analysis.

In accordance with Service policy, we updated the refuge’s compatibility determination for hunting opportunities analyzed in this draft CCP and EA. The compatibility determinations hunting focuses on public deer hunting and provides specific information regarding where, when, why, and how this use would be conducted on the refuge to ensure that this use would not materially interfere with or detract from the fulfillment of the Refuge System mission or

the refuge's purpose. We provided detailed analyses of impacts associated with allowing this use in chapter 4 and the compatibility determination included in appendix B of this draft CCP and EA. Expanding the existing hunt program and adding new hunting opportunities for adults and youth requires additional NEPA review, and planning for these changes is anticipated to be initiated within 5 years of CCP approval.

#### **Open the Refuge to Public Small Game Hunting**

Public comments suggested that refuges, such as James River NWR, open to opportunities for the public to hunt small game species.

The VDGIF defines small game species to include crow, groundhog, grouse, quail, pheasant, rabbit, and squirrel. Harvest seasons of these species range from late August through early March with an additional few weeks open for squirrels in June. Though the Service recognizes and supports hunting as an important wildlife-dependent recreation, the long hunt seasons for small game would interfere with other hunting opportunities, limit other wildlife-dependent recreational opportunities, and require more staff time for administration than is available. In addition, there would be conflicts with many of the habitat management strategies discussed in all alternatives in this plan including prescribed fire and timber operations. Therefore, we dismissed further discussion of hunting seasons for these species on the refuge at this time.

#### **Open the Refuge to Public Coyote Hunting**

Public comments suggested that refuges, such as James River NWR, open to public coyote hunting.

Virginia classifies the coyote as a nuisance wildlife species. Refuge staff manages them as a nuisance species and not a game species. At this time, there is no evidence that the coyote population on the James River NWR is causing damage to the habitat or to native wildlife populations. For this CCP, we dismissed further discussion of coyote hunting on the refuge. Refuge staff will continue to monitor this population and will adjust management plans in accordance with adaptive management principles if necessary.

#### **Do Not Open to Fishing from the Refuge's Shoreline**

Public comments suggested that refuges, such as James River NWR, remain closed to public fishing opportunities along the refuge's shoreline.

The purpose of this CCP is to develop a strategic course of action that achieves the refuge's goals as presented in chapter 1. Fishing 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 the Refuge Improvement Act and the Service's Compatibility policy, the Service shall facilitate these uses where found to be compatible and ensure that other public uses do not interfere with our ability to provide quality, wildlife-dependent recreational uses.

Since our planning team determined that recreational fishing could be offered on the refuge at designated locations, we developed management objectives, strategies, and inventory and monitoring activities for fishing into alternatives B and C. We provided a detailed analysis of impacts associated with allowing fishing from the refuge's shoreline in chapter 4.

### **Construct a Vehicular Tour Route along the James River**

Public comments suggested the construction of a new “river drive” along the south side of the James River, which could potentially start at Route 156 in Charles City to the Williamsburg barge at Surry.

An existing auto tour route, referred to as the “John Smith’s Adventures on the James,” circles the river on both sides. This auto tour follows two scenic byways (State Routes 5 and 10) and the 23-mile Colonial Parkway (<http://206.113.151.20/johnsmithtrail/default.asp?loop=james>; accessed June 2014). The auto route is divided into three driving loops, which correspond to one day’s journey in a small watercraft. The combination of exploring the James River by boat and car offers ample opportunity to enjoy the river without needing a new impervious transportation corridor through the refuge’s wildlife habitat. Therefore, we dismissed development of a new river drive through the refuge from further analysis.

### **Construct a Public Boat Ramp for Motorized Watercraft**

Public comments suggested the construction of public boat ramp for motorized watercraft to increase public access to the James River. A public boat ramp would allow for vehicles with trailered boats driven along a road down to the waterway. Parking for the vehicle and trailers on the refuge would also be needed to support use of a public boat ramp.

Construction and use of a public boat ramp, road, and parking for vehicles with boat trailers on the refuge would result in a marked increase of impervious surface on the refuge, increase stormwater runoff and pollutants into adjacent waterways, and promote the spread of invasive aquatic species. The noise generated by non-electric, two- and four-stroke engines would disturb nesting and roosting bald eagles on the refuge, resulting in a direct conflict with the refuge’s purpose. This type of boating noise would also degrade opportunities to view a diversity of wildlife and substantially alter the peaceful, naturally quiet soundscape along the refuge’s shoreline. Therefore, we dismissed construction of a public boat ramp for motorized watercraft on the refuge from further analysis.

### **Creation of a Firing Range on the Refuge**

Public comments suggested that a public outdoor firing range be created on the refuge.

In accordance with the Service’s Appropriate Refuge Use policy, the Refuge Manager has determined that the establishment and operation of a public firing range on the refuge is not appropriate because the use does not meet the Service’s definition as a wildlife-dependent recreational use and does not contribute to the fulfillment of the refuge purpose, goals, or objectives as described in this draft CCP and EA. Additionally, the use of a firing range is not consistent with Service policy on secondary uses and would divert existing and future resources from accomplishing priority tasks. It also presents unacceptable levels of risk from the potential negative impacts on sensitive habitats, migratory birds, and other wildlife species, and could present conflicts with other refuge users. The finding of appropriateness documentation for this use is included in appendix B of this draft CCP and EA.

### 3.3 Actions Common to All Alternatives

All of the alternatives share some common actions. These actions are current practices or policies that would continue under all 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 are those 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.
- Refuge revenue sharing payments.
- Special designation areas.
- Additional NEPA analysis.

It is important here to re-emphasize 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 above current budget allocations and, as such, should be viewed as strategic in nature. Congress determines our budgets annually, which are then distributed through our Washington and regional offices before arriving at field stations. 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.

#### 3.3.1 Refuge Staffing and Administration

All 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 biological science technician, and maintenance worker, identified in appendix C of this CCP and EA as well as in appendix C of the Rappahannock River Valley NWR draft CCP and Presquile NWR draft CCP (USFWS 2007b and 2012b, respectively).

##### *Discussion and Rationale*

In 2000, a decision was made by the Service to administratively group James River NWR with Rappahannock River Valley and Presquile 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 maximum extent possible, due to declining budgets. The refuge manager for the refuge complex is responsible for setting staff priorities and resource distribution across the four refuges.

In 2007, our Regional Directorate completed the “*Strategic Workforce Plan for the National Wildlife Refuge System in Region 5*” (Phase 2; January 16, 2007) to support a new base budget approach. The goal of the plan is a maximum of 75 percent of a refuge station budget to cover salaries and fixed costs, while the remaining 25 percent or more would be operating and maintenance funds. 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 2007b). Increasing refuge complex staff by three would help support management on James River NWR, including increased visitor services opportunities and management of the natural and built facilities on the refuge. The three new positions would be allocated across each of the four refuges as needed to ensure efficient operation and management throughout the refuge complex.

Our strategy is to improve the capability of each refuge manager to do the highest priority work, and not to have most of a refuge budget tied up in inflexible fixed costs. This strategy was successful for a few fiscal years; however, we now anticipate a level or declining budget environment, which will affect our flexibility in managing financial resources and may have implications for the level of permanent staffing. A new round of workforce planning began in 2013 in response to the Federal Government’s sequestration directive and anticipated future budget reductions.

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

Until further notice, 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 who participate in the refuge’s deer hunts or made advanced reservations to participate in a refuge program, partner-sponsored event, or conduct a visit are allowed access to the refuge. People interested in visiting the refuge outside of refuge-or partner-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 issue a special use permit that visitors are required to carry a copy of while on the refuge. Requiring permission to visit the refuge 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.
- Provides a mechanism for law enforcement to prevent people from beaching their boat on the fragile shoreline and engaging in other unauthorized uses.

This practice would continue under all alternatives until a VSP is approved and signage and visitor support facility improvements are completed. Improvements of the existing 0.5-mile trail, parking, restroom, and development of the refuge's VSP are needed prior to relaxing the refuge's permit requirement for wildlife observation, photography, environmental education, interpretation, and fishing in the designated public use area. As discussed in the "Refuge Step-down Plans" section below, we would complete the signage installation, facility improvements, and VSP within 5 years of CCP approval. If the VSP includes proposals for modifying existing visitor service facilities and/or additional visitor service improvements, additional NEPA and approvals may be necessary prior to implementing those actions. We anticipate that NEPA analysis and implementation of facility improvements or other improvements needed to support appropriate and compatible uses on the refuge would be completed 5 to 10 years after CCP approval.

Permit availability (i.e., the number of permits issued) is not a concern and is not predicted to become a major concern over the next 5 years. Very few permit requests are denied annually and are denied in accordance with Service policy (603 FW 2).

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

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

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

#### *Discussion and Rationale*

The Service uses CCPs to detail the "what, why, and how" of refuge management priorities that would be explored further in step-down plans, which detail the "how, where, and when" we would accomplish the refuge's goals and objectives. Step-down plans would be prepared in accordance with Service guidance, handbooks, and the refuge's final CCP. As discussed in chapter 1, we have completed some step-down plans for the refuge. We would develop new plans and revise existing plans once the final CCP is approved. The following three step-down plans are a priority for completion on James

River NWR. Under each description, we identify a timeline for their completion.

Habitat Management Plan: A HMP for the refuge is the requisite first step to achieving the objectives of the biological goals, goals 1 and 2, for any of the alternatives (USFWS 2013c). We would complete an HMP within 5 years of CCP approval. The HMP would 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 would detail the specific areas and habitat types we would manage for, as well as the tools and techniques we would use and the timing of our management actions. Additional analysis of the impacts of specific methods may be necessary to fulfill our responsibilities under NEPA. The HMP would also incorporate the results of appendix A, which identifies how we derived priority refuge species and habitats for the refuge. We would not prepare a separate Forest Management Plan because the HMP would serve the same purpose for this refuge.

The goals, objectives, and strategies in this CCP 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 would be updated as new, credible information becomes available. To facilitate our management, we would regularly maintain our databases, including Geographic Information Systems (GIS) data, documenting any major vegetation changes on at least a 5-year basis.

Inventory and Monitoring Plan: The IMP would 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 IMP would be completed within 5 years of completing the HMP. We would use our inventory and monitoring program to assess whether our original assumptions and proposed management actions are supporting the refuge's habitat and species objectives, as well as Service priorities at the regional, flyway, and landscape scales. The results of inventories and monitoring would provide us with more information on the status of our natural resources and allow us to make more informed management decisions. The IMP would 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 VSP is required by Service policy (605 FW 1, Section 1.8.A) and, along with the HMP, is among the highest priority step-down plans for all refuges (USFWS 2013c). Exhibit 1 of that policy includes an outline for the plan. The VSP would further detail strategies to help meet the visitor services goals and objectives contained in the refuge's CCP over the next 15 years, including finding ways to increase the understanding and appreciation for fish and wildlife conservation by urban audiences (<http://americaswildlife.org/wp-content/uploads/2012/04/Recommendation-131.pdf>; accessed September 2013). We would complete a VSP within 5 years of CCP approval. If the VSP includes proposals for modifying existing visitor service facilities and/or additional visitor service improvements, additional NEPA and approvals may be necessary prior to implementing those actions.

We anticipate that NEPA analysis and implementation of facility improvements or other improvements needed to support appropriate and compatible uses on the refuge would be completed 5 to 10 years after CCP approval.

#### **Known and Potentially Hazardous Materials**

Conduct an ecological risk assessment at former skeet range.

##### *Discussion and Rationale*

As discussed in section 2.10.4, a 25-acre skeet range exists on present-day refuge land and refuge staff are working with our Ecological Services Virginia Field Office to assess the extent and nature of the contamination associated with the former skeet range. The site characterization will consist of conducting a field reconnaissance, designing a sampling plan (i.e., surficial soil samples collected either through a sampling grid or transect design), implementing this plan, and comparing analytical results to ecological soil screening levels for contaminants to evaluate potential risk to ecological receptors. If ecological risk is confirmed, remedies to mitigate this risk will be evaluated.

The primary constituent of concern associated with the former skeet range is from the lead shot. Firing of lead shot can create lead dust, which can be carried off site by either wind or water erosion. The heat of firing projectiles can also atomize lead into vapor, which can precipitate or condense on soil particles at the firing line. The normal operation of a range can produce lead concentrations of several percent (1 percent = 10,000 ppm) in soils located behind and adjacent to targets and impact areas within the range.

Lead is a particularly hazardous element for fish and wildlife resources. The ecological and toxicological aspects of lead in the environment have been extensively studied and reported in the scientific literature (Eisler 1988). Lead concentrates in organic-rich soils and may be mobilized through exposure to acidic rainwater and groundwater (USEPA 2001). Lead is neither essential nor beneficial to living organisms, and measured effects to biota are adverse (Eisler 1988). It is toxic in most of its chemical forms. In plants, excessive lead levels can cause growth inhibition, as well as reduced photosynthesis, mitosis, and water absorption (Demayo et al. 1982). In animals, lead is a nonspecific toxicant at the molecular level and inhibits the activities of many enzymes necessary for normal biological functions (Pattee and Pain 2003). Mortality, neurological dysfunctions, immune suppression, and reproductive impairment are documented effects of lead exposure in birds (Kendall et al. 1996). Lead can be incorporated into the body by inhalation, ingestion, dermal absorption, and placental transfer to the fetus. An accumulative metabolic poison, lead affects behavior as well as the vascular, nervous, renal, and reproductive systems. Lead is known to be fetotoxic and teratogenic. Ingestion of lead-contaminated soil and prey are principal pathways for wildlife exposure (Kendall et al. 1996, Pattee and Pain 2003). Lethal or sublethal effects depend on lead absorption and distribution within the body and other factors including age, sex, environment, and diet (Pattee and Pain 2003).

#### **Facilities Maintenance**

Continue to address the refuge's maintenance backlog of high priority maintenance and construction projects.

*Discussion and Rationale*

Periodic maintenance and renovation of existing facilities would 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 RONS and Service Asset Maintenance Management System (SAMMS) databases would be undertaken in accordance with the regional and refuge rankings for each project (see appendix D).

As we undertake these projects, 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. We would conduct further consultations, as warranted, to ensure compliance with Federal laws such as the NHPA and the ESA. We would also work to ensure compliance with the enforceable policies of the Virginia Coastal Management Program for consistency with the Coastal Zone Management Act of 1972 (see appendix F); to acquire required permits prior to commencing with projects; and to ensure that the Service and its agents use appropriate and required mitigation measures if required during project implementation.

CEQ guidelines for implementing NEPA also require examining energy requirements and conservation potential in environmental documents. For any of the alternatives, we would meet these guidelines by incorporating principles of sustainability in the design, construction, and operation of existing and new facilities constructed on the refuge.

**Rights-of-way Easements**

Continue to coordinate with right-of-way easement holders regarding maintenance activities.

*Discussion and Rationale*

While purchasing land to complete the refuge boundary, the Service has acquired land with reserved rights, rights-of-way, leases and other agreements. Currently there are three easements for electricity and power service on lands now included within the refuge. The refuge would follow policy guidance when any of these reserved rights are exercised. Specifically we follow 50 CFR 29.21-9, as well as ensure compliance under the refuge compatibility policy (603 FW 2) and biological integrity, diversity and environmental health policy (601 FW 3). Depending on the location and the extent of disturbance required to exercise reserved rights on refuge lands, other laws may apply. In general, the refuge would coordinate with all private parties exercising their rights to ensure the protection of refuge resources. The refuge would issue special use permits (SUP) as necessary to manage these uses and to ensure that impacts to refuge resources are as minimal as possible.

**3.3.2 Species and Habitat Conservation**

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

**Protecting Federally Listed and Recently De-listed Species**

Continue to protect and enhance bald eagle nesting and roosting habitat throughout the refuge forests by protecting active bald eagle nests (independent of habitat type), as well as providing and maintaining communal nocturnal roost and feeding habitat in a condition capable of supporting a

minimum of 150 bald eagles.

Protect and enhance existing habitat throughout the refuge for federally listed species found to exist on the refuge.

*Discussion and Rationale*

The bald eagle was removed from the Federal list of threatened and endangered species in 2007 and removed from the State list in 2013. However, the bald eagle continues to be protected federally under BGEPA and the MBTA. We would continue to protect nesting bald eagles and their habitat on the refuge under all alternatives because their protection was the primary purpose for establishing the refuge. There are currently five nesting bald eagle pairs on the refuge, and we would continue to monitor the nests and breeding activities and prohibit the public from disturbing them. Each alternative provides for bald eagle habitat to be protected and promoted.

Under all alternatives, we would continue to protect federally listed and recently de-listed species as follows:

- Bald eagles:
  - ❖ Protecting and enhancing the active nests on the refuge, while improving the habitat to a condition that would support additional nesting pairs.
  - ❖ Protecting and enhancing the existing nocturnal roost and feeding roost habitat on the refuge, while improving the habitat to a condition that would support additional roost areas.
  - ❖ Continually identifying, protecting, and enhancing potential nest and roost trees to ensure that high quality habitat would continue to exist within the refuge.
- Sensitive joint-vetch and small whorled pogonia:
  - ❖ In cooperation with the VDCR Natural Heritage Program, continue to survey for these species. If located, we would work with the respective species' recovery lead and other experts to develop plans to protect them.

**Adaptive Management**

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

*Discussion and Rationale*

All alternatives would 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 provides the following definition for adaptive management (U.S. Department of the Interior 2009):

*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 would document them in our project evaluation, annual reports, or 5-year reviews, as appropriate. Implementing an adaptive management approach supports all refuge goals. Furthermore, adaptive management is all the more compelling in light of climate change concerns.

#### **Climate Change**

Continue to address climate change by maintaining and restoring healthy, connected, and genetically diverse wildlife populations and ecological communities, monitoring conditions over the long-term; promoting energy efficient practices; and promoting other carbon reduction activities.

#### *Discussion and Rationale*

Climate Change: 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, would lead to significant impacts across the U.S. and the world (Joint Science Academies 2005). 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 include:

- 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.
- Employ monitoring and adaptive management. (see Inkley et al. 2004 for more recommendations).

James River NWR may play an important role in monitoring and predicting the effects of global climate change. At the refuge level, it would be increasingly important to understand how the refuge and its habitats and communities respond to potential changes such as habitat shifts, changes in temperature, changes in waterway salinity, and storm intensification.

In forests, climate change will likely result in shifts in forest composition and structure (Iverson and Prasad 1998) that will greatly change the availability of habitat for many species. Shifts in the dominant vegetation type or even small changes in the understory composition may result in significant changes in animal communities. The goal of adaptation is to reduce the vulnerability of ecosystems to climate change and increase their resilience to climate-induced changes in ecological conditions.

Forest management strategies include those listed above, as well as the following:

- Reduce the impacts of stresses that can exacerbate the effects of climate change, particularly from wildland fire, insects, and diseases.
- Step-up measures to prevent and control the spread of invasive species.
- Prevent or reduce barriers to species migration, such as forest fragmentation.
- Improve forest health monitoring for early detection of climate change impacts.
- Help forests regenerate after disturbances (e.g., through reforestation).
- Support research to better understand forest vulnerability to multiple stressors and to find ways to enhance forest resilience.
- Consider establishing a continuous forest inventory monitoring system.

Energy Efficient Practices: We would continue to make incremental progress in maintaining and constructing facilities in a manner consistent, to the maximum extent practicable, with the most current guidance. We would continue to identify and remove those structures that have no useful purpose or that pose safety hazards. We must also take care to maintain both new and rehabilitated facilities to Service standards to keep them safe, functional, and attractive.

We would continue to service, repair, and maintain existing renewable energy infrastructure as needed. The Refuge Manager would fully evaluate the alternative energy structures on the refuge and, if necessary, remove them, modify their design, move them to more effective locations or add additional infrastructure. The Service remains committed to use of renewable energy sources to the fullest extent feasible on refuge lands.

**Carbon Reduction Practices:** Carbon sequestration is one mitigation strategy used to offset effects of climate change. The USFWS provides widely accepted calculations of carbon stored in various forest types (Smith et al. 2004). Opinions in the literature regarding the effect of active forest management on carbon sequestration capability of forests are not consistent among scientists (Nunery and Keeton 2010, Hennigar et al. 2008). Management of refuge forests would be focused on providing wildlife habitat, promoting healthy native forests, and support the ability of refuge forests to sequester carbon effectively. These strategies also support the carbon sequestration activities within the Service's proposed climate change objectives, as outlined in the draft strategic plan for responding to accelerating climate change (USFWS 2009b).

#### **Invasive Plant Species Control**

Continue to control invasive species on refuge lands as funding, staffing, and equipment logistics allow, with particular attention to controlling Japanese privet and stiltgrass in moist hardwood forest, as well as tree-of-heaven and princess tree along roadsides and within non-forested upland.

#### *Discussion and Rationale*

EO 13112 defines an invasive species as "...an alien (or non-native) species whose introduction does, or is likely to cause economic or environmental harm or harm to human health." 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 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. James River NWR staff has begun identifying and mapping locations of invasive species on the refuge as time and resources allow. Japanese privet, Japanese stiltgrass, and tree-of-heaven are the biggest concerns on the refuge currently. We would use this information to guide the development of monitoring, control, and eradication projects. When control is deemed necessary, the refuge would use the most effective combinations of mechanical, biological, and chemical controls to achieve long-term control or eradication. Only herbicides approved by the national contaminants coordinator would be used, and only in accordance with the approved rate and timing of application. Currently, the refuge uses

triclopyr and glyphosate to treat invasive species, when resources allow.

Under all alternatives, we would 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 integrated pest management using biological, ecological, mechanical, prescribed fire, or chemical techniques, as needed.
- When using heavy equipment on refuge property, we would ensure all equipment brought on to and taken off the refuge for this work is clean and free from reproductive plant parts, to minimize opportunities for invasive species transport.

### **Pest Management**

Continue to participate with State and Federal partners to monitor and manage nuisance issues from wildlife, such as pine beetle, feral hogs, and nutria.

#### *Discussion and Rationale*

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

An integrated approach uses various methods, including natural, biological, cultural, mechanical, and chemical controls. Some examples of pest management problems and solutions follow.

- *Existing problem:* The southern pine beetle outbreaks in dense pine stands, over mature trees, and generally unhealthy stands poses a significant threat to the health of the refuge’s pine-dominated forest.

*Existing solution:* Proper silviculture management techniques of thinning and promoting a stand of large, healthy trees should reduce susceptibility to infestations.

*Potential solution:* If infestation is severe, chemical treatments may be needed.

- *Potential problem:* If documented on the refuge in the future, small populations of feral hogs can grow exponentially and decimate habitat and food resources that are important for native wildlife species.

*Potential solutions:* If documented on the refuge in the future, use

control methods to eliminate population on refuge property. Methods may be conducted by USFWS staff, partners, or through SUPs.

- *Potential problem:* If documented on the refuge in the future, nutria eating of roots and stems of wetland plants can convert marshes and swamps into unvegetated mudflats.

*Potential solutions:* If documented on the refuge in the future, use control methods to eliminate population on refuge property. Methods may be conducted by USFWS staff, partners, or through SUPs.

- *Potential problem:* If documented on the refuge in the future, mute swans can have a direct adverse impact on plant diversity, fish assemblages, water quality/erosion control, and vegetation available to native waterfowl.

*Potential solution:* If documented on the refuge in the future, we would work with other Federal and State partners to capture and remove mute swans from the refuge. The Service goal is zero productivity for mute swans in the Northeast Region, due to the swan's negative impact on native waterfowl and their habitats.

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

### **3.3.3 Cultural Resources Management**

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

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

Continue to comply with Section 106 of the NHPA through consultation with the RHPO and SHPO when new ground-altering activities are proposed, evaluate existing facilities for National Register eligibility before altering, and require compliance with standard terms and conditions agreed to by refuge staff for forest management.

#### *Discussion and Rationale*

As a Federal land management agency, we are entrusted with the responsibility to locate and protect cultural resources, including archaeological sites and historic structures that are eligible for the National Register. As described in chapter 2, there are 7 known archaeological sites, 53 potential historic locations, and a large area of prehistoric high probability. Considering the refuge's location on the lower James River, it is likely that additional sites of various periods would be identified in the future.

The Service Manual, 614 FW 1, outlines the process of refuge managers and

regional office archaeologists for analyzing the potential for our projects to affect archeological and historical resources, and consulting with the SHPO and Tribes as appropriate in order to comply with the NHPA. Projects involving soil moving or building alteration are most likely to damage archaeological sites and historic buildings. Identifying sites and buildings through archaeological or architectural survey early in the project planning process may enable the Service to avoid the cultural resources. Preserving important sites and structures is always the preferred outcome. If we cannot avoid an important site, we design mitigation for the impact in consultation with the SHPO, federally recognized Tribes, and other constituencies. NHPA requires that we consider the important sites and historic structures in planning the activity and get the advice of the SHPO during planning.

We also plan to work with the NPS, Tribal representatives, the SHPO, the Archaeological Society of Virginia, and local historical societies to interpret the Pre-Contact Period and history on the refuge and to explain the importance of protection and preservation of cultural resources.

#### **Outreach and Communications**

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

#### *Discussion and Rationale*

James River 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. The refuge consults with eight federally recognized Indian Tribes when NEPA and NHPA are relevant. In addition, there are 11 unrecognized Indian Tribes represented in Virginia: Cheroenhaka (Nottoway), Chickahominy, Eastern Chickahominy, Mattaponi, Monocan Nation, Nansemond, Nottoway of Virginia, Pamunkey, Pattawomeck, Rappahannock, and Upper Mattaponi (<http://www.ncsl.org/issues-research/tribal/list-of-federal-and-state-recognized-tribes.aspx#s-va>; accessed August 2013). All of these Tribes are State recognized, and some are actively seeking Federal recognition. The Pamunkey Indian Tribe has preliminary approval from the Department of the Interior for Federal recognition, and a comment period on their petition for Federal recognition is currently underway (<https://federalregister.gov/a/2014-01349>; accessed June 2014).

Through early 20th century residents, the refuge's history is linked to the nearby Eastern Chickahominy Tribe's history. We would continue to actively communicate with all recognized and unrecognized Virginia Tribal organizations with regard to identification, education, and interpretation efforts on the refuge to ensure information is shared about how the refuge was part of the history of Virginia's Native Americans.

### 3.3.4 Visitor Services Management

#### Outreach and Communications

Continue to work with partners to promote the protection and preservation of the refuge for the benefit of wildlife through environmental education and interpretation about the natural environment and wildlife of the James River.

#### *Discussion and Rationale*

Developing and maintaining partnerships is key to fulfilling the Service's mission. Refuge staff has established working relationships with a variety of partners to promote wildlife and habitat conservation through environmental education and interpretation. Under all alternatives, we would continue to participate in these partnerships and develop a better understanding of the refuge's and the Service's role in surrounding communities.

EO 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 James River 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, increasing public access, and expanding citizen stewardship.

We would continue to participate in the *Envision the James* initiative, a watershed-wide community outreach and engagement initiative to promote natural resource conservation stewardship and to develop recreational opportunities within the James River watershed (<http://www.EnvisionTheJames.org>; accessed November 2013). By participating in this effort, we would develop a better understanding the refuge's role in the promoting an understanding and appreciation of natural and cultural resources in communities along the James River.

At both James River NWR and Presquile NWR, we would continue working with the JRA and NPS to promote the Captain John Smith Chesapeake NHT and Chesapeake Bay Gateways and Watertrails Network 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. We would work with the NPS to ensure that Captain John Smith Chesapeake NHT-related activities proposed to occur at the refuge would be conducted in a manner compatible with the purpose and intent of the refuge.

Additionally, our partnership with the JRA for the Ecology School emphasizes our shared interest in encouraging the public to develop an appreciation for, and stewardship ethic toward, the protection and conservation of natural and cultural resources at James River and Presquile NWRs. Although the current focus of our partnership is to offer environmental education programs on Presquile NWR through the Ecology School, we would continue to work with the JRA to explore opportunities to host environmental education programs and projects at James River NWR that engage communities throughout the greater Richmond metropolitan area.

### 3.3.5 Findings of Appropriateness and Compatibility Determinations

Chapter 1 describes the requirements for findings of appropriateness and compatibility determinations. Uses are evaluated based on whether or not they contribute to meeting refuge purposes, goals, and objectives. Appendix B includes the appropriateness and compatibility determinations consistent with implementing alternative B, the Service-preferred alternative. Some of these uses are already approved, while others are presented here in draft for public review. Our final CCP would include all approved findings of appropriateness and compatibility determinations for the alternative selected. These activities would be evaluated based on whether or not they contribute to meeting refuge purposes, goals, and objectives.

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

#### Activities Allowed

In accordance with approved compatibility determinations, we would:

- Support a quality, public deer hunt on the refuge.
- Support wildlife observation, photography, environmental education, and interpretation opportunities on the refuge by maintaining quality facilities, offering quality programs, and supporting existing partnerships.
- Support compatible research and investigations on the refuge by non-Service personnel that help further our knowledge of refuge resources, or that address regional or national conservation concerns of the Service.

#### 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 activities that are prohibited on refuges (50 CFR 25-26). Other activities are not allowed because the refuge manager has determined that the activities are not appropriate on the refuge or are sufficiently provided elsewhere nearby on other ownerships. Appendix B documents the refuge manager's justification for why they are deemed not appropriate.

These activities would continue to be prohibited on this refuge under all alternatives:

- Camping.
- Collecting natural products.
- Firing range.
- Horseback riding.
- Pets on refuge.

- Swimming and sunbathing.
- Use of pursuit dogs for hunting.

The only exceptions would be at the discretion of the refuge manager, under specific, special circumstances (e.g., to accommodate visitors with disabilities). All other uses not explicitly allowed or not allowed that require a SUP would be evaluated on a case-by-case basis by the refuge manager for appropriateness and compatibility (50 CFR 26, 603 FW 2).

### **3.3.6 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*

NWRs contribute to local economies through shared revenue payments. Federally owned lands are not taxable; however, under the provisions of the Refuge Revenue Sharing Act (16 U.S.C. 715s), 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 all alternatives, we would 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.

### **3.3.7 Special Designation Areas**

Continue to protect key characteristics of the refuge habitats and resources that supported their special 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 would be consistent with, or not detract from, those special area designations.

We would continue to protect the refuge habitats and resources that supported their designation. For example, we would:

- continue to support and promote bald eagle nesting and roosting within the summer and winter bald eagle concentration area on the Lower James River;
- continue to support and promote other bird species of concern associated with the Lower James River IBA; and
- continue to promote anadromous fish use waterways within and adjacent to the refuge.

We would continue to conduct reviews every 15 years as required by Service policies by following the planning process outlined in 602 FW 1 and 3 to determine if the refuge would meet criteria for Wilderness Areas, National Wild and Scenic Rivers, or other Federal special status designations.

### **3.3.8 Additional NEPA Analysis**

We developed this draft CCP and EA with sufficient detail to account for the greatest potential impacts that could result from future step-down planning efforts. However, if we determine that our analysis of potential impacts on the human and natural environments are found to be inadequate during subsequent planning (e.g., refuge step-down plans), additional NEPA review and NHPA compliance may be required prior to implementing those plans, actions, or activities (40 CFR 1508.28).

Although we analyze the impacts of the management alternatives we have developed in this draft CCP and EA, additional NEPA analysis would 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 the impacts of the possible range of alternatives in this document, but may need to supplement this analysis later.

Examples of proposed actions that may require further analysis include:

- Developing a LPP with appropriate NEPA documentation to meet habitat needs for Service Trust species and to contribute to the network of conservation lands and wildlife resources in the regional landscape by expanding the refuge's acquisition boundary.
- Improving or removing existing facilities and construction of new facilities.
- Expanding the existing hunt program and adding new hunting opportunities for adults and youth.
- Removing nuisance wildlife using lethal and non-lethal methods, if deemed necessary.

### **3.4 Alternative A. Current Management (No-action Alternative)**

Alternative A satisfies the NEPA requirement of a “no-action” alternative, which we define as continuing current management. It presents current and approved management plan activities; describes projects funded or underway; and serves as a baseline for comparing and contrasting alternatives B and C.

In addition to the actions detailed in section 3.3 as common to all alternatives, we would continue to conduct the following activities under alternative A.

We would continue to maintain the 2,653 acres of pine-dominated forest on the refuge, using a regime of logging and prescribed fire to selectively reduce forest density while still protecting large trees. The management focus would remain on protecting this habitat for nesting and roosting bald eagles, as well as other species that use this habitat, such as wild turkey, cavity-nesting bird species, various hawk species, and native mammals. We would conduct regeneration burns, in areas that are not prime bald eagle habitat, to achieve a mixed pine and hardwood community.

No thinning would occur in either the existing moist hardwood forest or the floodplain forest, keeping these habitats at their current acreages (775 acres of moist hardwood forest and 633 acres of floodplain forest). The moist hardwood forest habitat supports wild turkey, neotropical migratory birds, gray squirrels, white-tailed deer, and other native species. The floodplain forest supports bald eagles and wild turkey, as well as wood ducks and other priority wildlife species (see appendix A).

The refuge’s 82 acres of freshwater marsh and shrub swamp would be minimally maintained, with efforts limited to protecting existing native vegetation from any disturbance and periodic monitoring for invasive species.

Along the James River, the refuge provides 17 acres of aquatic habitat. Because construction and land management activities adjacent to the river can result in sedimentation impacts, we would continue to implement best management practices to protect this habitat from degradation, so that it can support native species such as the federally listed Atlantic sturgeon, alewife, and blueback herring. Fish populations are particularly important to maintain, as they provide a key food source for wildlife, bald eagles in particular.

The existing 3 miles of shoreline erosional bluff would be minimally maintained, focusing our efforts on protecting all native trees and not removing vegetation to prevent erosion.

We would continue to mow 13 acres of non-forested upland for administrative purposes. We would continue to control invasive species as feasible based on current resources to help prevent woody vegetation and invasive species establishment.

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 NHPA. We would continue to consult the RHPO and SHPO early in project planning for activities that may involve

ground disturbance. We would ensure that refuge activities are conducted in accordance with the approved standard operating procedures for mechanical pine thinning and fire management.

We would continue to offer public deer hunting opportunities on the refuge in accordance with the 1993 approved hunt management plan, as amended, and in coordination with the VDGIF DMAP. The refuge would remain closed to hunting of other species and closed to fishing. On a case-by-case basis we would allow visitors to the refuge to engage in refuge-sponsored wildlife observation, photography, environmental education, and interpretation activities. We would continue to use our reservation system to manage visitors, and we would continue to require that visitors obtain a refuge-issued permit 3 days in advance of the proposed visit. While we would improve the canoe/kayak launch to meet the Virginia Marine Resources Commission's (VMRC) permit requirements and rehabilitate the existing hunter check station, we would not construct any additional infrastructure.

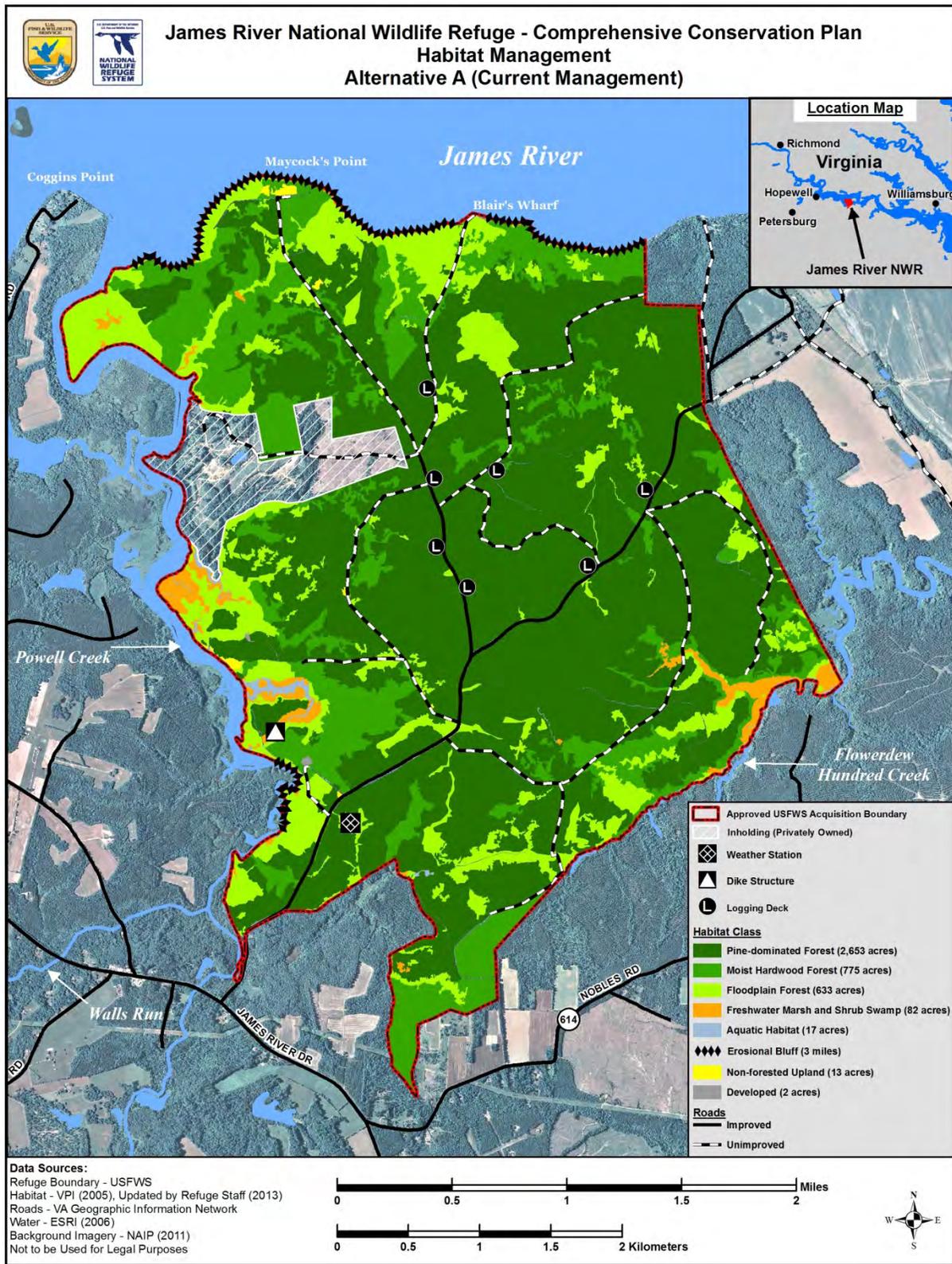
James River NWR has key partnerships with several State, local, and private entities that help to provide maintenance and education programs on the refuge. These groups also perform research work that the Service does not currently have capacity to conduct. We would maintain our partnerships with these groups.

Current management and habitat conditions are depicted in maps 3.1 through 3.3.

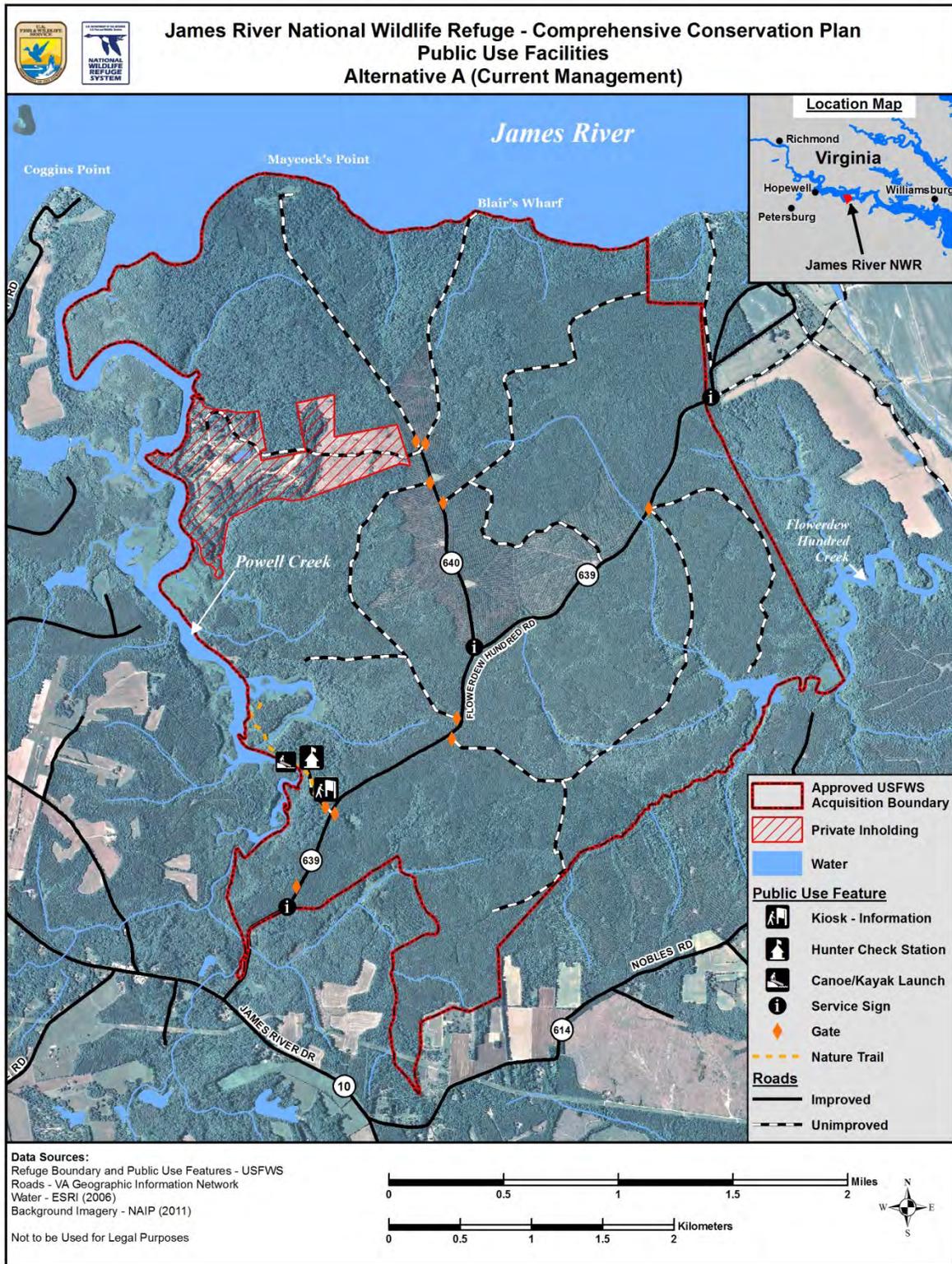


*Forest renewal project sign at the intersection of State Routes 639 and 640*

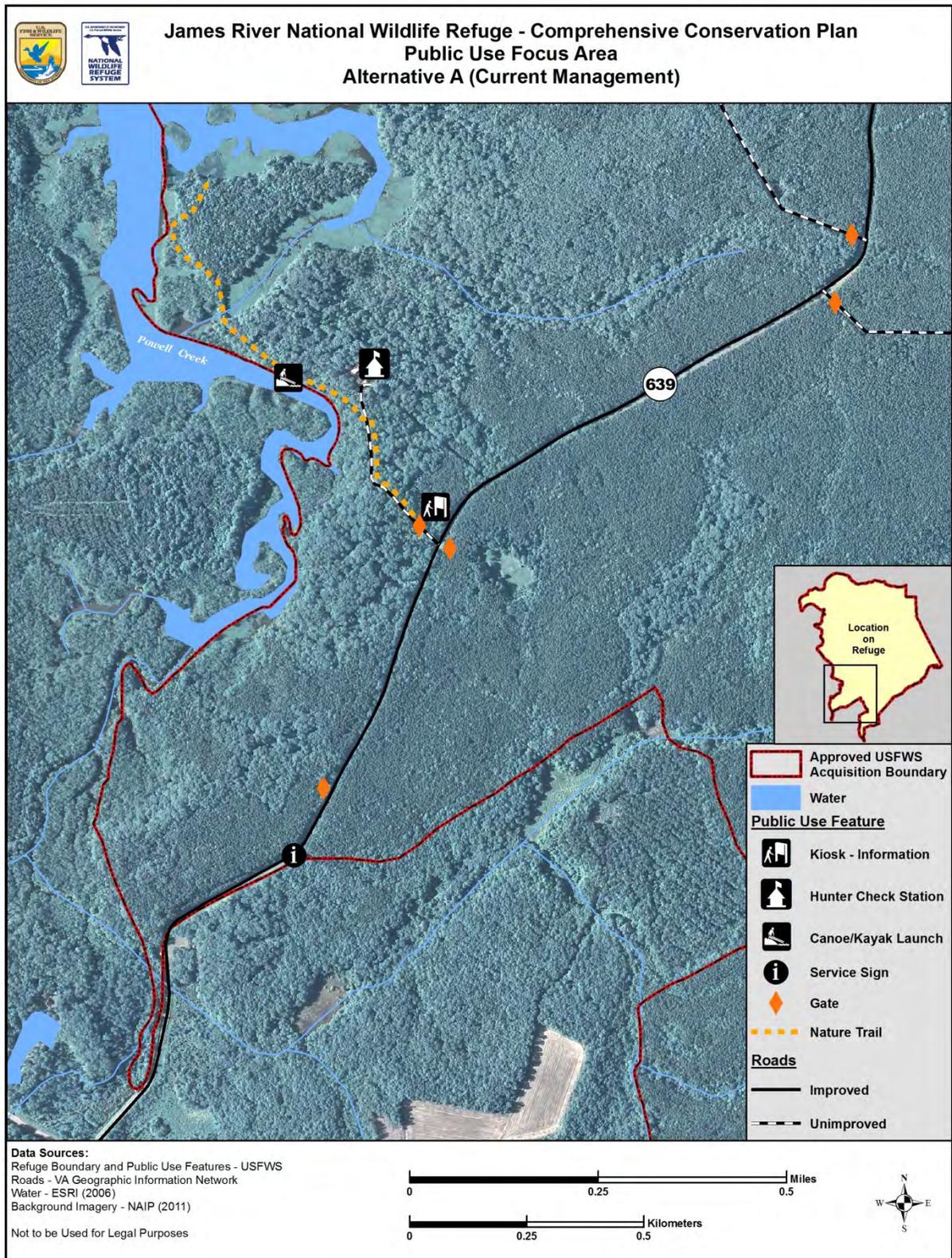
Map 3.1 Alternative A: Current Habitat Management at James River NWR



Map 3.2 Alternative A: Current Public Use Facilities at James River NWR



Map 3.3 Alternative A: Current Public Use Focus Area at James River NWR



**GOAL 1****FOREST HABITAT**

Protect, enhance, and restore the ecological integrity of inner coastal plain forest ecosystems of the lower James River to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient in anticipation of climate change.

**Objective 1.1****Pine-dominated Forest**

Over the life of the plan, promote general forest health on 2,653 acres of pine-dominated forest for the benefit of roosting, foraging, and nesting bald eagles, wild turkey, cavity-nesting avian species, various hawk species, and native mammalian species.

**Discussion and Rationale**

Prior to refuge establishment, the pine-dominated forest was managed by clear cutting small blocks of forest with subsequent regeneration for future harvest. This management was proven conducive for the continued use of the area by bald eagles. In effect, the timber management actually enhanced eagle habitat on the land by creating “super trees” for nesting and providing the conditions required for eagle roosting (USFWS 1996).

Since refuge establishment in 1991, we have employed sound forest management techniques with the intention of maximizing refuge bald eagle production. Specifically, we aimed to maximize the number and use of refuge nocturnal roost sites, increase the use of the refuge diurnal feeding roost, and transform James River NWR into a world class showcase for the management of the bald eagles in eastern North America (USFWS 1996). We targeted the young and middle aged loblolly pine stands for thinning to reestablish viable bald eagle nesting and roosting habitat, increase the health and vigor of the forest stands, reduce the risk of wildfire, and reduce the threat of diseased trees. Thinning efforts would occur by reducing trees per acre from 1,000 trees to 400 trees. Subsequent thinning would occur after 5 to 10 years, further reducing the trees per acre. Fire management would be introduced after thinning and then rotationally every 2 to 3 years.

Bald eagles select large open loblolly pines with good line of sight for nest trees (USFWS 1996). Maintaining unencumbered viewing around roost or nest trees is fundamental to ensuring continued use of this habitat by bald eagles (USFWS 1996, USFWS 2003).

Under alternative A, our forest management activities would continue to benefit bald eagles, as well as wild turkey, cavity-nesting avian species, various hawk species, and native mammalian species. Management activities would provide uneven aged forests to accommodate for varied nesting, roosting, and foraging needs of these species (USFWS 1996).

The desired future condition for the pine-dominated forest would not necessarily be representative of any one naturally occurring wildlife habitat. Rather, activities in the pine-dominated forest would contribute toward satisfying the following conditions applicable to all refuge forests:

- Produce 20 potential bald eagle nesting trees per acre over the next 60 to 80 years, including the addition of one to two additional active nest sites on the refuge within 60 years, and result in no net loss of nest trees over the next 60 to 80 years.

- Provide and maintain nocturnal roost and feeding roost habitat in a condition capable of supporting a minimum of 150 bald eagles by identifying and protecting the existing and potential roost trees to assure ideal bald eagle habitat would continue to exist within the refuge.
- Provide nesting and feeding habitats for cavity-nesting birds including wood ducks, woodpeckers, and songbirds. Retain all snags that do not pose a hazard to refuge operations.
- Develop a forest with three stages of foliage heights including mature, pole size, and seedling/brush cover types.
- Develop a forest with a reduced hazard fuel load and a healthier stand of mixed pine and hardwoods that are fire dependent (USFWS 2013b).

Under alternative A, we would thin and burn much of the existing 2,653 pine-dominated forest acres over the life of the plan to promote forest health. Small, fragmented pockets of pine-dominated forest exist within other habitat types and often are remote, are difficult to access, or are environmentally sensitive sites. As a result, some of these areas may not be intensively thinned or burned. As of August 2013, we have targeted 1,721 acres of pine-dominated forest for prescribed burn treatment (USFWS 2013b). Of those, 450 acres of loblolly pine stands have been mechanically thinned and approximately 300 acres have previously been treated with fire (USFWS 2013b). Logging decks are maintained with grass cover to limit, but not eliminate, woody regrowth and allow for reuse as needed.



Cyrus Brame/USFWS

*Prescribed burn in the pine-dominated forest cooling*

**Strategies**

*Continue to:*

- Identify areas within pine-dominated forest that are prime bald eagle habitat.
- Protect potential nest and roost trees to ensure ideal bald eagle habitat would continue to exist on the refuge.
- Thin dense stands of re-generating pines to maintain unencumbered views from bald eagle nest or roost trees.
- Do not harvest trees 24-inch diameter at breast height (DBH) or greater.
- Protect mast bearing species (e.g., oak) from fire impacts if possible through regulation of fire intensity and seasonality of burns.
- Reduce the risk of wildfire occurrences by using a regimen of pine thinning and prescribed fire to reduce 1 hour and 10 hour fuels by 50 percent and 100 hour fuels by 25 percent.
- Reduce tree density (from more than 1,000 trees per acre to 400 trees per acre), releasing stagnated trees from resource competition to promote a healthier, robust stand of mixed pine and hardwoods, and to promote species and structural diversity.
- Conduct prescribed burns in a manner that mimics natural fire regimes to reduce the potential for catastrophic wildfire, forest pests, and forest diseases.
- In areas that are not prime bald eagle habitat, conduct regeneration burns to promote a fire-tolerant mixed pine and hardwood community, to emphasize structure.
- Seed 1 to 1.5 acre decks used in logging operations with native grasses (e.g., broomsedge) when operations cease to limit woody regrowth between thinning operations.

**Inventory and Monitoring Activities**

*Continue to:*

- Conduct annual forest breeding bird point count survey.

**Objective 1.2**

**Transitional Dry Hardwood Forest**

This habitat type is not present under alternative A (0 acres).

**Discussion and Rationale**

None.

**Strategies**

None.

**Inventory and Monitoring Activities**

None.

### **Objective 1.3**

#### **Moist Hardwood Forest**

Over the life of the plan, maintain the existing 775 acres of moist hardwood forest to support nesting, roosting, and feeding by native species, including wild turkey, neotropical migratory birds, gray squirrels, and white-tailed deer.

#### **Discussion and Rationale**

Since refuge establishment, the emphasis for moist hardwood forest management has been to protect native tree species, especially those large trees with the potential to be used by nesting eagles, and limit public activities that would disturb eagles. The moist hardwood forest also provides important feeding and roost sites for wild turkey, stopover site habitat for neotropical migratory birds, feeding and bedding habitat for white-tailed deer, as well as feeding and nesting sites for cavity-nesting birds, hawks, gray squirrels and other native mammalian species (USFWS 1996, USFWS 2003).

Under alternative A, our forest management activities would continue to benefit bald eagles, as well as wild turkey, cavity-nesting avian species, various hawk species, and native mammalian species (USFWS 1996). Activities in the moist hardwood forest would contribute toward satisfying the following conditions applicable to all refuge forests:

- Produce 20 potential bald eagle nesting trees per acre over the next 60 to 80 years, including the addition of one to two additional active nest sites on the refuge within 60 years, and result in no net loss of nest trees over the next 60 to 80 years.
- Provide and maintain nocturnal roost and feeding roost habitat in a condition capable of supporting a minimum of 150 bald eagles by identifying and protecting the existing and potential roost trees to assure ideal bald eagle habitat would continue to exist within the refuge.
- Provide for nesting and feeding habitats for cavity-nesting birds including wood ducks, woodpeckers, and songbirds. Retain all snags that do not pose a hazard during refuge operation.
- Develop a forest with three stages of foliage heights including mature, pole size, and seedling/brush cover types.

#### **Strategies**

*Continue to:*

- Protect all native trees.
- Not thin any moist hardwood forested areas.
- Limit activities (e.g., human and mechanical) that would disturb bald eagles.

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

*Continue to:*

- Conduct annual forest breeding bird point count survey.

### **Objective 1.4**

#### **Floodplain Forest**

Over the life of the plan, maintain the existing 633 acres of floodplain forest to

benefit roosting, foraging, and nesting bald eagles, wild turkeys, wood ducks, and other priority wildlife species.

#### **Discussion and Rationale**

Year-round populations of bald eagles roost and forage in the refuge's floodplain forest. Wild turkeys use the forest floor for foraging and roost in the branches of hardwood trees within these forests. Protecting the floodplain forest also allows hardwoods to mature enough for wood duck populations to build cavity nests as they utilize insects and mast crops for forage (USFWS 1996).

Under alternative A, our forest management activities would continue to benefit bald eagles, as well as wild turkey, cavity-nesting avian species, various hawk species, and native mammalian species (USFWS 1996). Activities in the floodplain forest would contribute toward satisfying the following conditions applicable to all refuge forests:

- Produce 20 potential bald eagle nesting trees per acre over the next 60 to 80 years, including the addition of one to two additional active nest sites on the refuge within 60 years, and result in no net loss of nest trees over the next 60 to 80 years.
- Provide and maintain nocturnal roost and feeding roost habitat in a condition capable of supporting a minimum of 150 bald eagles by identifying and protecting the existing and potential roost trees to assure ideal bald eagle habitat would continue to exist within the refuge.
- Provide for nesting and feeding habitats for cavity-nesting birds including wood ducks, woodpeckers, and songbirds. Retain all snags that do not pose a hazard during refuge operation.
- Develop a forest with three stages of foliage heights including mature, pole size, and seedling/brush cover types.

#### **Strategies**

*Continue to:*

- Protect native trees.
- Not thin any floodplain forest areas.
- Limit activities that would disturb bald eagles, especially during nesting season.

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

*Continue to:*

- Conduct spring and summer shoreline bald eagle surveys.
- Conduct annual forest breeding bird point count survey.

## **GOAL 2**

### **NON-FOREST HABITAT**

Protect, enhance, and restore the ecological integrity of non-forest ecosystems to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient in anticipation of climate change.

## Objective 2.1

### Freshwater Marsh and Shrub Swamp

Over the life of the plan, maintain 82 acres of freshwater marsh and shrub swamp in current condition to support native species.

#### Discussion and Rationale

Freshwater marshes and shrub swamps are types of freshwater wetland ecosystems. Wetlands are significant for global cycles of nitrogen, sulfur, methane, and carbon dioxide (Mitsch and Gosselink 1993). Wetlands also provide essential ecosystem functions that technology has yet to rival such as flood mitigation (especially riverine wetlands), storm abatement, and filtering nutrients and toxic material. Eighty percent of America's breeding bird populations and more than 50 percent of its 800 species of protected migratory birds rely on wetlands (Wharton et al. 1982). More than 95 percent of the commercially harvested fish and shellfish species are wetland-dependent. Most freshwater fish depend on wetlands for spawning, and anadromous fish rely on them as nurseries for young fry.

The refuge's freshwater marshes and shrub swamps are located primarily along Powell Creek and Flowerdew Hundred Creek, and are adjacent to the floodplain forests. As discussed in chapter 2, these marshes typically occur as complexes dominated by large grasses, such as salt hay, bulrushes, cattails, and rushes. Freshwater marsh and shrub swamp habitats provide breeding, migratory, and overwintering habitat for a variety of waterfowl, waterbirds, and shorebirds.

Currently, much of the freshwater marsh and shrub swamp habitat is ecologically intact, with minimal presence of invasive species. As a result, this area currently requires minimal management to provide beneficial habitat. Under alternative A, we would continue to visually survey habitat conditions by boat as resources allow to detect habitat disturbance and early indicators of invasive species presence. We would also protect the native grasses and other plant species by not performing habitat management activities in the marsh areas. By doing so, we would keep the wetland habitats as undisturbed as possible.

#### Strategies

*Continue to:*

- Protect all native vegetation by limiting disturbance from refuge operations in and public access to freshwater marsh and shrub swamp areas.

#### Inventory and Monitoring Activities

None.

## Objective 2.2

### Aquatic Habitats

Over the life of the plan, support efforts of partners to improve 17 acres of aquatic habitat to benefit native species and protect the habitat from being degraded.

#### 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 alewife, American shad, freshwater mussels) and as foraging and resting habitat for migratory and overwintering waterfowl, waterbirds, and bald

eagles. 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 would 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. The VMRC 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). Within James River NWR, Powell Creek is 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.

The James River adjacent to the refuge is listed as a category 5 impaired waterway for "Aquatic Life" and "Fish Consumption" uses, due to inadequate benthic community shores and elevated levels of PCB in fish tissues (VDEQ 2012c). This news is countered by evidence that SAV has been increasing annually since 2006 along Powell Creek, the refuge's western border. In 2011, SAV was observed to cover the headwaters between 70 and 100 percent in fragmented patches throughout the majority of Powell Creek extending to its mouth at the James River (VIMS 2013). Continued efforts to improve water quality in refuge and adjacent waters are necessary.

Under this alternative, management of the James River and associated backwaters habitats is fairly minimal. The aquatic habitat acreage within the refuge boundary is a mere 17 acres of non-contiguous waters. The ability for USFWS to manage this habitat type is limited jurisdictionally. A variety of Federal and State agencies (including, but not limited to, the U.S. Army Corps of Engineers (USACE), VDEQ, VMRC, and VDGIF) oversee activities tied to waterway bottoms, water quality management and navigation. Coordination with the appropriate agencies would be required for any action tied to this habitat type. We would employ best management practices on refuge lands to minimize sedimentation to tributaries of the James River. Additionally, existing wetlands and riparian buffer protection would continue within the refuge throughout the life of the plan.

Monitoring and data collection projects initiated by local universities and area watershed organizations would be encouraged. 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 for construction and land management activities to minimize potential release of sediment load and deposition in the James River.
- Maintain vegetated riparian areas and natural habitats.

- Collaborate with State and Federal partners to maintain fish populations suitable for wildlife consumption (i.e., bald eagles) and public recreational opportunity.
- Support partner efforts to restore federally listed Atlantic sturgeon habitat.
- Assist partners in promoting James River watershed protection and health, and contribute to the recovery of species of conservation concern (e.g., Atlantic sturgeon, alewife, blueback herring).

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

*Continue to:*

- Work with partners to monitor water quality stations in refuge vicinity.
- Support partner efforts to monitor federally listed Atlantic sturgeon habitat.
- Work with partners to monitor SAV.

### **Objective 2.3**

#### **Erosional Bluff**

Over the life of the plan, maintain and promote native vegetation on 3 shoreline miles to help stabilize bluffs and reduce erosion.

#### **Discussion and Rationale**

Three miles of shoreline erosional bluff occur along the refuge's border with the James River and Powell Creek. While the unconsolidated soils along the bluffs provide habitat for burrowing wildlife, the soils are easily eroded and transported into adjacent waterways. Since refuge establishment, our habitat management activities have emphasized using best management practices to localize and minimize soil disturbance, as well as alteration of existing topography and limiting disturbance to roosting bald eagles, throughout the refuge (USFWS 1989, 1996, and 2003).

#### **Strategies**

*Continue to:*

- Protect all standing, live or dead, native trees in erosional bluff areas by not removing vegetation and limiting mechanical equipment use in areas around waterways and steep slopes.

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

*Continue to:*

- Opportunistically conduct informal visual surveys to monitor shoreline conditions and eroding areas.

### **Objective 2.4**

#### **Non-forested Upland**

Over the life of the plan, maintain 13 acres of non-forested upland for administrative purposes (e.g., weather station operation).

#### **Discussion and Rationale**

The refuge currently maintains 13 acres as non-forested upland. These areas are used for administrative purposes, including supporting the operation of a weather station. We regard these areas as incidental habitat of low value to wildlife, especially grassland birds, because of their small size and low quality

vegetation.

To prolong the onset of succession to transitional and eventually mature forest, non-forested upland would continue to be mown at least once a year and cedars would be thinned or removed (USFWS 1996). Maintaining a mature forest with small pockets of managed non-forested upland is in keeping with the historic natural condition of the area (Wilson and Watts 1999).

**Strategies**

*Continue to:*

- Mow at least once a year.

**Inventory and Monitoring Activities**

None.

**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 lower James River.

**Objective 3.1**

**Cultural Resource Protection**

Over the life of the plan, minimize ground disturbance throughout the refuge.

**Discussion and Rationale**

James River NWR contains significant archeological sites that have the potential to advance our understanding of Virginia prehistory and history. The sites surviving at the refuge chronicle Native American culture, initial settlement of the James River by Europeans, Native American resistance against European settlement, Plantation society, military history, post-Civil War rural agriculture, and 20th century African and Native American adaptation to the lack of economic opportunity. The sites are potentially significant regionally and perhaps nationally.

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 NHPA. We would continue to consult the RHPO and SHPO early in project planning for activities that may involve ground disturbance. To date, projects requiring such review on the refuge have been limited.

We would continue to conduct forest management activities at James River in accordance with standard operating procedures that were SHPO reviewed, as well as VDOF Best Management Practices (USFWS 2006), to allow logging to occur without further SHPO review.

The standard operating procedures include:

- Outfitting any equipment with high flotation tires.
- Marking known archaeological sites in the field and excluding these areas from any forest management activities.

- Using grapple skidders instead of cable skidders.
- Creating any new log landings without lowering the grade.
- Using skid trails only on level stands where no water diversion will be needed.
- Using only low pressure equipment for pre-mechanical thinning of small diameter trees.
- Identifying areas excluded from being logged.

In sensitive cultural resource areas, we employ alternative timber management techniques, such as hand labor and herbicide application, to reduce tree density as prescribed in objective 1.1.

We suspect archaeological sites along the refuge's shoreline and steep slopes have been damaged by erosion. Under alternative A, three known archaeological sites would continue to be damaged by erosion from different causes (Small 2013 personal communication).

#### **Strategies**

*Continue to:*

- Consult with the RHPO and SHPO regarding refuge activities that have the potential to disturb the ground.
- Ensure that refuge activities are conducted in accordance with the approved standard operating procedures for mechanical pine thinning and fire management.

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

*Continue to:*

- Periodically monitor known cultural resource sites.

### **GOAL 4**

#### **WILDLIFE-DEPENDENT RECREATION**

Provide wildlife-dependent recreational opportunities for visitors to connect with nature and foster enhanced stewardship of the lower James River, Chesapeake Bay estuary, and the National Wildlife Refuge System.

#### **Objective 4.1**

##### **Hunting**

Accommodate public deer hunting on the refuge for 1,370 hunter use days annually to maintain the population of white-tailed deer at a level commensurate with the biological carrying capacity of the available refuge habitat and to provide high quality wildlife-oriented recreation.

##### **Discussion and Rationale**

Hunting is one of the six priority public uses as outlined in the Refuge Improvement Act. We recognize deer hunting as a long-established, traditional outdoor pastime in this area of Virginia. When managed responsibly, it can instill a unique appreciation of wildlife, their behavior, and their habitat needs. Service policy also states that, where practicable, we should make our hunt regulations consistent with State regulations. As detailed in chapter 2, the refuge is open to hunting of only white-tailed deer.

Deer are common in the upland hardwood and mixed forested areas of the refuge. Woody herbaceous and fruit-producing plants are important to deer populations throughout the southeast (including Virginia). Acorns are a major component of their fall diet (Dickson 2001), and oak trees are common in the moist hardwood forests and pine-dominated forests on the refuge. A substantial amount of escape cover, used for fleeing predators and bedding, is available in the refuge's pine-dominated forests. The refuge has a harvestable deer population, habitat that deer prefer, and the means to administer public hunting opportunities. The hunt is provided as a recreational opportunity and contributes to maintaining county herd populations.

Since the 1940s, VDGIF has based deer populations on harvest totals. The estimated deer population has been steadily increasing throughout the State, from low of 4,019 in 1947 to a high of 259,147 in 2008. The 5-year average for Prince George County is 2,254 deer, and this number is both holding relatively stable and similar to Statewide trends (<http://www.dgif.virginia.gov/wildlife/deer/harvest/index.asp>; accessed August 2013).

As detailed in chapter 2, we offer public deer hunting opportunities to maintain the population of white-tailed deer at a level commensurate with the biological carrying capacity of the available refuge habitat and to provide quality wildlife-oriented recreation (USFWS 1993). We offer hunting opportunities for public deer hunting on specific days during the State's archery, muzzleloader, and shotgun seasons. The refuge harvest totals support the objective of having a stable deer population, with a female harvest rate of approximately 40 percent of the total deer kill (VDGIF 2013). Based on the past 5 years of available State participation data and refuge harvest success ratios, deer hunters participating in our muzzleloader and shotgun seasons have a successful harvest ratio that is similar to the State average for 2012 (Brame 2013 personal communication).

We would continue to accommodate public deer hunting to stabilize the deer population and offer this quality wildlife-oriented recreational opportunity. We would continue to offer up to 1,370 hunter use days annually because we have developed a manageable and stable public deer hunt program. We would continue to participate in the State's DMAP program and coordinate with our VDGIF District Biologist to evaluate herd size, disease issues, and current regulations.

We would continue to offer the same mix of archery, shotgun, and muzzleloader hunting opportunities because the harvest totals meet State and refuge population objectives for the property. Additionally, refuge hunter participation data confirms demand for hunting opportunity does not exceed current capacity. For the past 5 years (2008 through 2012), hunting has occurred on 345 of the total 1,370 hunter use days annually; this means that hunter participation has averaged 25 percent annually over the past 5 years. We have averaged 7 archery hunters per available archery hunt day (16 percent daily participation), 38 muzzleloader hunters per available muzzleloader hunt day (54 percent daily participation), and 33 shotgun hunters per available shotgun hunt day (47 percent daily participation) (Brame 2013 personal communication).

Under this alternative, we would make minor adjustments to the annual

administration of the hunt, but we would not alter the total availability of hunting opportunities or open the refuge to any new hunts. On refuge hunt days, the refuge would continue to be closed to all other public uses.

### **Strategies**

*Continue to:*

- Administer public deer hunt in accordance with the approved hunt management plan (1993), and subsequent amendments to accommodate up to:
  - ❖ Fifty hunters to hunt on any/all days within one 19-day archery season (950 hunter use days annually).
  - ❖ Seventy hunters per day on each of 2 muzzleloader hunting days (140 hunter use days annually).
  - ❖ Seventy hunters per day on each of 4 shotgun hunting days (280 hunter use days annually).

### **Inventory and Monitoring Activities**

*Continue to:*

- Monitor harvest success ratios, deer health, and safety.
- As needed throughout the year, coordinate with VDGIF District Biologist to evaluate herd size, disease issues, and current regulations.
- Participate in the VDGIF DMAP.

## **Objective 4.2**

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

Provide wildlife observation, photography, environmental education, and interpretation opportunities to visitors on a by-request, case-by-case basis, to offer educational experiences in ecosystem management.

### **Discussion and Rationale**

Wildlife observation, photography, environmental education, and interpretation are four of the six priority public uses as outlined in the Refuge Improvement Act. When managed responsibly, these uses can instill refuge visitors with a deeper appreciation for wildlife, their behavior, and their habitat needs.

Public use of the refuge is highly managed by refuge staff for a few reasons. First, refuge management activities and resources have been focused on limiting disturbance to bald eagles, conducting forest management activities, and administering a quality public deer hunt. Second, the refuge has limited infrastructure to support self-guided touring of the refuge and limited staffing to open facilities or accompany refuge visitors (USFWS 1994). A few small facilities, including a 0.5-mile trail and one restroom at the hunter check station, are available for visitor use when their use would not conflict with other refuge management activities or the public deer hunt. Therefore, we evaluate requests to visit the refuge on a case-by-case basis and encourage interested persons to participate in upcoming refuge- or partner-sponsored refuge events and programs.

Under this alternative, we would implement existing plans to improve existing infrastructure to support these public uses. We would continue to evaluate requests to visit the refuge on a case-by-case basis and issue SUPs for refuge visitors participating in any of these four public uses; however, we would not allow visitors to participate in these four public uses on refuge hunt days. We would continue to offer refuge- or partner-sponsored events and programs on the refuge.

### Strategies

*Continue to:*

- Use the existing reservation system for visitor participation in refuge-sponsored and partner-sponsored programs.
- Offer refuge-sponsored boat trips as staffing and resources allow.
- Require participants to request a refuge-issued permit three days in advance of proposed visit.
- Issue permits for planned, unchaperoned visits to use the existing 0.5-mile trail, existing canoe/kayak launch on Powell Creek, and unimproved refuge roads.
- Implement approved infrastructure improvement or construction projects to support public use (appendix D), in particular:
  - ❖ Improve the canoe/kayak launch to meet VMRC's permit requirements.
  - ❖ Repair refuge roads.
  - ❖ Rehabilitate hunter check station.
- Opportunistically offer up to two on-refuge interpretive programs annually.
- Upon request, refuge staff offers up to two off-refuge interpretive programs annually.

### Inventory and Monitoring Activities

*Continue to:*

- Monitor conditions of existing facilities and infrastructure used by visitors (e.g., trail, restrooms, kiosk).

## Objective 4.3

### Fishing

The refuge remains closed to fishing from its shoreline.

### Discussion and Rationale

The refuge would remain closed to fishing from its shoreline because the refuge has not previously been opened to this use. All national wildlife refuges remain closed to all public uses until a compatibility determination is prepared to document if the use is compatible with the refuge purpose (50 CFR 26.31).

**Strategies**

No documentation required by Service regulation or policy to maintain the refuge as closed to this use.

**Inventory and Monitoring Activities**

None.

**GOAL 5**

**PARTNERSHIPS**

Develop new partnerships and strengthen existing partnerships to promote natural and cultural resource conservation and the mission of the National Wildlife Refuge System.

**Objective 5.1**

**Partnerships**

Over the life of the plan, maintain existing partnerships to support habitat management activities, outreach, and wildlife-dependent recreation on the refuge.

**Discussion and Rationale**

Developing and maintaining partnerships is key to fulfilling the Service's mission. At the heart of the Service's mission are the conservation and management of the Federal Trust Species: migratory birds, threatened and endangered species, interjurisdictional fish, certain marine mammals, and species of international concern. It is estimated that 73 percent of our Nation's land is privately owned, and that the majority of our fish and wildlife resources occur on those lands. Consequently, we recognize that other government agencies, organizations, conservation groups, and individuals share our interest in providing for fish and wildlife needs. Existing partnerships with VDGIF, VDOF, TNC, and VDCR Natural Heritage provide needed assistance for managing habitat resources on the refuge and increase our success in effectively managing habitats for species of concern.

Research is essential to successful habitat and species management; however, refuge staff is extremely limited in our ability to design and conduct research projects. The research conducted by VCU, CCB, and Richmond Audubon provides important data and information that helps guide refuge management decisions and activities.

Public outreach improves recognition of the refuge, the Refuge System, and the Service among neighbors, local leaders, conservation organizations, and elected Officials (USFWS 1994). By participating in community events, refuge staff is better able to engage with the public in direct communication and raising awareness about the refuge. Although we are constrained by limited available resources and staffing, we are able to effectively reach the public through partnerships. Our partnerships with organizations and groups such as Richmond Audubon, CBF, and JRA enable us to conduct more effective outreach and provide more wildlife-dependent recreational opportunities on the refuge than we could do alone. Our collective public outreach efforts garner support for conservation in the region.

Since refuge establishment, we have developed and maintained partnerships with a variety of groups to fulfill the refuge's purpose and meet management goals and objectives. Some of our partnerships have been formally documented, while others remain informal agreements. For example, the Service entered into a cooperative agreement with NPS, USFS, and

Commonwealth of Virginia for wildland fire management and Stafford Act response. In contrast, there is no formal agreement or documentation between the Service or refuge with the Appalachian Trail Club for habitat management assistance and infrastructure maintenance at James River NWR. Under this alternative, we would continue to work with partners on the refuge and document the partnership arrangements and understanding on a case-by-case basis.

### Strategies

*Continue to:*

- Maintain existing partnerships to manage forests and respond to wildfires; conduct formal and informal biological inventory, monitoring, and research; conduct cultural resource surveys; offer environmental education and wildlife interpretation programs; and maintain refuge infrastructure.



George Golf

*Measuring a juvenile bald eagle's talon*

### **3.5 Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)**

In addition to the actions detailed in section 3.3 as common to all alternatives, the following describes what other activities would occur under alternative B.

Under alternative B, over the life of this plan we would manage the existing pine-dominated forest in a manner to allow it to transition to a mature pine savanna habitat with an open midstory and understory. We would reduce the density of trees in the pine-dominated forest by mechanical thinning and prescribed burning, which would promote the growth of larger and healthier pine trees, and help establish and maintain this habitat at a high quality for the benefit of priority refuge species, such as the brown-headed nuthatch and Chuck-will's-widow. We would experimentally plant longleaf pine seedlings and saplings and monitor their progress.

We would continue to protect the biological integrity, diversity, and environmental health of the existing moist hardwood forest, floodplain forest, freshwater marsh and shrub swamp, and aquatic habitats at their current acreages. Their locations would remain the same, and we would not undertake any new management activities in these habitats. However, we would increase monitoring and control of invasive species in these areas. We would conduct baseline inventories and long-term monitoring of priority refuge species and invasive species. We would investigate the hydrologic flow between the wetlands in the southwestern portion of the refuge and Powell Creek.

To help stabilize the 3 miles of erosional bluff, we would consider employing erosion control techniques, such as planting bald cypress to break up wave action, and formally monitor erosion rates and bank loss, to help stabilize bluffs, reduce erosion, and benefit priority refuge species, such as the bank swallow. Because this habitat is also important to protecting bald eagles, we would use the spring and summer bald eagle surveys as an additional time to evaluate the condition of the shoreline.

We would continue to mow the existing 13 acres of non-forested upland for administrative purposes. We would convert 2 acres of pine-dominated forest around the weather station to non-forested upland to prevent interference of the signal transmission in the future.

Under this alternative, we would conduct expanded cultural resources activities. We would conduct fieldwork to better understand the location of archaeological sites, to help prevent against adverse impacts from activities related to the pine-dominated forest transition, as well as to protect those resources located in the other refuge habitat areas. We would implement recommendations in the Archaeological Overview (Goode et al. 2009).

We would gradually expand the number and diversity of public use opportunities on the refuge available for a broad range of audiences. Although some improvements to existing visitor support facilities can be accomplished within 5 years of CCP approval, the majority of the following proposed expansions of existing public uses and opening the refuge to new uses require completion of additional planning documents and NEPA review. We would accommodate public deer hunting on the refuge for 1,460 hunter

use days annually, allowing for an increased hunt participation overall. In addition, we would open the refuge to turkey hunting, offering up to 1,200 hunter use days annually, most of which would be in conjunction with the deer hunt. We would also promote youth involvement in hunting by providing youth hunt opportunities for deer, turkey, and waterfowl. We would open the refuge to fishing at two designated locations. We would designate one area to support regular use by refuge visitors interested self-guided and organized wildlife observation, photography, environmental education, and interpretation opportunities between sunrise and sunset throughout the year; no permit would be required for visitors participating in these wildlife-dependent uses in the designated public use areas after approval of a VSP and completion of infrastructure improvements.

Because James River NWR is considered by the Service to be an urban refuge, we anticipate that interest in the refuge and annual visitation would increase in the future. To support this, we would enhance on-refuge infrastructure to support those increases, including an expanded and improved trail system, improved roads, and designated public use parking areas. We would further support increased visitors through our partnerships with a variety of entities outside of the Service, which we would develop further to support the refuge's purpose, provide research support, and meet the refuge's goals and objectives for resource management.

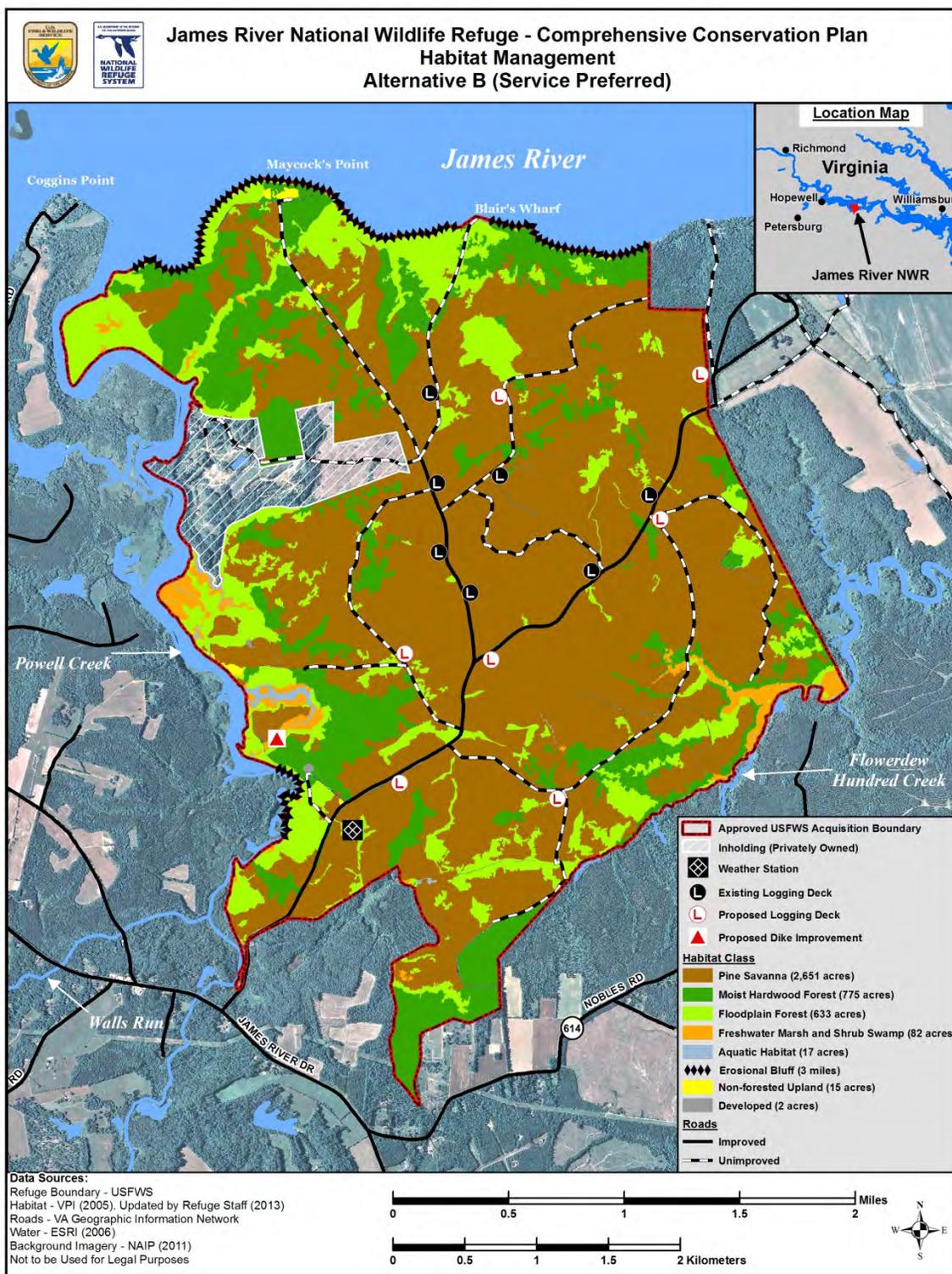
Alternative B management and habitat conditions are depicted in maps 3.4 through 3.6.



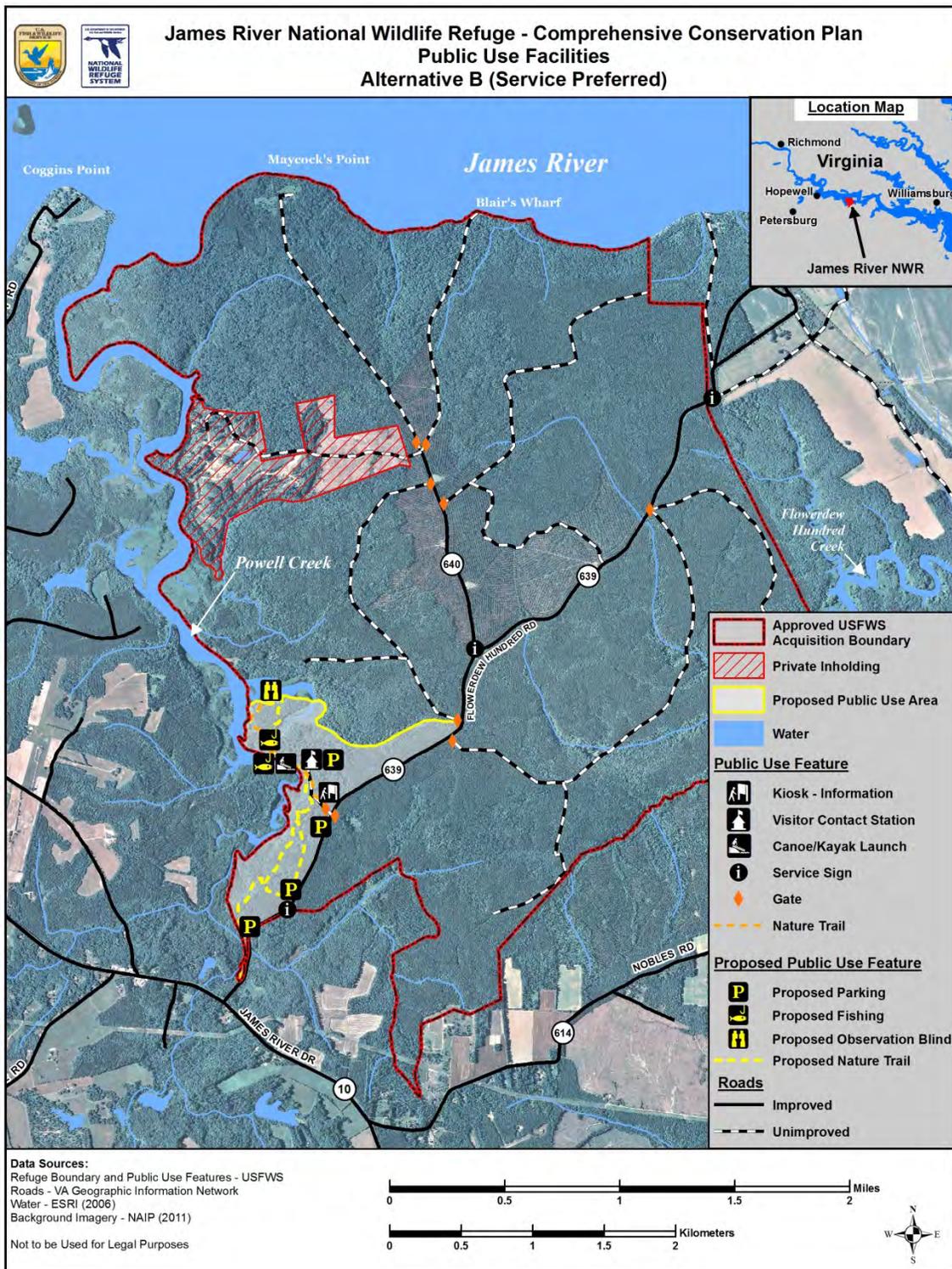
Cyrus Brame/USFWS

*Child standing next to a large pine tree*

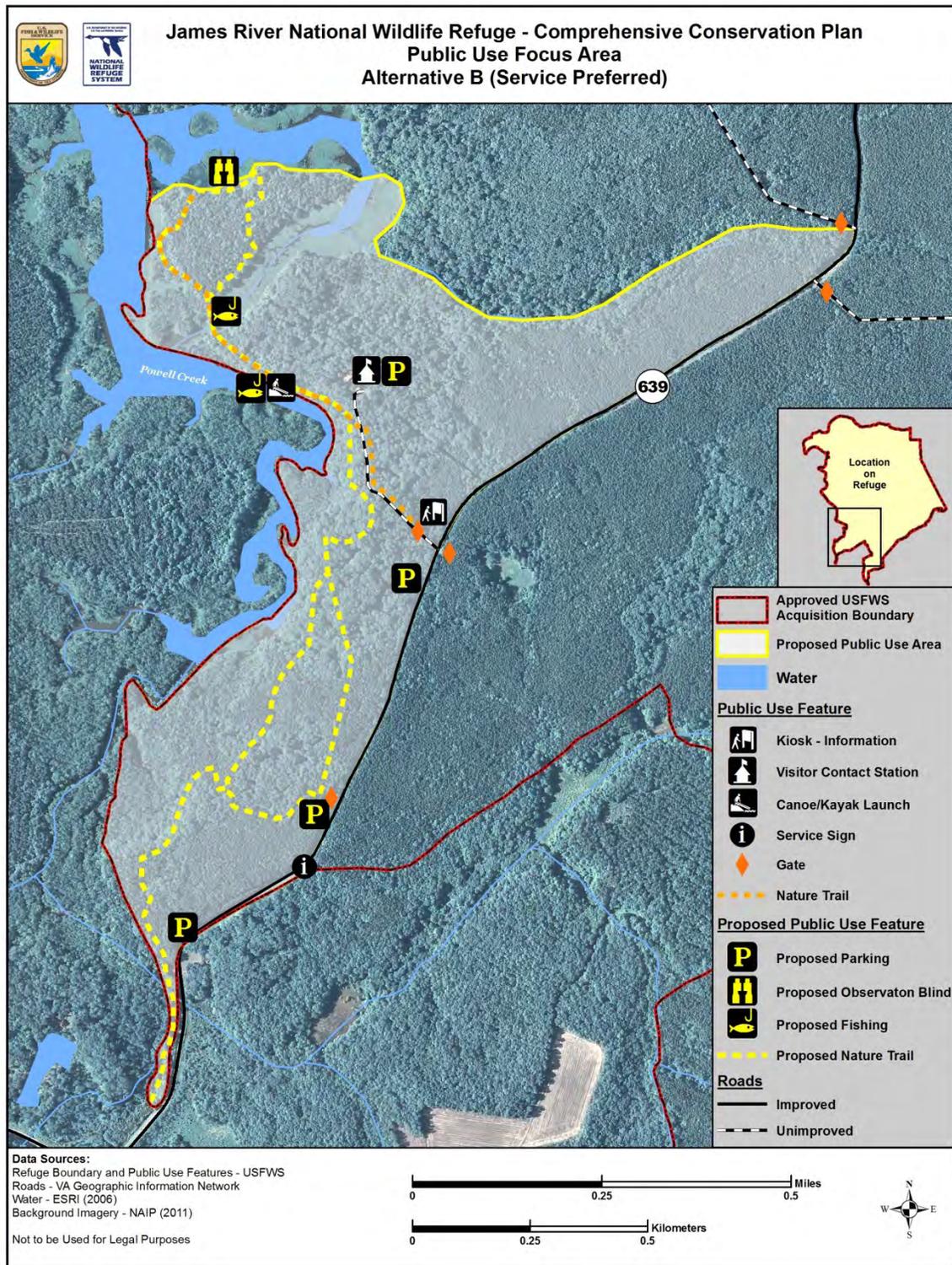
Map 3.4 Alternative B: Proposed Habitat Management at James River NWR



Map 3.5 Alternative B: Proposed Public Use Facilities at James River NWR



Map 3.6 Alternative B: Public Use Focus Area at James River NWR



## **GOAL 1**

### **FOREST HABITAT**

Protect, enhance, and restore the ecological integrity of inner coastal plain forest ecosystems of the lower James River to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient in anticipation of climate change.

#### **Objective 1.1**

##### **Pine-dominated Forest**

Over the life of the plan, promote transformation of up to 2,651 acres of pine-dominated forest towards a mature pine savanna with 80 to 100 trees per acre containing mature trees with a minimum average DBH of 10 inches, an open midstory, and an understory with an average diversity of 23 plant species per square meter to increase resident brown-headed nuthatch populations and breeding populations of Chuck-will's-widow.

##### **Discussion and Rationale**

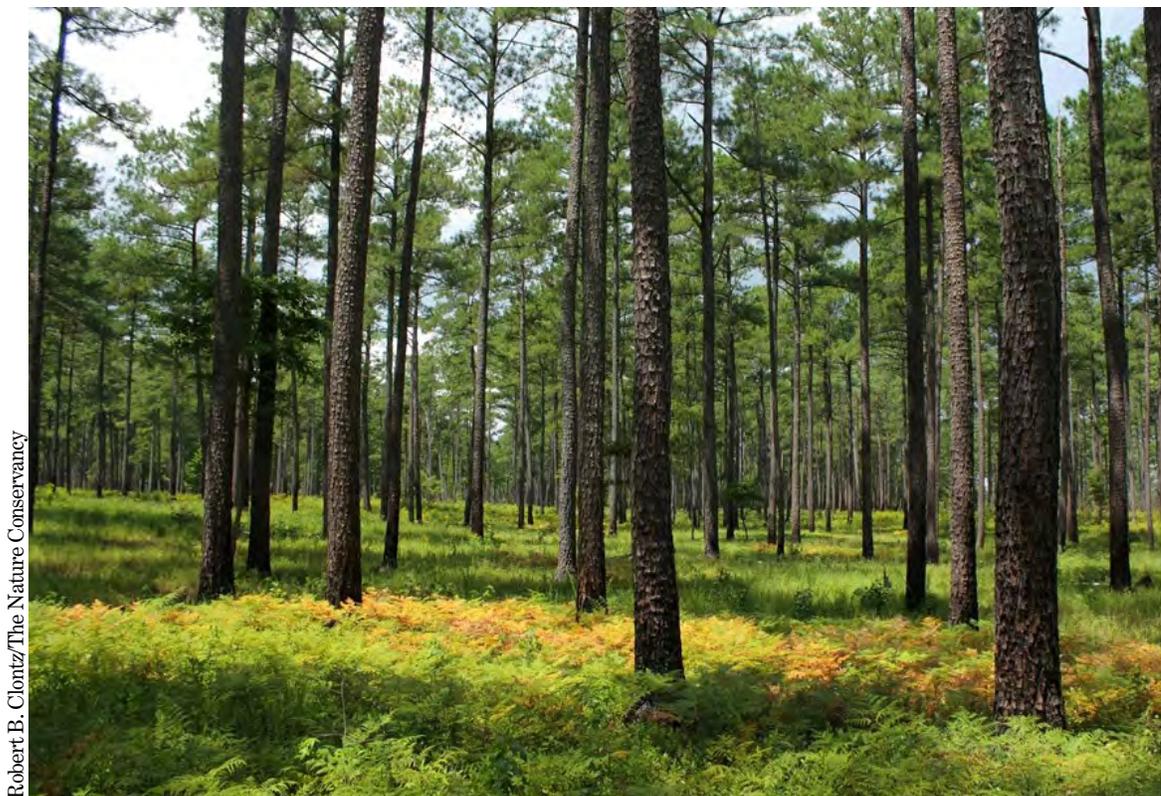
While there are small pockets of pine savanna in Virginia, this habitat is missing from the larger landscape context surrounding the refuge and is disappearing in the southeast region of the U.S. Today, pine savanna only covers 3.6 percent of its original range (Kelly and Bechtold 1990). Pine savannas are open, fire-dependent plant communities dominated by well-developed ground cover and some low-growing shrubs with only scattered trees. The open herbaceous understory of the dry pine ecosystem provides more diversity than almost any other upland habitat type in North America, an average diversity of 23 plants per square meter (Walker and Peet 1983), and the structure suitable for many ground nesting and foraging species including Chuck-will's-widow, bobwhite quail, and wild turkey (Straight and Cooper 2012, Stoddard 1931, Markley 1967). Decline of this habitat has been attributed to landscape fragmentation, logging operations, and fire suppression (Platt et al. 2006).

Regionally and locally important species are dependent on this habitat type. For example, the nesting brown-headed nuthatch populations would benefit from increased stand age and fire management practices because of the increase in dead standing trees for cavity nests (Wilson and Watts 1999, Wilson and Watts 2000). Brown-headed nuthatches almost exclusively forage on mature pine trees, focusing on insects in the spring/summer months and pine seeds during winter (Slater et al. 2013). Chuck-will's-widow nesting populations would benefit from a more open forest for nesting habitat. Though limited data on nesting Chuck-will's-widow exists, local birders have noticed increase in occurrence of individuals on the refuge in areas where thinning and prescribed burning operations are being conducted (Straight and Cooper 2012; Bose 2013 personal communication).

The previous forest management techniques of thinning the dense pine plantations were employed to increase forest health, reduce disease risk, and improve wildlife habitat. Under alternative B, we would undertake more intense active management through thinning and prescribed fire to work toward pine savanna as the desired future condition that would be achieved over the next 30 or more years. Within 10 years after approval of this plan, we would actively thin pines and use prescribed fire to reduce tree density to 200 trees per acre, control hardwood regeneration, and allow release of pines to increase DBH of mature trees to a minimum average DBH of 10 inches (25.6 cm), as preferred by brown-headed nuthatch (O'Halloran and Conner

1987). Over the next 30 or more years, the density of pine trees would be reduced to between 80 and 100 trees per acre. Active pine thinning and prescribed burning would also encourage herbaceous plant growth in the understory to develop the savanna habitat. Pine thinning and prescribed burning would enable ample sunlight to reach the forest floor; most herbaceous plants require ample sunlight (Kelly and Bechtold 1990).

Under alternative B, we would experimentally plant longleaf pine using the existing thinned areas within the forest as our experimental planting sites. Though loblolly pine is the dominant pine species and most of our habitat objectives can be reached in a loblolly pine ecosystem, the refuge lies along the northern edge of the historic range of longleaf pine (Bhuta et al. 2008). Longleaf pine is better adapted than loblolly to the dry, sandy soils often found in southeastern Virginia. Compared to loblolly, longleaf pine is a more long-lived species and is resistant to invasive pine beetles (Kelly and Bechtold 1990). The older, more closely spaced, and slower growing the pines, the more likely they are to be infested and killed by bark beetles. Furthermore, during southern pine beetle outbreaks, infestation can spread much more rapidly when trees are closer together (VDOF 2007). For these reasons, as well as for restoring some of the original biodiversity and aesthetic appeal that was lost with the disappearance of this habitat, there is great interest throughout the South in restoring longleaf in selected areas (VDOF 2007). We would widen the thinned corridors to allow more light to the planting area and promote longleaf pine growth (Kelly and Bechtold 1990). This method is preferred over a complete clear cut of the whole unit because of reduced cost and habitat that would still be available for wildlife.



Robert B. Clontz/The Nature Conservancy

*Pine savanna at The Nature Conservancy's Piney Grove Preserve in Sussex County, Virginia*

### **Strategies**

*Continue to:*

- Protect potential nest and roost trees to ensure ideal bald eagle habitat would continue to exist on the refuge.

*Throughout the life of the plan:*

- Protect 75 percent of trees with 24-inch DBH or greater.
- Protect snags that do not pose a threat to safety of refuge operations. Create dead trees in the interior of management units to replace snags that are removed.
- Actively work to remove the midstory through mechanical and fire treatments to promote development of pine savanna habitat.
- Promote an open understory of savanna habitat by mimicking natural fire regimes.
- Seed 1 to 1.5 acre decks used in logging operations with native grasses (e.g., broomsedge) to limit woody regrowth between thinning operations.

*Within 5 to 10 years of CCP approval:*

- Investigate longleaf pine restoration options by planting longleaf pine seedlings and/or saplings in widened thinning corridors as part of the existing forest management actions.

*Within 10 years of CCP approval:*

- Perform active thinning and fire management projects to reduce tree density to 200 trees per acre and allow release of pines to increase DBH of mature trees to a minimum average DBH of 10 inches (25.6 cm).

### **Inventory and Monitoring Activities**

*Continue to:*

- Conduct annual forest breeding bird point count survey.

*Throughout the life of the plan:*

- Coordinate with regional forester to conduct regular timber assessments.

*Within 5 years of CCP approval:*

- Conduct baseline inventory and identify long-term monitoring protocols for brown-headed nuthatch and breeding Chuck-will's-widow populations.

*Within 10 to 15 years of CCP approval:*

- Assess survivorship and cost-effectiveness of planting longleaf pine seedlings and/or saplings.

## **Objective 1.2**

### **Transitional Dry Hardwood Forest**

This habitat is not present under alternative B (0 acres).

### **Discussion and Rationale**

None.

### **Strategies**

None.

### **Inventory and Monitoring Activities**

None.

## **Objective 1.3**

### **Moist Hardwood Forest**

Over the life of the plan, maintain 775 acres of moist hardwood forest with 75 percent ground cover in leaf litter, 50 percent midstory cover from more than 10 native species, and 30 percent mature trees with a minimum DBH of 20 inches to protect year-round habitat for eastern box turtle and nesting habitat for breeding red-shouldered hawks and wood thrushes.

### **Discussion and Rationale**

The refuge contains 775 acres of hardwood forest, which is approximately 18 percent of the total refuge area.

Since refuge establishment, the emphasis for moist hardwood forest management has been to protect native tree species, especially those large trees with the potential to be used by nesting eagles, and limit public activities that would disturb eagles. The moist hardwood forest also provides important feeding and roost sites for wild turkey, stopover site habitat for neotropical migratory birds, feeding and bedding habitat for white-tailed deer, as well as feeding and nesting sites for cavity-nesting birds, hawks, gray squirrels and other native mammalian species (USFWS 1996, 2003, 2013).

Under this alternative, our forest management activities would continue to benefit bald eagles, as well as wild turkey, cavity-nesting avian species, various hawk species, and native mammalian species (USFWS 1996). Activities in the moist hardwood forest would contribute toward satisfying the following conditions applicable to all refuge forests:

- Produce up to 20 potential bald eagle nesting trees per acre over the next 60 to 80 years, with the potential addition of one to two additional active nest sites on the refuge within 60 years, and to result in no net loss of nest trees over the next 60 to 80 years.
- Provide and maintain nocturnal roost and feeding roost habitat in a condition capable of supporting a minimum of 150 bald eagles by identifying and protecting the existing and potential roost trees to assure ideal bald eagle habitat would continue to exist within the refuge.
- Provide for nesting and feeding habitats for cavity-nesting birds including wood ducks, woodpeckers, and songbirds. Retain all snags that do not pose a hazard during refuge operation.
- Develop a forest with three stages of foliage heights including mature, pole size, and seedling/brush cover types.

Under alternative B, we would focus on using three species as indicators of habitat quality and to trigger habitat management actions: eastern box turtle, wood thrush, and red-shouldered hawk. These species were chosen because their habitat requirements focus on different aspects of this habitat type. Although eastern box turtles are considered habitat generalists, they have

more specific requirements when it comes to overwintering. The refuge's moist hardwood forest floor provides ideal habitat for burrowing in soil or leaf litter to protect themselves from weather extremes (Erb 2011). The breeding wood thrush uses the midcanopy portion of the forest and is found in areas with a variety of mature deciduous tree species, moderate structure in the subcanopy and shrub layer, and a fairly open forest floor (Evans et al. 2011). The red-shouldered hawk nesting habitat is characterized by bottomland hardwoods with larger trees and reduced canopy cover (Moorman and Chapman 1996).

To satisfy all three of these species' needs, the moist hardwood forest would need to be intact at the forest floor, midstory, and canopy levels. Under this alternative, we would continue to protect these mature forests that are important for this each of these species. We would work to improve our understanding of these species on refuge property and monitor their populations during seasons of use. Monitoring changes in resident and breeding populations of the eastern box turtle, wood thrush, and red-shouldered hawk would give staff indication of the success of management strategies to protect this habitat.

### **Strategies**

*Throughout the life of the plan:*

- Limit activities (e.g., human and mechanical) that would disturb bald eagles and other forest dwelling species during the nesting season.
- Limit disturbance of forest floor to protect wildlife species dependent on this microhabitat.

### **Inventory and Monitoring Activities**

*Continue to:*

- Conduct annual forest breeding bird point count survey.

*Within 5 to 10 years of CCP approval:*

- Conduct baseline inventory and identify long-term monitoring protocols for eastern box turtle, wood thrush, and red-shouldered hawk.
- Conduct periodic habitat/vegetation assessment surveys.

## **Objective 1.4**

### **Floodplain Forest**

Over the life of the plan, maintain 633 acres of floodplain forest containing 30 percent mature trees with a minimum DBH of 20 inches, 20 percent trees with DBH between 15 and 20 inches, and 3,530 to 10,600 cubic feet per hectare of coarse woody debris to promote forest health and to protect nesting and roosting bald eagles, breeding prothonotary warblers, and resident spotted salamander populations.

### **Discussion and Rationale**

The refuge's existing 633 acres of floodplain forest would be maintained to provide nesting habitat for the benefit of bald eagles, the refuge purpose. Under alternative B, we would focus on nest and roost habitat for bald eagles. Mature trees adjacent to bodies of water are the most important for use as roost and foraging sites year round for both juvenile and adult bald eagles (USFWS 1996). As protection of this habitat from development or disturbance is limited outside of the refuge boundaries, these 633 acres

provide an important sanctuary for both migratory and resident bald eagles.

Under alternative B, we would also expand our focus to include prothonotary warblers and spotted salamander populations. Prothonotary warblers, a species in decline due to habitat loss on breeding and wintering grounds, are cavity nesters that select nesting sites in flooded, well-shaded bottomland hardwood forests with sparse understory (Petit 1999). With only 10 percent of the U.S. original bottomland forest remaining (Dickson et al. 1995), protecting forested tracts that are more than 247 acres (100 hectares) (Robbins et al. 1989) and riparian woodlands that are less than 98 feet wide (30 meters wide) (Kahl et al. 1985) is important for providing prothonotary warbler breeding grounds.

Most of the amphibian populations in the U.S. are declining nationally, with amphibian occupancy declining by 3.7 percent from 2002 to 2011. Those species that are red-lined by the IUCN declined an average of 11.6 percent annually (Adams et al. 2013). The spotted salamander is listed as an overall stable population (Hammerson 2004), but threats to local populations include intensive timber harvesting practices that reduce canopy closure, understory vegetation, uncompacted forest litter, or coarse woody debris (moderately to well-decayed) in areas surrounding breeding sites (deMaynadier and Hunter 1999). Resident spotted salamander populations require maintained forest habitat greater than 328 feet (100 meters) around breeding pools for dispersal during winter months. Maintaining connectivity of large forest blocks is a priority for this species and other amphibians as they avoid open areas and edges (Regosin et al. 2005). Butts and McComb (2000) recommend that 3,530 to 10,600 cubic feet per hectare (100 to 300 cubic meters per hectare) of coarse woody debris be retained for terrestrial salamanders.

There is little information on amphibian populations for either species on refuge property, but understanding their use of the refuge and monitoring their populations would be the inventory and monitoring focus in this habitat. We would use this information to inform management decisions and future plans to benefit wildlife species that depend on this habitat.

### **Strategies**

*Continue to:*

- Protect native trees.
- Not thin any floodplain forest areas.
- Limit activities that would disturb bald eagles, especially during nesting season.

### **Inventory and Monitoring Activities**

*Continue to:*

- Conduct spring and summer shoreline bald eagle surveys.
- Conduct annual forest breeding bird point count survey.

*Within 5 to 10 years of CCP approval:*

- Conduct baseline inventory and identify long-term monitoring protocols for prothonotary warblers and spotted salamanders.

- Conduct periodic habitat/vegetation assessment surveys.

## **GOAL 2**

### **NON-FOREST HABITAT**

Protect, enhance, and restore the ecological integrity of non-forest ecosystems to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient in anticipation of climate change.

#### **Objective 2.1**

##### **Freshwater Marsh and Shrub Swamp**

Over the life of the plan, maintain and promote natural hydrology and native plant species in 82 acres of freshwater marsh and shrub swamp for resident marsh wren populations and breeding least bitterns.

##### **Discussion and Rationale**

Approximately 80 percent of America's breeding population and more than 50 percent of its 800 species of protected migratory birds rely on wetlands (Mitsch and Gosselink 1993, citing Wharton et al. 1982). More than 95 percent of the commercially harvested fish and shellfish species are wetland dependent. Most freshwater fish depend on wetlands for spawning, and anadromous fish rely on them as nurseries for young fry. Wetlands also provide essential ecosystem functions that technology has yet to rival such as flood mitigation (especially riverine wetlands), storm abatement, and nutrient and toxic material filtering. Wetlands are significant for global cycles of nitrogen, sulfur, methane, and carbon dioxide (Mitsch and Gosselink 1993). Freshwater marshes and shrub swamps are types of freshwater wetland ecosystems.

The refuge contains 82 acres of freshwater marsh and shrub swamp, which is approximately 2 percent of the total refuge area. Freshwater marshes and shrub swamps are located primarily along Powell Creek and Flowerdew Hundred Creek adjacent to the floodplain forests. As discussed in chapter 2, these marshes typically occur as complexes dominated by large grasses, such as salt hay, bulrushes, cattails, and rushes.

Currently, much of the freshwater marsh and shrub swamp habitat is ecologically intact, with minimal presence of invasive species. Controlling and preventing the spread of invasive plants and animals, particularly common reed, nutria, and feral hogs, is an essential component of wetland protection and management. Most of the system is hydrologically intact; however, the culvert in the dike located in the southwestern portion of the refuge has filled in, reducing water from flowing between the wetlands on either side of the dike. The reduced water flow has resulted in an increase in sediment being deposited on the eastern side of the dike. We would investigate the hydrologic flow between the wetlands in the southwestern portion of the refuge and Powell Creek.

Freshwater marsh and shrub swamp habitats provide breeding, migratory, and overwintering habitat for a variety of waterfowl and waterbirds. The American black duck, which is a priority species in BCR 27, BCR 30, and the Virginia WAP, 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).

The freshwater marshes on the James River support colonies of breeding and wintering marsh wrens, a species of high priority in the BCR 30 plan. Because marsh wrens are pseudo-colonial nesters that would not nest in isolation, they require marshes large enough to accommodate multiple male breeding territories (Kale 1965, Picman et al. 1988, Spencer 2000). Marsh wrens breed in large freshwater or brackish marshes that have tall vegetation such as cattails, bulrushes, reeds, cordgrass, or needlerush (Gutzwiller and Anderson 1987). Least bitterns, a priority species in BCR 27, BCR 30, and the Virginia WAP, also occupy freshwater or brackish marshes with tall, dense emergent vegetation and clumps of woody plants over deep water (Poole et al. 2009), like those at the refuge. Because least bitterns are so secretive, population trend data is lacking and contradictory. The least bittern is sensitive to structurally different vegetation types (Winstead and King 2006); therefore, the invasion of common reed into refuge marshes may alter the wetland habitat and eliminate least bitterns from infested wetlands.

Under this alternative, we would conduct an inventory and monitoring program of existing and future conditions to identify potential changes and trends in freshwater marsh and shrub swamp habitat conditions or marsh wren and least bittern populations. Creating an inventory and monitoring program would also allow us to detect and respond to the presence of invasive species rapidly. We plan to use the inventory and monitoring program to inform us on potential changes, as well as to inform us on the outcomes of our management decisions. Ultimately, the inventory and monitoring program would direct our future management actions. For example, the inventory and monitoring program would enable us to understand the hydrologic conditions at the dike in the southwestern portion of the refuge.



Mark Vance

*Least bittern*

### **Strategies**

*Continue to:*

- Protect all native vegetation by limiting disturbance from refuge operations and public use in freshwater marsh and shrub swamp areas.

### **Inventory and Monitoring Activities**

*Within 3 years of CCP approval:*

- Investigate the hydrologic flow between the wetlands in southwestern portion of the refuge and Powell Creek.

*Within 5 to 10 years of CCP approval:*

- Conduct baseline inventory and identify long-term monitoring protocols for marsh wren and least bittern populations.

## **Objective 2.2**

### **Aquatic Habitats**

Over the life of the plan, support efforts of partners to maintain or increase submerged aquatic vegetation in 17 acres of aquatic habitat for the benefit of native species (e.g., Atlantic sturgeon, alewife, blueback herring) and protect this habitat from being degraded.

### **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 alewife, American shad, freshwater mussels, and as foraging and resting habitat for migratory and overwintering waterfowl, water birds, and bald eagles. 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 would 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. VMRC 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). Within James River NWR, Powell Creek is 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.

The James River adjacent to the refuge is listed as a category 5 impaired waterway for "Aquatic Life" and "Fish Consumption" uses, due to inadequate benthic community shores and elevated levels of PCB in fish tissues (VDEQ 2012). This news is countered by evidence that SAV has been increasing annually since 2006 along Powell Creek, the refuge's western border. In 2011, SAV was observed to cover the headwaters between 70 and 100 percent in fragmented patches throughout the majority of Powell Creek extending to its mouth at the James River (VIMS 2013). Continued efforts to improve water quality in refuge and adjacent waters are necessary.

Under this alternative, management of the James River and associated backwaters habitats would be fairly minimal. The aquatic habitat acreage within the refuge boundary is only 17 acres of non-contiguous waters. While it is a small component when considered in the context of the entire 10,432-square mile watershed, under this plan, we would engage activities that would maximize our beneficial contribution to the James River watershed's health.

The ability for Service to manage this habitat type is limited jurisdictionally. A variety of Federal and State agencies (including, but not limited to, USACE, VDEQ, VMRC, and VDGIF) oversee activities tied to waterway

bottoms, water quality management and navigation. Coordination with the appropriate agencies would be required for any action tied to this habitat type.

The 4,324-acre refuge would employ best management practices on refuge lands to minimize sedimentation to the James River. Additionally, existing wetlands and riparian buffer protection would continue within the refuge throughout the life of the plan.

We would investigate the hydrologic flow between the wetlands in the southwestern portion of the refuge and Powell Creek. The existing earthen dike restricts natural flow patterns of waters. This 300-foot-long by 20-foot-wide earthen dike was originally constructed to provide access to a 30-acre island for logging operations. The presence of the dike affects marsh hydrology. The existing culvert that is buried within the dike is no longer functional. The dike functions as a barrier to tidal flooding in the channel immediately south of the island. The impacts are most pronounced in the emergent marsh immediately east of the dike and south of the island. By restricting the connection with Powell Creek, the dike lengthens the flow path for tidal water. Instead of water flowing approximately 0.10 miles from Powell Creek, water must now pass about 0.60 miles through the tidal channel that wraps around the north and east side of the island. In the emergent marsh east of the dike, there is less tidal fluctuation than there was prior to dike construction (Wurster 2013 personal communication).

Water quality monitoring and data collection projects initiated by local universities or watershed organization would be encouraged. Monitoring of tidal creeks and aquatic habitats may provide critical reference information, because other aquatic resources outside of the refuge are affected by global climate change and land use changes.

### **Strategies**

*Continue to:*

- Implement best management practices for construction and land management activities to minimize potential release of sediment load and deposition in the James River.
- Maintain vegetated riparian areas and natural habitats.
- Collaborate with State and Federal partners to maintain fish populations suitable for wildlife consumption (i.e., bald eagles) and public recreation opportunity.
- Support partner efforts to restore federally listed Atlantic sturgeon habitat.
- Assist partners in promoting James River watershed protection and health, and contribute to the recovery of species of conservation concern (e.g., Atlantic sturgeon, alewife, blueback herring).

*Within 10 to 15 years of CCP approval:*

- Plant native species along disturbed or denuded riparian areas.

### **Inventory and Monitoring Activities**

*Continue to:*

- Work with partners to monitor water quality stations in refuge vicinity.
- Support partner efforts to monitor federally listed Atlantic sturgeon habitat.
- Work with partners to monitor SAV.

*Throughout the life of the plan:*

- Make use of the Virginia Institute of Marine Science monitoring of SAV to evaluate success.

*Within 3 years of CCP approval:*

- Investigate the hydrologic flow between the wetlands in the southwestern portion of the refuge and Powell Creek.

### **Objective 2.3**

#### **Erosional Bluff**

Over the life of the plan, maintain and promote native vegetation on 3 shoreline miles to help stabilize bluffs, reduce erosion, and provide nesting substrate for breeding bank swallows.

#### **Discussion and Rationale**

Three shoreline miles of erosional bluff occur along the refuge's border with the James River. While the unconsolidated soils along the bluffs provide habitat for burrowing wildlife, the soils are easily eroded and transported into adjacent waterways. Since refuge establishment, our habitat management activities have emphasized using best management practices to localize and minimize soil disturbance, as well as alteration of existing topography and limiting disturbance to roosting bald eagles, throughout the refuge (USFWS 1989, USFWS 1996, USFWS 2003).

Under alternative B, we would continue to maintain the existing erosional bluff habitat by limiting activities that would disturb existing topography and standing vegetation, whether live or dead. We would increase our shoreline monitoring efforts to determine if any erosion is occurring at a rate that is adversely impacting the refuge and assess the sediment load transported into the James River. We would also monitor this habitat for any potential impacts that could be attributed to climate change, such as sea level rise or salinity change effects on vegetation. By formally monitoring our shoreline conditions, we would be better able to determine how best to balance our responsibilities to provide nesting habitat for species that are dependent on this erosional bluff habitat (such as bank swallow) while also limiting the transport of sediment in to the James River.



*Erosional bluff habitat along the James River*

Cyrus Brame/USFWS

According to the national breeding bird survey data for 1966 through 2007, bank swallow populations nationwide are experiencing a significant decline of approximately 2 percent per year (NatureServe 2009). Habitat alteration by humans has been identified as the only major known threat to this species. The growing emphasis on implementing flood and erosion control projects and streamflow regulation projects has eliminated much of the nesting habitat for bank swallows in California (Garrison 1998). Conversely, sand and gravel mining activities can create new nesting habitats.

### **Strategies**

*Continue to:*

- Protect all standing, live or dead, native trees in erosional bluff areas by not removing vegetation and limiting mechanical equipment use in areas around waterways and steep slopes.

*Within 10 to 15 years of CCP approval:*

- Investigate and employ shoreline erosion control techniques to promote bank stabilization and protect bank swallow habitat, if appropriate.
- Strategically plant key plant species (e.g., bald cypress) to break up wave energy, if appropriate.

### **Inventory and Monitoring Activities**

*Within 5 years of CCP approval:*

- Conduct shoreline erosion surveys and document bank loss.

*Within 5 to 10 years of CCP approval:*

- Conduct baseline inventory and identify long-term monitoring protocols for breeding bank swallow populations.

## **Objective 2.4**

### **Non-forested Upland**

Over the life of the plan, maintain 15 acres of non-forested upland for administrative purposes (e.g., weather station operation).

### **Discussion and Rationale**

The refuge currently mows 13 acres as non-forested upland, which is less than 1 percent of the total refuge area. We regard these areas as incidental habitat of low value to wildlife, especially grassland birds, because of their small size and low-quality vegetation.

To prolong the onset of succession to transitional and eventually mature forest, and to support administrative uses of these areas, non-forested upland would continue to be mown at least once a year and cedars would be thinned or removed (USFWS 1996). Maintaining a mature forest with small pockets of non-forested upland is in keeping with the historic natural landscape of the area (Watts 1999).

Under alternative B, we would selectively cut up to 2 acres of pine-dominated forest adjacent to the existing weather station as preventative maintenance to promote functioning of the station. Tall trees in the vicinity of the weather station can adversely affect signal transmission from the weather station to the satellites (National Wildfire Coordinating Group 2012; Craig 2013 personal communication). Under alternative B, a total of 15 acres would be maintained as non-forested upland for administrative purposes.

We would continue to monitor infestations of invasive species and increase control of specific highly invasive species as resources allow. The VDCR published an advisory list of invasive alien plant species of Virginia to inform land managers of potential risks associated with certain plant species known to exhibit invasive behavior in some situations ([http://www.dcr.virginia.gov/natural\\_heritage/invspdpdlist.shtml](http://www.dcr.virginia.gov/natural_heritage/invspdpdlist.shtml); accessed August 2013). This list details light and moisture requirements, habitat regions, and degree of invasiveness for Virginia's most troublesome invaders. The species are ranked as highly invasive, moderately invasive, or occasionally invasive. Tree-of-heaven and Japanese stiltgrass are among the highly invasive species known to occur within or along the edges of the refuge's non-forested upland (Brame 2013 personal communication).

### **Strategies**

*Continue to:*

- Mow at least once a year.

*Within 3 years of CCP approval:*

- Selectively cut up to 2 acres of pine-dominated forest around the weather station and manage it as non-forested upland to maintain equipment functions.

### **Inventory and Monitoring Activities**

None.

## **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 lower James River.

### **Objective 3.1**

#### **Cultural Resource Protection**

Within 5 years, use more precise information about archaeological sites to protect known archaeological sites and better inform refuge management decisions.

#### **Discussion and Rationale**

James River NWR contains significant archeological sites that have the potential to advance our understanding of Virginia prehistory and history. The sites surviving at the refuge chronicle Native American culture, initial settlement of the James River by Europeans, Native American resistance against European settlement, Plantation society, military history, post-Civil War rural agriculture, and 20th century African and Native American adaptation to the lack of economic opportunity. The sites are potentially significant regionally and perhaps nationally.

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 NHPA. We would continue to consult the RHPO and SHPO early in project planning for activities that may involve ground disturbance. To date, projects requiring such review on the refuge have been limited. In preparation for this CCP, an archaeological overview of the refuge was prepared (Goode et al. 2007). That study located 47 new archaeological sites based on historic background research. A model of

prehistoric archaeological site location and areas of high sensitivity were developed and can now be used to inform future refuge management actions.

The existing FMP (USFWS 2006) calls for protecting known archaeological sites and sensitive areas by delineated an area where forest management activities are not conducted. Conducting archaeological surveys before ground disturbing activities occur helps to ensure that vulnerable archaeological sites are identified and appropriate management actions are developed for the sites. In addition, by more precisely locating the sites, less acreage will need to be excluded from logging. Such surveys are conducted under Section 106 of the NHPA in advance of the proposed logging or could be conducted as part of a more comprehensive inventory of sensitive areas designed to improve management information for the refuge in the future to satisfy Section 110 of the NHPA.

We would continue to conduct forest management activities at James River in accordance with SHPO-reviewed standard operating procedures and VDOF Best Management Practices (USFWS 2006), to allow logging to occur without further SHPO review. If necessary, we would work cooperatively to update the standard operating procedures to ensure protection of the refuge's cultural resources.

The current standard operating procedures include:

- Outfitting any equipment with high flotation tires.
- Marking known archaeological sites in the field and excluding these areas from any forest management activities.
- Using grapple skidders instead of cable skidders.
- Creating any new log landings without lowering the grade.
- Using skid trails only on level stands where no water diversion will be needed.
- Using only low pressure equipment for pre-mechanical thinning of small diameter trees.
- Identifying areas excluded from being logged.



Cyrus Brame/USFWS

*Skids used by forest management equipment*

We suspect archaeological sites along the refuge's shoreline and steep slopes may have been damaged by erosion. Under alternative B, three known archaeological sites would be evaluated and would possibly need stabilization (Small 2013 personal communication). Shoreline protection efforts we plan under objective 2.2 would also serve cultural resource protection; however, development and implementation of restoration plans would likely take more than 5 years to adequately prevent further shoreline erosion. At the same time, some of the shoreline protection efforts, such as tree planting and promoting forest succession on the refuge, could negatively impact archaeological sites. For example, the growing roots of trees could damage intact cultural levels and features (Kirchen 2013 personal communication). The development of a proactive NHPA Section 110 initiative 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.

### **Strategies**

#### *Continue to:*

- Consult with the RHPO and SHPO regarding refuge activities that have the potential to disturb the ground.
- Ensure that refuge activities are conducted in accordance with the approved standard operating procedures for mechanical pine thinning and fire management.

#### *Throughout the life of the plan:*

- Stabilize sites vulnerable to erosion.
- Conduct targeted archaeological Phase I surveys on strategically determined sensitive locations related to habitat management and survey structures on the refuge to determine eligibility for the National Register.
- Protect indigenous cultural landscapes of the moist hardwood forest, floodplain forest, freshwater marsh and shrub swamp, aquatic habitats, and erosional bluff.
- Promote professionally qualified and permitted archaeological research and study to expand professional knowledge and understanding of the objects, their context, and relevance.
- Assemble artifacts and field records of previous archaeological excavations on the refuge in a repository that meets Department of Interior standards to make them available for research and interpretation.

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

- In advance of conducting forest management activities, refuge staff would prepare a list of the pine-dominated stands to be logged and Service archaeologists would map and flag archaeological sites and sensitive areas with a buffer zone of 200 feet.

### **Inventory and Monitoring Activities**

*Within 5 years of CCP approval:*

- Establish an archaeological site monitoring program, including both a baseline assessment of the two major excavated archaeological sites, site visits, and mapping to record location information and monitor site condition.

## **GOAL 4**

### **WILDLIFE-DEPENDENT RECREATION**

Provide wildlife dependent recreational opportunities for visitors to connect with nature and foster enhanced stewardship of the lower James River, Chesapeake Bay estuary, and the National Wildlife Refuge System.

#### **Objective 4.1**

#### **Hunting**

Over the next 3 to 5 years, provide high quality recreational hunting opportunities and complete all the administrative requirements to expand the existing deer hunt, add new hunts, and promote youth hunt involvement.

#### **Discussion and Rationale**

Hunting is one of the six priority public uses as outlined in the Refuge Improvement Act. We recognize deer hunting as a long-established, traditional outdoor pastime in this area of Virginia. When managed responsibly, it can instill a unique appreciation of wildlife, their behavior, and their habitat needs. Service policy also states that, where practicable, we should make our hunt regulations consistent with State regulations.

Under this alternative, we would continue to administer the refuge's existing deer hunt while completing administrative requirements to expand the refuge's existing deer hunt and open the refuge to wild turkey and waterfowl hunting within 5 years of CCP approval. Promoting youth involvement in the refuge's existing deer hunt does not require us to complete any additional administrative documentation.

We would provide visitors with information related to the hunting opportunities at the refuge and to refuge-specific and State hunting regulations through various media, including the refuge website, signage, and brochures. For example, all materials related to the hunting program would promote the use of lead-free shot by hunters. Ingestion of lead-contaminated soil and prey are principal pathways for wildlife exposure (Kendall et al. 1996, Pattee and Pain 2003). Sensitivity to lead toxicity varies among bird species, but in most instances a single lead shot can kill a bird (Eisler 1988, Sanderson and Bellrose 1986). Lead shot has been found to have harmful effects on birds, particularly waterbirds, because of their feeding habits (Michael 2006). Laboratory studies show that an amount of lead as small as 82.5 milligrams can be lethal for a bald eagle (Pattee et al. 1981, Hoffman et al. 1981); this lethal amount represents less than one percent of a single 12-gauge slug, a single 20-gauge slug, or a single muzzleloader bullet. Promotional materials regarding lead-free shot would provide hunters with information on the impacts of lead shot on wildlife; encouragement to use cost-effective, lead-free ammunition when hunting deer and turkey on the refuge, as well as at non-refuge locations; and actions that can be taken to protect wildlife from contamination when lead shot is used.

Lead-free shot is required by Federal and State regulation for hunting all waterfowl, mergansers, coots, moorhens, gallinules, snipe, and rails (51 FR

23443, codified at 50 CFR 20.21; <http://www.dgif.virginia.gov/hunting/regulations/2013-2014-waterfowl-booklet.pdf>, accessed July 2014), but lead-free shot is not currently required by State law or refuge-specific regulation for deer or turkey hunting. While completing the administrative requirements for the proposed expanded hunt program, we would investigate the required use of lead-free ammunition for deer and turkey hunting. This would include identifying the impacts of lead exposure from hunting activities on wildlife as well as the impacts of lead ammunition restrictions on hunters.

#### *Expanded Deer Hunt*

Deer are common in the upland hardwood and mixed forested areas of the refuge. Woody herbaceous and fruit-producing plants are important to deer populations throughout the southeast (including Virginia). Acorns are a major component of whitetails' fall diet (Dickson 2001), and oak trees are common in the moist hardwood forests on the refuge. A substantial amount of escape cover, used for fleeing predators and bedding, is available in the refuge's pine forest. The refuge has a harvestable population, habitat that deer prefer, and the means to administer public hunting opportunities. The hunt is provided as a recreational opportunity and contributes to maintaining county herd populations.

Since the 1940s, VDGIF has based deer populations on harvest totals. The estimated deer population has been steadily increasing throughout the State, from low of 4,019 in 1947 to a high of 259,147 in 2008. The 5-year average for Prince George County is 2,254 deer, and this number is both holding relatively stable and similar to Statewide trends (<http://www.dgif.virginia.gov/wildlife/deer/harvest/index.asp>; accessed August 2013).

As detailed in chapter 2, the refuge offers public deer hunting opportunities to maintain the population of white-tailed deer at a level commensurate with the biological carrying capacity of the available refuge habitat and to provide high quality wildlife-oriented recreation. We offer hunting opportunities for public deer hunting on specific days during the State's archery, muzzleloader, and shotgun seasons. The refuge harvest totals support that objective of having a stable deer population, with a female harvest rate of approximately 40 percent of the total deer kill (VDGIF 2013). Based on the past 5 years of available State participation data and refuge harvest success ratios, deer hunters participating in our muzzleloader and shotgun seasons have a successful harvest ratio that is nearly the State average for 2012 (Brame 2013 personal communication).

Under alternative B, we would continue to offer public deer hunting opportunities to maintain the population as determined by the State, and to continue providing this type of high quality wildlife-oriented recreation. We would offer a mix of archery, shotgun, and muzzleloader hunting opportunities on 1,460 hunter use days. We would increase the total number of hunter use days on the refuge by increasing the number of muzzleloader hunt days and participating in the State's Youth Deer Hunt Day.

We propose increasing the number hunt days in the muzzleloader hunting season, as opposed to increasing the archery or shotgun season, for two reasons. First, hunters wishing to participate in muzzleloader hunting

opportunities are also interested in participating in shotgun hunting opportunities. We have heard from hunters that increasing the number of muzzleloader hunt days on the refuge would be of interest because they have less opportunity on non-refuge lands to hunt, largely due to private hunt club restrictions, during muzzleloader season (Brame 2013 personal communication). Second, we have documented that hunters participating in our muzzleloader season have a higher rate of success than hunters participating in the refuge's archery or shotgun hunt seasons (Brame 2013 personal communication). Increasing our muzzleloader hunt days would help to satisfy the public request for more deer hunting opportunities on the refuge and meet our need to provide a quality hunt.

We would make administrative changes to our hunt program and enhance our promotional efforts to increase hunter participation in each of the hunts offered. We would enhance our promotional efforts through various media, including our refuge website and VDGIF, to reach a larger audience. By having a large pool of hunters that are familiar with the refuge opportunity, we would fill available hunting spaces and issue more permits on the day of the hunt on a first-come, first-served basis. We aim to increase hunter participation to 35 percent annually, across the three hunt seasons. This would include the 19-day archery season, during which participants are authorized to hunt every day available to them, but rarely do. A 35 percent hunter participation means that hunting would occur on at least 511 of the total 1,460 hunter use days offered annually.

#### *New Hunts*

Turkey Hunting. VDGIF and the public requested we consider providing opportunities for turkey hunting at James River NWR. Turkey hunting is an extremely popular form of hunting in Virginia. During the 2011-2012 hunt season, turkey hunters accounted for 38 percent of all hunters in Virginia (VDGIF 2013). In 2011 to 2012, Virginia hunters were asked how important different forms of hunting were to them; spring turkey season ranked 2nd and fall turkey season ranked 3rd most important (VDGIF 2013). In addition, a Service-led visitor services review (USFWS 2010b) recommended that James River NWR explore possibility of fall turkey hunting opportunities that could couple with or compliment the deer hunt without additional staff involvement. VDGIF established a youth spring gobbler hunt day in 2004 and a youth fall turkey hunt day in 2008. In 2013, nearly 3 percent of the spring gobbler harvest (522 birds) occurred during the Special Youth Season (<http://www.dgif.virginia.gov/wildlife/turkey/springharvestsummary.asp>; accessed June 2014).

Wild turkeys are common in the hardwood and mixed forested areas of the refuge (USFWS 1992). Oak mast is the most important spring and winter food for wild turkeys (Hurst 1992) and greatly influences wild turkey population dynamics (Steffen et al. 2002). Oak trees are common in the moist hardwood forests on the refuge. While no reliable, economically feasible method exists for accurately estimating turkey populations in Virginia, research shows that the best indices of turkey population trends and abundance are spring gobbler harvests and success by hunters (VDGIF 2013). Relative densities of wild turkey populations in the immediate vicinity of the refuge in 2012 were found to be high with populations stable or increasing across the region from 2003 to 2012 (VDGIF 2013).

Under alternative B, we propose to open the refuge to accommodate up to 1,260 turkey hunter use days annually. We would offer wild turkey hunting during the State's fall season in conjunction with the refuge's fall archery and muzzleloader deer hunt seasons and 3 days of wild turkey hunting during the State's spring season. A hunter participating in a refuge hunt during a fall designated deer and turkey hunt day would be allowed to take either species or both.

Developing a wild turkey hunting program would give us the opportunity to provide additional hunting opportunities to the surrounding community, potentially attracting a new hunter user group of hunters interested in taking only turkey during a combined deer and turkey hunt. Under this alternative, offering a spring turkey season would also enable us to offer a different hunt opportunity that would attract a new and different hunter user group. Gobbler-only hunting in the spring is a different hunting approach that taking turkey while hunting for other species.

We would be able to open the refuge to limited spring turkey hunt opportunities when we complete the administrative requirements for opening the refuge to this new hunting opportunity, establish the necessary thinning and burning regime for the pine-dominated forest to transition toward a pine savanna, and complete public use infrastructure improvements to support this new hunting opportunity. We would coordinate closely with VDGIF to keep informed about State hunting regulations, trends in turkey populations, and disease outbreaks to most effectively manage the wild turkey hunting program at the refuge.

Waterfowl Hunting. The public requested we consider providing opportunities for waterfowl hunting at James River NWR. A 2010 survey of Virginia waterfowl hunters showed that what made for an enjoyable waterfowl hunting experience included being in the field and enjoying the outdoors (89 percent); seeing waterfowl (87 percent); and being able to hunt with friends or family (85 percent). Only 9 percent of Virginia waterfowl hunters accompanied a youth on the designated youth waterfowl hunting day during the 2009 to 2010 season (Jagnow et al. 2010).

In the late 1990s, the Service began promoting youth waterfowl hunting. To promote youth involvement in waterfowl hunting at James River NWR, we propose to open the refuge to accommodate up to four hunters (at least one youth hunter per licensed adult companion on each of 10 days; 40 waterfowl hunter use days) during the State's season. Waterfowl hunting would be allowed on the refuge from one stationary blind that would accommodate up to four people, which would also serve as a wildlife observation and photography blind on non-hunt days. We propose to construct the blind at the northern most tip of the Powell Creek trail. On waterfowl hunt days, we would close a portion of the wildlife observation trail to minimize the potential for user conflicts and safety concerns.

#### *Promote Youth Hunt Involvement*

The VDGIF and public requested that we consider promoting youth hunt involvement. State fish and wildlife agencies across the Nation have reported significant declines in the number of youth hunters (Engelmeyer 2013 personal communication). Virginia has observed a 30-year decline in hunting license sales and, in response, has implemented a youth hunting program

(<http://www.dgif.virginia.gov/about/board/issues/hunter-recruitment-retention/hunter-recruitment-retention-presentation.pdf>; accessed August 2013). The State has designated specific youth hunt days outside of regular hunt seasons to provide youth with the opportunity to learn how to hunt from experienced, licensed hunters.

Under this alternative we would offer youth hunting at the refuge on the State youth deer, turkey, and waterfowl hunt days that are designated in the annual issue of *Hunting and Trapping in Virginia* Regulations Digest. By providing separate youth hunt days on the refuge, we would contribute to the State and Service's goals of developing a new generation of hunters and fostering a sense of stewardship for the environment.

Although no new specialized infrastructure would be required to solely support youth hunting opportunities, we would renovate the interior and exterior of the hunter check station to become a visitor contact station. The visitor contact station would have the look and feel of an old-time hunting and fishing lodge. We would include features such as archival hunting and fishing photos and wildlife mounts to complement a comfortable, down-home setting. We would highlight how hunters and anglers contributed to the early conservation movement, as well as the rich history of the Service. Sustainable materials and green technologies would be featured throughout the visitor contact station. The footprint of the visitor contact station would not change unless required to meet ADA requirements. If any required changes result in an increase in footprint, we aim to avoid or minimize the potential for ground disturbance. The visitor contact station would continue to be a staging and registration area for all hunt programs.

### **Strategies**

*Continue to:*

- Administer public deer hunt in accordance with the approved hunt management plan (1993) and subsequent amendments to accommodate up to:
  - ❖ Fifty hunters to hunt on any or all days within one 19-day archery season (950 hunter use days annually).
  - ❖ Seventy hunters per day on each of 2 muzzleloader hunting days (140 hunter use days annually).
  - ❖ Seventy hunters per day on each of 4 shotgun hunting days (280 hunter use days annually).

*Throughout the life of the plan:*

- Allow adaptive management of hunt days offered based on State monitoring program (DMAP) recommendations for herd management.

*Within 3 years of CCP approval:*

- Improve hunt administration processes to increase hunter participation.
- Enhance promotion of the hunt to a larger audience, including youth.
- Construct a four-person stationary blind along the northern peninsula of the Powell Creek trail.

*Within 5 years of CCP approval:*

- Complete all administrative requirements for the proposed expanded hunt program once the CCP is approved and resources are available, including developing a separate NEPA document, compatibility determination, hunt plan, and further public involvement, to accommodate up to:
  - ❖ Deer:
    - Fifty hunters on any or all days within one 19-day fall archery season (950 hunter use days annually).
    - Seventy hunters per day on each of 3 fall muzzleloader hunting days (210 hunter use days annually).
    - Seventy hunters per day on each of 4 fall shotgun hunting days (280 hunter use days annually).
    - Twenty youth hunters to participate in the 1 fall State Youth Deer Hunt Day (20 hunter use days annually).
  - ❖ Turkey:
    - Fifty hunters per day on any or all 19 days, in conjunction with the 19-day fall archery deer hunt season (950 hunter use days annually).
    - Seventy hunters per day on each of 3 hunt days, in conjunction with fall muzzleloader deer hunt season (210 hunter use days annually).
    - Twenty hunters per day on 3 days during the State's spring season (60 hunter use days annually)
    - Twenty youth hunters on 1 spring day and 1 fall day, in conjunction with the State's Youth Turkey Hunt Day (40 hunter use days annually).
  - ❖ Waterfowl:
    - Open one location on Powell Creek for four hunters (at least one youth per licensed adult) on each of 10 hunt days (40 hunter use days annually).
- Provide visitors with general information on the expanded hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote use of lead-free ammunition.
- Investigate the required use of lead-free ammunition for deer and turkey hunting, including identifying the impacts of lead exposure from hunting activities on wildlife and the impacts of lead ammunition restrictions on hunters.

*Within 5 to 15 years of CCP approval:*

- Renovate the hunter check station with features that are similar to an old-time hunting and fishing lodge (archival hunt/fishing photos, mounts, and comfortable/downhome setting). The facility would highlight the rich history of the Service and the conservation movement and serve as a staging/registration area for all hunt programs.

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

*Continue to:*

- Monitor harvest success ratios, harvested game species health, and public safety.
- As needed throughout the year, coordinate with DGIF District Biologist to evaluate game species population size, disease issues, and current regulations.
- Participate in the VDGIF DMAP.

*Within 5 years of CCP approval:*

- Request that each waterfowl hunt participant complete the Migratory Bird Hunt Report (FWS form 3-2361).

### **Objective 4.2**

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

Over the next 10 years, provide infrastructure within a designated area to support opportunities for visitors to participate in wildlife observation, photography, environmental education, and interpretation to improve the quality of visitor experiences.

#### **Discussion and Rationale**

Wildlife observation, photography, environmental education, and interpretation are four of the six priority public uses as outlined in the Refuge Improvement Act. When managed responsibly, these uses can instill refuge visitors with a deeper appreciation for wildlife, their behavior, and their habitat needs.

As part of the data gathering process for developing the Virginia Outdoor Plan (VOP), VDCR sponsored an outdoor demand survey in 2011. The Statewide survey asked respondents to select up to three recreation opportunities that are most needed in Virginia from a list of possibilities. The most frequently selected choices were trails for hiking and walking (68 percent); public access to State waters for fishing, swimming, and beach use (60 percent); and access to natural areas (55 percent) (Ellis et al. 2012).

A Service-led visitor services review (USFWS 2010b) recommended that the refuge:

- Provide unreserved access to Powell Creek Trail.
- Consider extending the Powell Creek Trail to provide a richer experience.
- Ensure part of this trail is ADA-compliant.

- Consider converting the existing hunter check station into a visitor contact station.

Within 5 years of CCP approval, we would complete a VSP to designate a 240-acre area adjacent to Powell Creek in which we would develop public use infrastructure (maps 3.5 and 3.6) to support wildlife observation, photography, environmental education, and interpretation. We believe that designating a total of 240 acres to support these public uses would dovetail well with our habitat management actions under this alternative.

Within the public use area, we would improve public parking by providing an area to support up to 20 vehicles and a bus (approximately 14,000 square feet). The new parking area would include a trailhead that would provide access to the existing 0.5-mile trail. Following the development of the parking area and trailhead, we would open the existing 0.5-mile trail to wildlife observation, photography, environmental education, and interpretation from sunrise to sunset. The public use area would be open throughout the year, including on refuge hunt days. However, we would administer the hunt programs in a manner that ensures public safety. Wildlife observation, photography, environmental education, and interpretation would be conducted on designated refuge roads and trails in all Service-owned areas open to the public.

We would improve the refuge's restroom facilities and renovate the hunter check station to become the refuge's visitor contact station as discussed under objective 4.1 (above). We would upgrade the existing equipment shed to serve as an outdoor meeting space for partners promoting Service mission-related topics. The location for new facilities would be selected based on ease of access, high value for watchable wildlife opportunities, clearly defined man-made features and natural barriers (e.g., archaeological resources, roads, and waterways), and placement away from conflicting upland habitat management and consumptive recreational activities (e.g., prescribed burns, mechanical thinning, and hunting). Completion of these facility improvements and other improvements that may be proposed in the VSP would allow us to accommodate an increase in refuge visitation and lift our refuge permit requirement to visit, while ensuring compatibility with the Refuge System mission and refuge's purpose.

We would also provide local, regional, and national visitors an opportunity to connect with nature and learn about our diverse ecosystem. Within Prince George County, green spaces designated for wildlife observation opportunities and preserved native habitats are lacking. We would work more actively with Prince George County Parks and Recreation Department to provide environmental education and interpretation programs. James River NWR is located within a 25-mile radius of Richmond, which makes it a candidate for an urban refuge. To reach out to this key audience, we would develop an urban partnership to coordinate with local schools to establish regular visitation and introduce community youth to the natural resources within their county. Biology classes could use the trails and facilities as an outdoor classroom, as a location for stewardship project, or as a place to encourage connections with nature.

Within 5 to 10 years of CCP approval, we would continue to improve visitor support facilities in designated areas. For example, we would extend the

existing 0.5-mile trail to 3 miles, including a portion that would be ADA-compliant; improve vehicular ingress and egress route(s) on the refuge and establish two additional parking areas, each of which would accommodate up to five vehicles for trail users; and improve the existing canoe/kayak launch to provide access to Powell Creek for canoes, kayaks, and non-trailerred, hand-launched boats with small electric motors. Completion of these and other facility improvements would support an increase in refuge visitation in the long term.

Within the life of the plan, we would relocate the maintenance complex from the public use area to a less public location that would also improve our refuge operational efficiency.

We would monitor existing and newly constructed infrastructure used by visitors to determine use patterns and capacity limits, as well as monitor impacts on vegetation and wildlife within public use area and track trends.

### **Strategies**

*Continue to:*

- Require participants to request a refuge-issued permit three business days in advance of proposed visit until signage and visitor support facility improvements are completed.

*Within 5 years of CCP approval:*

- Designate a 240-acre area adjacent to Powell Creek in which we would develop public use infrastructure.
- Improve public parking (approximately 14,000 square feet, sufficient for 20 vehicles and a bus) and establish a trailhead that would provide access to the existing 0.5-mile trail.
- Open public access from sunrise to sunset.
- Improve restroom facilities and renovate hunter check station to become a visitor contact station.
- Upgrade equipment shed to serve as an outdoor meeting space for partners promoting Service mission-related topics.
- Partner with Prince George County Parks and Recreation Department to administer environmental education and interpretation programs.

*Within 5 to 10 years of CCP approval:*

- Improve visitor use facilities in designated areas, in particular:
  - ❖ Extend the existing 0.5-mile trail to become a 3-mile wildlife observation trail system with:
    - A pedestrian walkway as part of the trail, which doubles as an observation platform along steep valleys.
    - An improved canoe/kayak launch.
    - An improved vehicular ingress and egress route(s) and establish

two additional parking areas (combined total of approximately 7,000 square feet, sufficient for five vehicles each).

- An improved access at Powell Creek to accommodate nature trail users' access to island.
  - Develop interpretive signs and brochures to address topics of interest including, but not limited to, bald eagle life history and recovery success, forest management, and indigenous cultural landscapes.
  - Construct a four-person wildlife observation/photography blind along Powell Creek.
- Provide refuge or partnered-sponsored programs throughout the year, using a reservation system only when space or equipment is limited (such as boat trips or canoe sojourns).
  - Offer two boat tours annually, specifically to observe bald eagles.
  - Develop an urban partnership to coordinate with local schools to establish regular visitation and introduce community youth to the natural resources within their county.

*Within the life of the plan:*

- Relocate the maintenance complex from the area of high visitor use to a more centralized, non-public location.

**Inventory and Monitoring Activities**

*Continue to:*

- Monitor conditions of existing facilities and infrastructure used by visitors (e.g., trail, restrooms, kiosk).

*Throughout the life of the plan:*

- Monitor existing and newly constructed infrastructure used by visitors to determine use patterns and capacity limits.
- Monitor impacts on vegetation and wildlife within public use area and track trends, adjust public access as necessary.

**Objective 4.3**

**Fishing**

Over the next 5 years, open the refuge to year-round fishing at up to two designated locations to accommodate up to 1,460 anglers annually.

**Discussion and Rationale**

The Refuge Improvement Act identifies fishing as a priority wildlife-dependent recreation activity. It states, "Compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System." As with hunting, we recognize fishing as a healthy, traditional outdoor past time and an important cultural activity in this area of Virginia. Fishing promotes public understanding and appreciation of natural resources and their management on lands and waters in the Refuge System.

We received public comments requesting that the refuge be opened to

recreational fishing and that we provide public access to waterways for fishing. Additionally, according to the 2007 VOP (VDCR 2007), fishing ranked as the seventh most popular outdoor recreational activity; improved access to Virginia's rivers and streams is necessary to meet water-related recreational demands.

Under this alternative, the refuge would remain closed to fishing until we completed the administrative requirements to open the refuge to fishing. We would complete these administrative requirements within 5 years of CCP approval.

Under this alternative, we would open the refuge to fishing at up to two designated locations within 5 years of CCP approval and completion of administrative requirements to open the refuge to this use. Both locations would provide access to fishing in Powell Creek. At the first location, we would improve the infrastructure at the canoe launch site to establish it as a fishing location. Improvements at this site would also facilitate non-trailerred, hand-launching of canoes, kayaks, and boats with small electric motors for fishing access to Powell Creek. At a second location along Powell Creek (yet to be determined), we would create infrastructure to establish a fishing location. The second fishing location would be sited to ensure that a quality fishing opportunity would be offered and easily accessible.

Fishermen would park at designated parking areas for public access to the 3-mile trail network (e.g., gravel corridors, unimproved dirt trails, and boardwalk) on foot and travel to the two designated fishing locations (maps 3.5 and 3.6). To facilitate access to the fishing locations, we would improve and maintain roads and parking areas. Designating these two sites for fishing access would enable us to open the refuge to a traditional, priority wildlife-dependent recreation activity while continuing to protect the shoreline, particularly in areas of eagle nests or high concentration roosting activity. We anticipate that up to 1,460 fishermen would be accommodated annually, assuming two anglers per day would use each of the two sites daily. Fishing of some sort can be accommodated throughout the year, as determined by VDGIF.

We would provide visitors with information related to the fishing opportunities at the refuge and to refuge-specific and State fishing regulations through various media, including the refuge website, signage, and brochures. For example, we would advise fishermen that the refuge would remain closed to herring dipping in accordance with State regulations (4 VAC 20-1260-10 et seq.). All materials related to the fishing program would promote the use of lead-free tackle by anglers. Lead tackle has been found to have harmful effects on birds, particularly waterbirds, because of their feeding habits (Michael 2006). Sensitivity to lead toxicity varies among bird species, but in most instances a single fishing weight can kill a bird (Eisler 1988, Sanderson and Bellrose 1986). Promotional materials regarding lead-free tackle would inform anglers about the impacts of lead tackle and encourage them to utilize cost-effective, lead-free tackle alternatives when fishing on the refuge as well as at non-refuge locations.

Under alternative B, we would monitor the refuge support facilities at both designated fishing locations for fishing-related impacts. We would coordinate closely with VDGIF to keep informed about State fishing regulations, trends

in fish populations, and disease outbreaks in fish to most effectively manage the fishing program at the refuge.

### **Strategies**

*Within 5 years of CCP approval:*

- Complete all administrative requirements for the proposed opening of the refuge to fishing once the CCP is approved and resources are available, including developing a separate NEPA document, compatibility determination, sport fishing plan, and further public involvement.

*Within 5 to 10 years of CCP approval:*

- Allow fishing (rod and hook) at up to two designated sites on Powell Creek.
- Improve and maintain access roads and parking areas for accessing both fishing locations.
- Work with partners and volunteers to improve the infrastructure at the canoe/kayak launch site to establish it as a fishing location and to facilitate non-trailerred, hand-launched boat access to Powell Creek.
- Provide visitors with general information on the fishing program and refuge-specific and State regulations through the refuge website, information signs, and a fishing brochure. In all materials related to the fishing program, promote use of lead-free tackle.

### **Inventory and Monitoring Activities**

*Throughout the life of the plan:*

- Monitor the refuge support facilities associated with fishing.
- Coordinate with VDGIF regarding angler regulations, fish populations, and disease notifications.
- Monitor impacts on vegetation and wildlife within public use area and track trends, adjust public access as necessary.

## **GOAL 5**

### **PARTNERSHIPS**

Develop new partnerships and strengthen existing partnerships to promote natural and cultural resource conservation and the mission of the National Wildlife Refuge System.

#### **Objective 5.1**

### **Partnerships**

Over the life of the plan, enhance existing partnerships and develop new partnerships with Federal, State, and local government agencies, non-government organizations, academic institutions, conservation organizations, and volunteers to fulfill mutual natural resource conservation mandates and help meet wildlife, habitat, and visitor services objectives.

### **Discussion and Rationale**

Developing and maintaining partnerships is key to fulfilling the Service's mission. At the heart of the Service's mission are the conservation and management of the Federal Trust Species: migratory birds, threatened and endangered species, interjurisdictional fish, certain marine mammals, and species of international concern. It is estimated that 73 percent of our

Nation's land is privately owned and that the majority of our fish and wildlife resources occur on those lands. Consequently, we recognize that other government agencies, organizations, conservation groups, and individuals share our interest in providing for fish and wildlife needs.

Under alternative B, we propose to expand our wildlife, habitat, and public use management programs while also anticipating that a level or declining budget environment will affect our flexibility in managing financial resources and may have implications for the level of permanent staffing. Maintaining and expanding our existing partnerships, as well as developing new partnerships, would promote the refuge in its effort to fulfill its wildlife, habitat, and public use management programs despite budgetary and staffing uncertainties. The potential for developing existing and new partnerships with other government agencies and organizations was highlighted in the 2007 VOP as a way to allow additional recreational access and involve volunteers in assisting refuge staff in managing and monitoring of the refuge. ([http://www.dcr.virginia.gov/recreational\\_planning/documents/voppd19.pdf](http://www.dcr.virginia.gov/recreational_planning/documents/voppd19.pdf); accessed April 2014)

Our existing partnerships with VDGIF, VDOF, TNC, and VDCR Natural Heritage provide needed assistance for managing habitat resources on the refuge and increase our success in effectively managing habitats for species of concern. Under alternative B, habitat management activities would increase with the transformation of the pine-dominated forest towards a mature pine savanna forest. This increase in activity would require an expansion of existing partnerships as well as the creation of new partnerships to help inform management decisions, to conduct management activities, and to fully understand the impacts of management activities on habitats and species. Increased habitat management activity would also require an increase in volunteers to assist in performing these activities, such as monitoring the effects of a thinning operation or prescribed fire.

Research is essential to successful habitat and species management; however, refuge staff is extremely limited in our ability to design and conduct research projects. The research conducted by our Ecological Services Virginia Field Office, VCU, CCB, and Richmond Audubon provides important data and information that helps guide refuge management decisions and activities. Under alternative B, the Service would undertake a number of new activities and develop a suite of new questions regarding the effectiveness of management techniques, the impacts of climate change on habitats and species, the benefits of management to habitats and species, and the effects of increase visitor use opportunities on the refuge and the public. Expanding existing partnerships and developing new partnerships offers the opportunity to conduct research to answer these and other questions. The refuge would continue to collaborate with existing partners, as well as develop new partnerships, to enhance the existing research program.

Public outreach improves recognition of the refuge, the Refuge System, and the Service among neighbors, local leaders, conservation organizations, and elected officials. By participating in community events, refuge staff is better able to engage with the public in direct communication and raising awareness about the refuge. Although we are constrained by limited available resources and staffing, we are able to effectively reach the public through partnerships. Our partnerships with the NPS for the Captain John Smith Chesapeake

NHT, Richmond Audubon, CBF, and JRA enable us to conduct more effective outreach and provide more wildlife-dependent recreational opportunities on the refuge than we could do alone. Our collective public outreach efforts garner support for conservation in the region. Implementing alternative B would result in increased visitor use and public outreach opportunities that would be supported by building and maintaining a variety of new visitor use support facilities, such as an expanded trail, fishing platforms, and canoe/kayak launch. The refuge would expand existing partnerships and develop new partnerships to conduct outreach on and off-refuge, and providing wildlife-dependent recreational opportunities on the refuge, as well as involve volunteers in the construction and maintenance of new visitor use support facilities. Past refuge volunteers have provided a great service to us and enjoyed themselves. Under this alternative, we would offer increased opportunities for volunteers to engage with our staff, each other, and the public.

Since refuge establishment, we have developed and maintained partnerships with a variety of groups to fulfill the refuge's purpose and meet management goals and objectives. Some of our partnerships have been formally documented, while others remain informal agreements. For example, the Service entered into a cooperative agreement with NPS, USFS, and Commonwealth of Virginia for wildland fire management and Stafford Act response. In contrast, there is no formal agreement or documentation between the Service or refuge with the Appalachian Trail Club for habitat management assistance and infrastructure maintenance at James River NWR. Under this alternative, we would significantly increase our work with partners and volunteers on the refuge in a strategic way that will help achieve our expanded wildlife, habitat, and public use objectives.

### **Strategies**

*Continue to:*

- Maintain existing partnerships to manage forests and respond to wildfires; conduct formal and informal biological inventory, monitoring, and research; conduct cultural resource surveys; offer environmental education and wildlife interpretation programs; and maintain refuge infrastructure.

*Within 5 years of CCP approval:*

- Expand partnership with NPS to accomplish Captain John Smith Chesapeake NHT interpretive and resource protection goals associated with Powell Creek and indigenous cultural landscapes, as well as partnership for improving the existing canoe/kayak launch on Powell Creek.

*Within 5 to 10 years of CCP approval:*

- Expand existing partnerships individually, and in small groups, with JRA, CBF, and Virginia Master Naturalists Chapters.
- Develop new and expand on existing partnerships with universities for research and environmental education programs.
- Create a Friends group or develop new partnerships with other organizations in support of off-refuge environmental education.

- Encourage long-term volunteers and seasonal volunteers by constructing a building or recreational vehicle (RV) hookups near where water and electricity are available.

### **Inventory and Monitoring Activities**

*Within 5 years of CCP approval:*

- Assess effectiveness of expanded public use opportunities including youth engagement and outreach efforts, promotion of conservation messages, and visitor satisfaction.



Rebekah Wilson/VDCR

*Fire crew partnership: The Nature Conservancy, Burrowsville Volunteer Fire Department, Virginia Department of Conservation and Recreation, National Park Service, and U.S. Fish and Wildlife Service*

### **3.6 Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities**

In addition to the actions detailed in section 3.3 as common to all alternatives, the following describes what other activities would occur under alternative C.

Under alternative C, over the life of this plan we would focus our forest management efforts primarily on transitioning up to 2,609 acres of pine-dominated forest towards an oak/hickory/pine forest using selective cut forestry and best management practices to facilitate this transition in a phased manner while still protecting select trees for bald eagle use. We would reduce the density of trees in the pine-dominated forest using selective cut forestry and associated best management practices to promote forest conversion using an incremental, gradual, and phased approach. We would use prescribed burning to promote dry hardwood species, and help establish and maintain this habitat at a high quality for the benefit of priority refuge species, such as black-and-white warblers and ovenbirds.

We would continue to protect the biological integrity, diversity, and environmental health of the existing moist hardwood, floodplain forest, erosional bluff, and freshwater marsh and shrub swamp to the same degree as under alternative B. We would investigate the hydrologic flow between the wetlands in the southwestern portion of the refuge and Powell Creek.

We would expanding the non-forested upland for administrative purposes by converting 2 acres of pine-dominated forest around the weather station to non-forested upland. Also, we would expand the non-forested upland area further to provide habitat for wildlife, such as American woodcock and northern bobwhite. This additional acreage would come from the hardwood conversion process, where we would transition 42 acres of logging decks to support native grasses. Up to a total of 57 acres would be managed as non-forested upland.

As under alternative B, we would conduct expanded cultural resources activities. We would conduct fieldwork to better understand the location of archaeological sites, to help prevent against adverse impacts from activities related to the pine-dominated forest transition, as well as protect those resources located in the other refuge habitat areas. We would implement recommendations in the Archaeological Overview (Goode et al. 2009).

As under alternative B, we would gradually expand the number and diversity of public use opportunities on the refuge to a broad range of audiences, and in some cases expand them further than under alternative B. We would expand our existing public deer hunt program to 1,780 hunter use days annually, by increasing the number of archery and muzzleloader hunting days offered each year. We would open the refuge to turkey hunting, offering up to 530 turkey hunter use days annually, which under this alternative would include 240 turkey-only hunter use days in the spring. We would also promote youth involvement in hunting by providing youth hunt opportunities for deer, turkey, and waterfowl. We would open the refuge to fishing at three designated locations. We would designate three areas to support regular use by refuge visitors interested in self-guided and self-organized wildlife observation, photography, environmental education, and interpretation opportunities, between sunrise and sunset throughout the year; no permit

would be required for visitors participating in these wildlife-dependent uses in the designated public use areas after approval of a VSP and completion of infrastructure improvements.

Because James River NWR is considered by the Service to be an urban refuge, we anticipate that interest in the refuge and annual visitation would increase in the future. To support this, we would enhance on-refuge infrastructure to support those increases, including improved roads and designated parking areas. We would further support increased visitors through our partnerships with a variety of entities outside of the Service, which we would develop further to support the refuge's purpose, provide research support, and meet the refuge's goals and objectives for resource management.

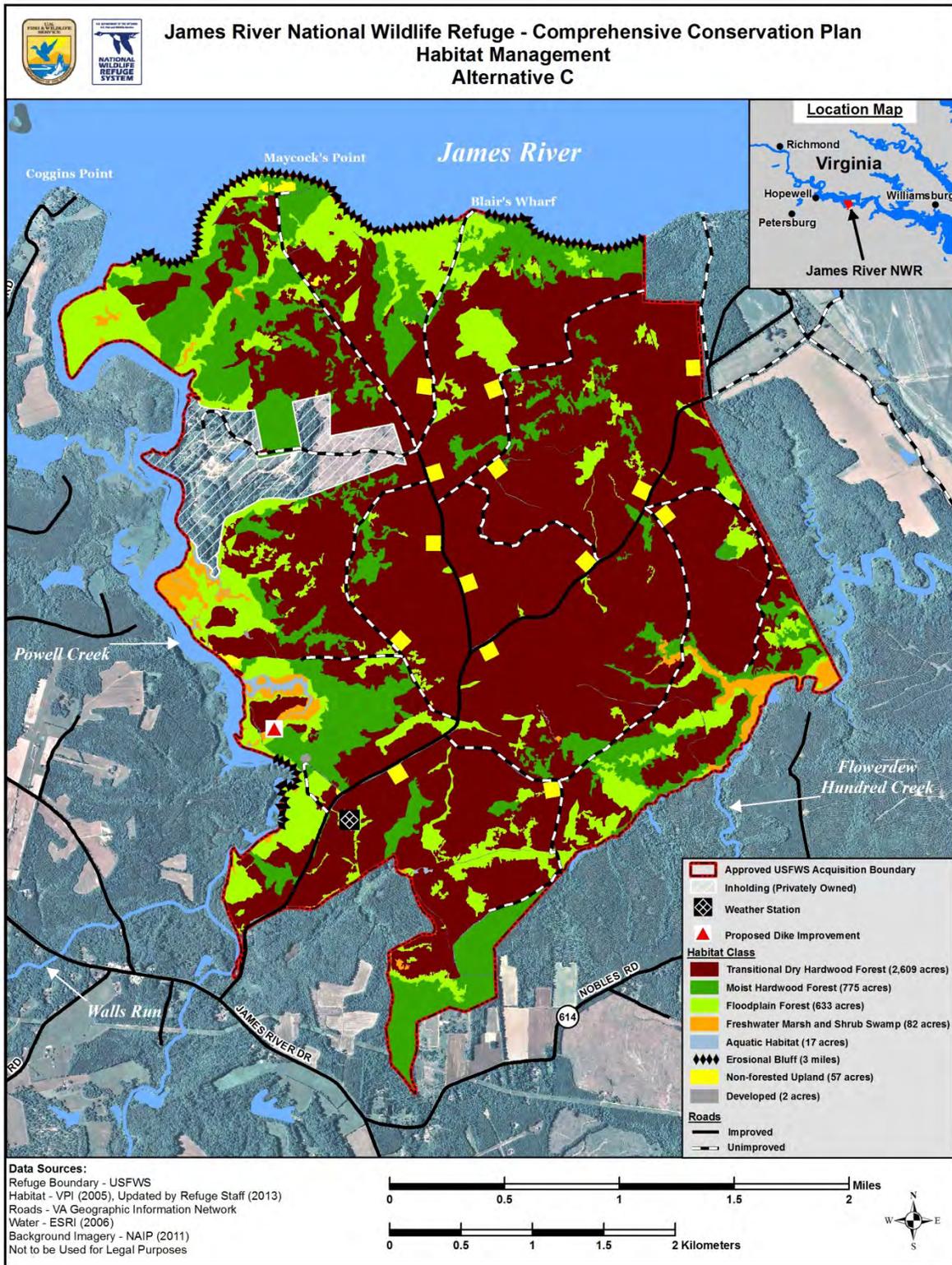
Alternative C management and habitat conditions are depicted in maps 3.7 through 3.9.



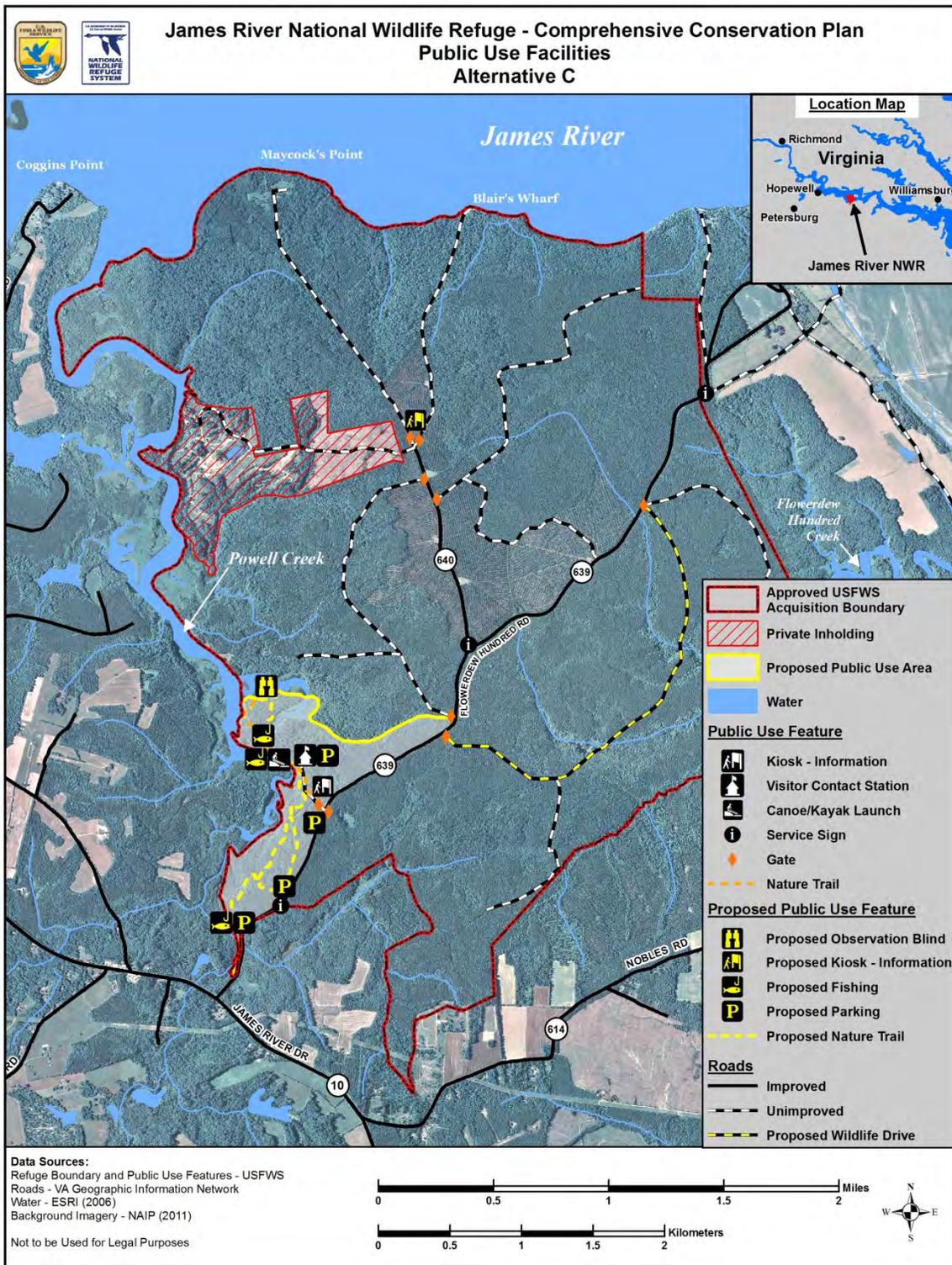
Cyrus Brame/USFWS

*Young oak tree*

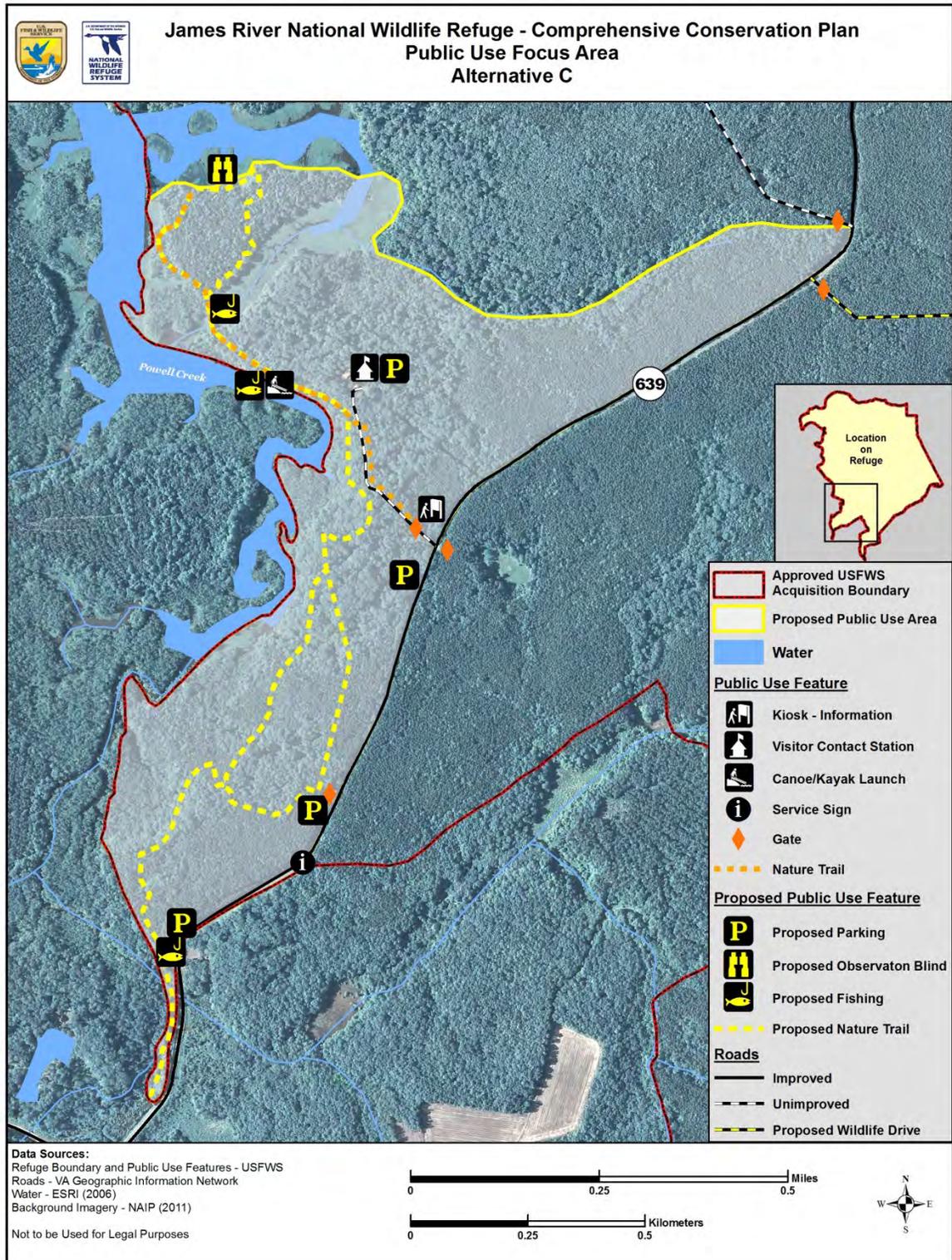
Map 3.7 Alternative C: Proposed Habitat Management at James River NWR



Map 3.8 Alternative C: Proposed Public Use Facilities at James River NWR



Map 3.9 Alternative C: Public Use Focus Area at James River NWR



**GOAL 1**

**FOREST HABITAT**

Protect, enhance, and restore the ecological integrity of inner coastal plain forest ecosystems of the lower James River to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient in anticipation of climate change.

**Objective 1.1**

**Pine-dominated Forest**

This habitat is not present under alternative C (0 acres).

**Discussion and Rationale**

None.

**Strategies**

None.

**Inventory and Monitoring Activities**

None.

**Objective 1.2**

**Transitional Dry Hardwood Forest**

Over the life of the plan, promote the transition of up to 2,609 acres of pine-dominated forest towards a dry hardwood forest dominated by oak and hickory, and include no more than 20 percent pine per acre, to increase breeding populations of black-and-white warblers and ovenbirds.

**Discussion and Rationale**

Transitional dry hardwood forest habitat is not currently present on the refuge. Individuals or small patches of species typical for this forest habitat (i.e., white oak, pignut hickory, and Virginia pine) occur in the pine-dominated and moist hardwood forests on the refuge and surrounding properties. Numerous sites in Prince George County and in adjacent Charles City County offer expanses of this forest type. Historically, the transitional dry hardwood forest was present near the refuge. Oak/hickory and pine-hardwood forests were dominant in the south by 5000 B.C. (Dickson 2001).

Under this alternative, we would aim to actively convert 2,609 acres of pine-dominated forest currently existing on the refuge to transitional dry hardwood forest over the next 80 years to return the habitat to something similar to what may have been present pre-European settlement, reduce the use of prescribed fire for long-term forest management, and benefit priority refuge species that utilize these habitats. In the absence of active conversion efforts by the refuge, progression of the refuge's poor quality, dense pine stands to transitional dry hardwood forest would take at least 100 years to happen naturally (Brame 2013 personal communication). Invasive plant infestations would impede the transition to hardwood forest (Parker et al. 2001).

As the mature forest develops, we would provide a greater acreage of quality habitat to support breeding populations of hardwood-dwelling wildlife species, including the black-and-white warbler and ovenbird.

Black-and-white warblers breed in mature and second-growth deciduous and mixed-deciduous forests throughout the eastern and central U.S. (Kricher 1995). This species has been found in association with increased tree species, vegetation height, percent canopy closure, percent hardwood saplings, large

tree density, and number of shrub species (Conner et al. 1983). Though breeding the range of this species is wide, population does face threats due to habitat fragmentation (Galli et al. 1976, Whitcomb et al. 1977). Creating increased continuous mature mixed forest would help protect breeding habitat for this species.

Ovenbirds have also been linked to the impacts of forest fragmentation. Many studies have shown that ovenbirds are sensitive to predation and disturbances associated with habitat fragmentation and suggest that future population success depends on large areas of core habitat (Porneluzi et al. 2011). Though both black-and-white warblers and ovenbirds are categorized as Late-successional breeders at least one study suggests that family groups may use clear cut areas and forest edges during the post-fledging period (Marshall et al. 2003).

Dryer soil types and level topography occur within the refuge's pine-dominated forest and would support conditions for transitional dry hardwood forest. Converting the pine-dominated forest to transitional dry hardwood forest would require dramatic reductions on the pine stock, mainly loblolly pine. Several tree removal methods would be employed depending on the location, vegetation density, and age class present. Methods would range from a straight clear cut of all trees in young, dense stands to varying degrees of selective thinning. Prescribed fire and herbicide application would follow initial thinning actions to limit regrowth of pine saplings. Targeted chemical applications and mechanical treatments would be necessary to reduce softwood growth and limit the influx of invasive plants. Because no commercial herbicide is currently available that, when broadcast, selectively kills pine without collateral impacts to hardwoods, we would apply herbicides directly to targeted trees using backpack sprayer or other non-broadcast methods (Lacey 2007 personal communication). Hardwood seeding plantings or seed distribution may be required in areas with minimal or non-existent hardwood seed base.

After initial thinning and follow-up invasive species controls, the native trees within the transitional forest would be allowed to grow unabated for 5 to 10 years and form a shrubland. Known by several other names, such as scrub-shrub or early successional forest, shrubland habitat represents a transitional or temporary state between open and forested habitats. Historically, this habitat type likely comprised less than 10 percent of 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

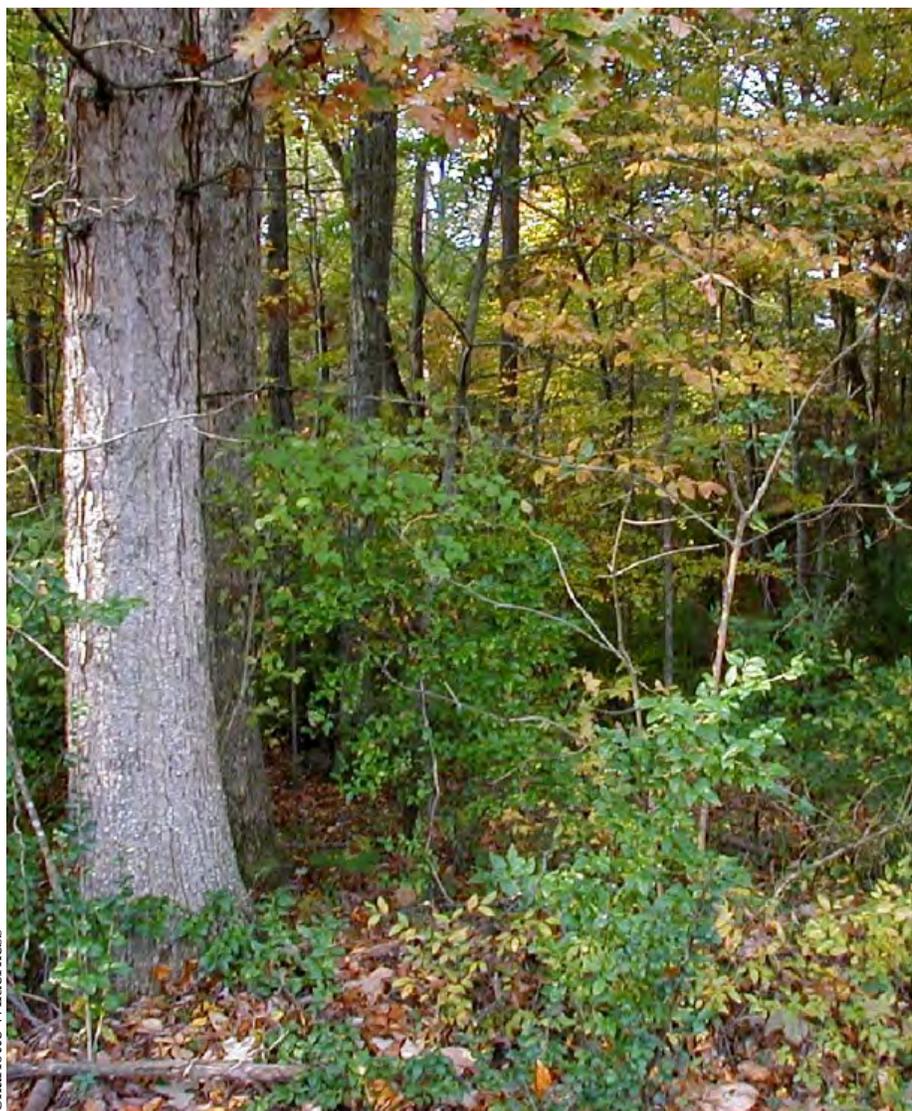
(<http://www.dgif.virginia.gov/wildlife/quail/action-plan/quail-action-plan.pdf>; accessed April 2012).

Within the first 5 to 10 years of initial cutting, a crew would be required to use mechanical hand-held brush cutting equipment to thin the non-desirable woody vegetation (e.g., pine, sweet gum) by 80 to 90 percent per acre. Invasive species control would continue during this management phase and through the life of this plan.

Between years 15 and 20, prescribed fire would be employed for timber stand

improvement because maturing hardwoods (e.g., oak, hickory) would be able to withstand a low intensity fire (Lacey 2007 personal communication). The fire would further reduce young pine and allow hardwoods to continue their height advantage and canopy coverage. Introducing fire into maturing hardwood forest would need to occur only once, within the 15 to 20 year timeframe, to suppress pine succession sufficiently for the hardwoods to dominate into the future.

Hand thinning and prescribed fire use to minimize pine regeneration would relax once hardwoods were dominant enough to limit light filtration within a closed canopy. In the long term (30 to 80 years), intensive management demands would decrease and the forest would thrive as a self-sustaining dry hardwood forest with only minimal staff directed manipulation and monitoring. Less than 20 percent of the woody vegetation per acre would be pine. The maturing forest would blend seamlessly into adjacent moist hardwood forests and form a larger (more than 3,000 acre) contiguous hardwood forest.



Charlotte Wilderness

*Dry oak-hickory forest in the Greater Charlotte Area of North Carolina*

### **Strategies**

*Continue to:*

- Protect potential nest and roost trees to offer benefits for bald eagle use on the refuge.

*Throughout the life of the plan:*

- Remove no more than 50 percent of hardwood trees with a DBH of 24 inches or greater.
- Remove no more than 80 percent of pine trees with a DBH of 24 inches or greater.

*Within 10 years of CCP approval:*

- Use selective cut forestry and associated best management practices to promote dry hardwood (oak/hickory/pine) conversion using an incremental, gradual, and phased approach.
- Use clear cut forestry and associated best management practices in young, dense pine stands, where trees are stagnated or underperforming, and are less than 9 inches DBH.

*Within 5 to 15 years of CCP approval:*

- Chemically, mechanically, and manually treat pine and regenerating pine to reduce seed stock and regrowth to stand levels of no more than 20 percent pine per acre.
- Use prescribed burning to promote dry hardwood species through fuel reduction in advance of hardwood plantings and control measures.

### **Inventory and Monitoring Activities**

*Continue to:*

- Continue annual breeding bird survey.

*Within 5 to 10 years of CCP approval:*

- Conduct baseline inventory and identify long-term monitoring protocols for breeding black-and-white warblers and ovenbirds.
- Develop focused, long-term studies to assess wildlife impacts and success of transitioning pine-dominated forest to dry hardwood forest.

## **Objective 1.3**

### **Moist Hardwood Forest**

Over the life of the plan, maintain 775 acres of moist hardwood forest with 75 percent ground cover in leaf litter, 50 percent mid-story cover from more than 10 native species, and 30 percent mature trees with a minimum DBH of 20 inches to protect year-round habitat for eastern box turtle and nesting habitat for breeding red-shouldered hawks and wood thrushes.

### **Discussion and Rationale**

See discussion and rationale under alternative B, objective 1.3.

### **Strategies**

Same as alternative B.

**Inventory and Monitoring Activities**

Same as alternative B.

**Objective 1.4**

**Floodplain Forest**

Over the life of the plan, maintain 633 acres of floodplain forest containing 30 percent mature trees with a minimum DBH of 20 inches, 20 percent trees with DBH between 15 and 20 inches, and 3,530 to 10,600 cubic feet per hectare of coarse woody debris to promote forest health and to protect nesting and roosting bald eagles, breeding prothonotary warblers, and resident spotted salamander populations.

**Discussion and Rationale**

See discussion and rationale under alternative B, objective 1.4.

**Strategies**

Same as alternative A.

**Inventory and Monitoring Activities**

Same as alternative B.

**GOAL 2**

**NON-FOREST HABITAT**

Protect, enhance, and restore the ecological integrity of non-forest ecosystems to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient in anticipation of climate change.

**Objective 2.1**

**Freshwater Marsh and Shrub Swamp**

Over the life of the plan, maintain and promote natural hydrology and native plant species in 82 acres of freshwater marsh and shrub swamp for resident marsh wren populations and breeding least bitterns.

**Discussion and Rationale**

See discussion and rationale under alternative B, objective 2.3.

**Strategies**

Same as alternative B.

**Inventory and Monitoring Activities**

Same as alternative B.

**Objective 2.2**

**Aquatic Habitats**

Over the life of the plan, support efforts of partners to maintain or increase submerged aquatic vegetation in 17 acres of aquatic habitat for the benefit of native species (e.g., Atlantic sturgeon, alewife, blueback herring) and protect this habitat from being degraded.

**Discussion and Rationale**

See discussion and rationale under alternative B, objective 2.4.

**Strategies**

Same as alternative B.

**Inventory and Monitoring Activities**

Same as alternative B.

**Objective 2.3**

**Erosional Bluff**

Over the life of the plan, maintain and promote native vegetation on 3 shoreline miles to help stabilize bluffs, reduce erosion, and provide nesting substrate for breeding bank swallows.

**Discussion and Rationale**

See discussion and rationale under alternative B, objective 2.2.

**Strategies**

Same as alternative B.

**Inventory and Monitoring Activities**

Same as alternative B.

**Objective 2.4**

**Non-forested Upland**

Over the life of the plan, maintain up to 57 acres of non-forested upland in native grasses as wildlife habitat to increase resident woodcock and northern bobwhite populations.

**Discussion and Rationale**

In addition to the discussion and rationale under alternative B, objective 2.4 for managing 15 acres of non-forested upland for administrative purposes, we believe that improving the quality of the existing non-forested upland and increasing the total acreage of non-forested upland within the refuge to 57 acres would dovetail well with our forest management objectives.

The American woodcock is a priority species in BCR 27, BCR 30, and the WAP. Long-term woodcock declines of 1 percent per year in the Eastern Region and in the Central Region have been documented (Cooper and Parker 2011). Loss of early successional forest habitat is thought to be the cause of the observed declines in woodcock recruitment and population status (Woodcock Task Force 2006). Woodcock require a variety of habitat types juxtaposed near one another. Clearings and grasslands near young hardwood stands provide male singing-grounds and nocturnal roosting habitat.



*American woodcock fledgling*

Cyrus Brame/USFWS

Northern bobwhite quail are ranked as a high priority species in both the BCR 27 and BCR 30 plans and are a Tier IV species in the WAP. The most significant factor limiting quail populations has been identified as the loss of early succession habitat, particularly in their nesting cover and brood range (VDGIF 2008). Since 1980, quail populations have declined 66 percent rangewide (Dimmick et al. 2002). According to the BCR 30 plan, bobwhites require patches of bare ground interspersed with standing vegetation. Within this region, bobwhites utilize a number of field types, including grasslands and early successional old fields, such as those that would be created by the converted logging decks.



Cyrus Brame/USFWS

*Logging deck one to two years after last use*

Under this alternative, our forest management activities would result in the clearing of six new logging decks, generally between 1 and 1.5 acres each. We would increase their size to 3 to 4 acres each (up to 42 new non-forested upland habitat), and we would continue to manage each of them as habitat for wildlife when they are no longer used to support forest management activities. We would aim to increase resident woodcock and northern bobwhite populations by providing improved and greater acreage of suitable habitat for these species. The result would be the creation of a natural mosaic of small open, grassy areas within the hardwood forest that would support various biological needs of wildlife using those habitat types. We would conduct a baseline inventory and establish a long-term monitoring protocol for woodcock and northern bobwhite populations to evaluate our management efforts over time.

As under alternative B, we would selectively cut up to 2 acres of pine-dominated forest adjacent to the existing weather station as preventative maintenance to promote functioning of the station. Tall trees near the

weather station can adversely affect signal transmission from the weather station to the satellites (National Wildfire Coordinating Group 2012; Craig 2013 personal communication). A total of 15 acres of non-forested upland would be maintained for administrative purposes. It is possible that wildlife would use these acres for various biological needs.

We would increase efforts to control highly invasive species and woody encroachment on all non-forested upland. The Virginia Department of Conservation and Natural Resources published an advisory list of invasive alien plant species of Virginia to inform land managers of potential risks associated with certain plant species known to exhibit invasive behavior in some situations ([http://www.dcr.virginia.gov/natural\\_heritage/invspdpdflist.shtml](http://www.dcr.virginia.gov/natural_heritage/invspdpdflist.shtml); accessed August 2013). This list details light and moisture requirements, habitat regions, and degree of invasiveness for Virginia's most troublesome invaders. The species are ranked as highly invasive, moderately invasive, or occasionally invasive. Tree-of-heaven, Japanese privet, and Japanese stiltgrass are among the highly invasive species known to occur within or along the edges of the refuge's non-forested upland (Brame 2013 personal communication).

#### **Strategies**

*Throughout the life of the plan:*

- Mow once a year or more in non-forested upland managed for habitat and for administrative purposes.

*Within 10 years of CCP approval:*

- Hand seed or plant native grasses in the former logging decks after thinning operations are complete.

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

*Within 5 to 10 years of CCP approval:*

- Conduct baseline inventory and identify long-term monitoring protocols for resident woodcock and northern bobwhite populations.

### **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 lower James River.

#### **Objective 3.1**

##### **Cultural Resource Protection**

Within 5 years, use more precise information about archaeological sites to protect known archaeological sites and better inform refuge management decisions

##### **Discussion and Rationale**

See discussion and rationale under alternative B, objective 3.1.

##### **Strategies**

Same as alternative B.

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

Same as alternative B.

## **GOAL 4**

### **WILDLIFE-DEPENDENT RECREATION**

Provide wildlife-dependent recreational opportunities for visitors to connect with nature and foster enhanced stewardship of the lower James River, Chesapeake Bay estuary, and the National Wildlife Refuge System.

#### **Objective 4.1**

##### **Hunting**

Over the next 3 to 5 years, provide high quality recreational hunting opportunities and complete all the administrative requirements to expand the existing deer hunt, add new hunts, and promote youth hunt involvement.

##### **Discussion and Rationale**

In addition to the discussion and rationale under alternative B, objective 4.1 for modifying the refuge's hunt program, we believe that the following proposed hunt program would dovetail well with our proposed habitat management actions under alternative C.

##### *Expanded Deer Hunt*

Under alternative C, we would continue to offer public deer hunting opportunities to maintain the population as determined by the State, and to continue providing this type of high quality wildlife-oriented recreation. We would offer a mix of archery, shotgun, and muzzleloader hunting opportunities on 1,780 hunter use days. We would increase the number of spaces for archery hunters by increasing the total number of archery season days, increase the number of muzzleloader hunt days, and participate in the State's Youth Deer Hunt Day.

We propose to modify the way we administer the refuge's archery hunt to allow a greater number of archery hunters to participate in multiple archery seasons. We would continue to administer the refuge's archery hunt as a quota hunt, in which up to 50 hunters would be selected to participate in the refuge's archery hunt. For the past 5 years, only approximately 30 percent of the hunt applicants have been selected to participate in the refuge's archery hunt. By breaking the archery hunt into two separate 12-day seasons, the potential to be selected to participate would be doubled. Increasing our archery hunt days would help to satisfy public interest and meet our need to provide a quality hunt. Increasing the potential for interested hunters to participate in our quota archery hunt and increasing the number of archery hunting days would help to satisfy the public request for more deer hunting opportunities on the refuge and meet our need to provide a quality hunt.

Also, we propose increasing the number hunt days in the muzzleloader hunting season, as opposed to increasing the shotgun season, for two reasons. First, hunters wishing to participate in muzzleloader hunting opportunities are also interested in participating in shotgun hunting opportunities. We have heard from hunters that increasing the number of muzzleloader hunt days on the refuge would be of interest because they have less opportunity on non-refuge lands to hunt, largely due to private hunt club restrictions, during muzzleloader season (Brame 2013 personal communication). Second, we have documented that hunters participating in our muzzleloader season have a higher rate of success than hunters participating in the refuge's archery or shotgun hunt seasons (Brame 2013 personal communication). Increasing our muzzleloader hunt days would help to satisfy the public request for more deer hunting opportunities on the refuge and meet our need to provide a quality

hunt.

We would make administrative changes to our hunt program and enhance our promotional efforts to increase hunter participation in each of the hunts offered. We would enhance our promotional efforts through various media, including our refuge website and VDGIF, to reach a larger audience. By having a large pool of hunters that are familiar with the refuge opportunity, we would fill available hunting spaces and issue more permits on the day of the hunt on a first come, first served basis. We aim to increase to increase hunter participation to 45 percent. A 45 percent hunter participation means that deer hunting would occur on at least 801 of the total 1,780 hunter use days offered annually.

#### *New Hunts*

Turkey Hunting. We would open the refuge to turkey hunting. Under alternative C, we would accommodate up to 1,760 hunter use days annually. We would offer wild turkey hunting during the State's fall season in conjunction with the refuge's fall archery and muzzleloader deer hunt season and 2 weeks (12 days) of wild turkey hunting during the State's spring season. A hunter participating in a refuge hunt during a fall designated deer and turkey hunt day would be allowed to take either species or both if able.

Developing a wild turkey hunting program would give us the opportunity to provide additional hunting opportunities to the surrounding community, potentially attracting a new hunter user group of hunters only interested in taking turkey during a combined deer and turkey hunt. Under this alternative, offering a spring turkey season would enable us to offer a different hunt opportunity that would attract a new and different hunter user group. Gobbler-only hunting in the spring is a different hunting approach than taking turkey while hunting for other species.

Under alternative C, we would convert the pine-dominated forest to transitional dry hardwood forest and encourage visitors to travel deeper into the refuge. We would be able to open the refuge to the spring turkey hunt once we complete the administrative requirements for opening the refuge to this new hunt opportunity, forest conversion activities, and public use infrastructure improvements. We would coordinate closely with VDGIF to keep informed about State hunting regulations, trends in turkey populations, and disease outbreaks to most effectively manage the wild turkey hunting program at the refuge.

Waterfowl Hunting. We would open the refuge to youth waterfowl hunting as detailed in the discussion and rationale under alternative B, objective 4.1.

#### **Strategies**

*Continue to:*

- Administer public deer hunt in accordance with the approved hunt management plan (1993) and subsequent amendments to accommodate up to:
  - ❖ Fifty hunters to hunt on any or all days within one 19-day archery season (950 hunter use days annually).
  - ❖ Seventy hunters per day on each of 2 muzzleloader hunting days (140

hunter use days annually).

- ❖ Seventy hunters per day on each of 4 shotgun hunting days (280 hunter use days annually).

*Throughout the life of the plan:*

- Allow adaptive management of hunt days offered based on State monitoring program (DMAP) recommendations for deer herd management.

*Within 3 years of CCP approval:*

- Improve hunt administration processes to increase hunter participation.
- Enhance promotion of the hunt to a larger audience, including youth.
- Construct a four-person stationary blind along the northern peninsula of the Powell Creek trail.

*Within 5 years of CCP approval:*

- Complete all administrative requirements for the proposed expanded hunt program once the CCP is approved and resources are available (including developing a separate NEPA document, compatibility determination, hunt plan, and further public involvement) to accommodate up to:

❖ Deer:

- Fifty archery hunters on any or all days within each of two 12-day seasons (1,200 hunter use days annually).
- Seventy hunters per day on each of 4 muzzleloader hunting days (280 hunter use days).
- Seventy hunters per day on each of 4 shotgun hunting days (280 hunter use days annually).
- Twenty youth hunters to participate in the 1 fall State Youth Deer Hunt Day (20 hunter use days annually).

❖ Turkey:

- Fifty hunters on any or all days within each of two 12-day seasons, in conjunction with fall archery season (1,200 hunter use days annually).
- Seventy hunters per day on each of 4 hunt days, in conjunction with fall muzzleloader deer hunt season (280 hunter use days annually).
- Twenty hunters per day on 12 days within two 6-day seasons in spring (240 hunter use days annually).
- Twenty youth hunters on 1 spring day and 1 fall day, in conjunction with the State's Youth Turkey Hunt Day (40 hunter use days annually).

❖ Waterfowl:

➤ Same as alternative B.

- Provide visitors with general information on the expanded hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote use of lead-free ammunition.
- Investigate the required use of lead-free ammunition for deer and turkey hunting, including identifying the impacts of lead exposure from hunting activities on wildlife and the impacts of lead ammunition restrictions on hunters.

*Within 5 to 15 years of CCP approval:*

- Renovate the hunter check station with features that are similar to an old-time hunting and fishing lodge (archival hunt/fishing photos, mounts, and comfortable/downhome setting). The facility would highlight the rich history of the Service and the conservation movement and serve as a staging/registration area for all hunt programs.

**Inventory and Monitoring Activities**

Same as alternative B.

**Objective 4.2**

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

Over the next 10 years, provide three designated areas to support opportunities for visitors to participate in wildlife observation, photography, environmental education, and interpretation to improve the quality of visitor experiences.

**Discussion and Rationale**

In addition to the discussion and rationale presented under alternative B, objective 2.3 for improvements made within 5 years, we would designate a second public use area at the northern terminus of State Route 640 to support these public uses. Designation of a second public use area at this location would dovetail well with our habitat management actions under this alternative (maps 3.8 and 3.9). We would install a kiosk with interpretive panels that would be visible from refuge visitors while in their automobiles. Installing a kiosk with interpretive panels at the end of this road would improve the visitor experience of the refuge within 5 years of CCP approval.

In addition to the discussion and rationale presented under alternative B, objective 2.3 for improvements made within 5 to 10 years of CCP approval, we would established a third public use area by creating a 2-mile wildlife drive on Hunter's Circle Road, an unimproved refuge road located in the southeast portion of the refuge and accessible from Route 639. We would install an informational sign at the beginning of the road, inviting visitors to travel into the refuge by automobile. Hunter's Circle Road is currently being used to facilitate forest management activities. Since we anticipate completing forest conversion activities in the vicinity of Hunter Circle Road within 5 to 10 years of CCP approval, we would open it as a designated wildlife drive for automobiles and pedestrians throughout the year. However, we would close the wildlife drive to wildlife observation, photography,

environmental education, and interpretation during hunt days. Driving for pleasure ranked high on the list of outdoor recreational activities enjoyed by Virginians (Ellis et al. 2012).



Steve Hillebrand/USFWS

*Father and son focus the spotting scope on a warbler*

### **Strategies**

*Continue to:*

- Require participants to request a refuge-issued permit 3 business days in advance of proposed visit until signage and visitor support facility improvements are completed.

*Within 5 years of CCP approval:*

- Designate two public use areas in which we would develop public use infrastructure:
  - ❖ 240-acre area adjacent to Powell Creek.
  - ❖ Northern terminus of Route 640.
- Improve public parking (approximately 14,000 square feet, sufficient for 20 vehicles and a bus) and establish a trailhead that would provide access to the existing 0.5-mile trail.
- Establish a kiosk with interpretive panels at the northern terminus of Route 640.
- Open public access from sunrise to sunset.
- Improve restroom facilities and renovate hunter check station to become a visitor contact station.
- Upgrade equipment shed to serve as an outdoor meeting space for partners promoting Service mission-related topics.

- Partner with Prince George County Parks and Recreation Department to administer environmental education and interpretation programs.

*Within 5 to 10 years of CCP approval:*

- Improve visitor use facilities in designated areas, in particular:
  - ❖ Extend the existing 0.5-mile trail to become a 3-mile wildlife observation trail system with:
    - A pedestrian walkway as part of the trail, which doubles as an observation platform along steep valleys.
    - An improved canoe/kayak launch.
    - An improved vehicular ingress and egress route(s) and establish two additional parking areas (combined total of approximately 7,000 square feet, sufficient for five vehicles each).
    - An improved access at Powell Creek to accommodate nature trail users' access to island.
    - Develop interpretive signs and brochures to address topics of interest including, but not limited to, bald eagle life history and recovery success, forest management, and indigenous cultural landscapes.
    - Construct a 4-person wildlife observation/photography blind along Powell Creek.
  - ❖ Designate a third public use area by creating a 2-mile wildlife drive on Hunter Circle that would be open from sunrise to sunset.
  - ❖ Allow foot access on Hunter Circle Road.
  - ❖ Develop interpretive signs and brochures to address topics of interest including, but not limited to, bald eagle life history and recovery success, forest management, and indigenous cultural landscapes.
- Provide refuge or partnered-sponsored programs throughout the year, using a reservation system only when space or equipment is limited (such as boat trips or canoe sojourns).
- Offer two boat tours annually, specifically to observe bald eagles.
- Develop an urban partnership to coordinate with local schools to establish regular visitation and introduce community youth to the natural resources within their county.

*Within the life of the plan:*

- Relocate the maintenance complex from the area of high visitor use to a more centralized, non-public location.

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

*Continue to:*

- Monitor conditions of existing facilities and infrastructure used by

visitors (e.g., trail, restrooms, kiosk).

*Throughout the life of the plan:*

- Monitor existing and newly constructed infrastructure used by visitors to determine use patterns and capacity limits.
- Monitor impacts on vegetation and wildlife within public use area and track trends, adjust public access as necessary.

## **Objective 4.3**

### **Fishing**

Over the next 5 years, open the refuge to year-round fishing at up to three designated locations to accommodate up to 2,190 anglers annually.

### **Discussion and Rationale**

In addition to the discussion and rationale under alternative B, objective 4.3 for designating two fishing locations, we believe that opening a third fishing location is viable under alternative C only for the following reasons.

Under alternative C, our public use area would be 240 acres and the Powell Creek trail would be extended southward toward Route 10 (maps 3.8 and 3.9). The extended Powell Creek trail would provide access to Powell Creek near its confluence with Nobles Swamp, and a small unimproved vehicle parking area near the refuge entrance on Flowerdew Hundred Road (State Route 639) would be designated for public use. The third fishing location would be located within the refuge, along the northern streambank of Nobles Marsh.

### **Strategies**

*Within 5 years of CCP approval:*

- Complete all administrative requirements for the proposed opening of the refuge to fishing once the CCP is approved and resources are available, including developing a separate NEPA document, compatibility determination, sport fishing plan, and further public involvement.

*Within 5 to 10 years of CCP approval:*

- Allow fishing (rod and hook) at three designated sites on Powell Creek. Two sites would be located on Powell Creek, and the third would be located along the northern portion of Nobles Marsh.
- Improve and maintain access roads and parking areas for accessing both fishing locations.
- Work with partners and volunteers to improve the infrastructure at the canoe/kayak launch site to establish it as a fishing location and to facilitate non-trailerred, hand-launched boat access to Powell Creek.
- Provide visitors with general information on the fishing program and refuge-specific and State regulations through the refuge website, information signs, and a fishing brochure. In all materials related to the fishing program, promote use of lead-free tackle.

### **Inventory and Monitoring Activities**

Same as alternative B.

**GOAL 5**

**PARTNERSHIPS**

Develop new partnerships and strengthen existing partnerships to promote natural and cultural resource conservation and the mission of the National Wildlife Refuge System.

**Objective 5.1**

**Partnerships**

Over the life of the plan, enhance existing partnerships and develop new partnerships with Federal, State, and local government agencies, non-government organizations, academic institutions, conservation organizations, and volunteers to fulfill mutual natural resource conservation mandates and help meet wildlife, habitat, and visitor services objectives.

**Discussion and Rationale**

See the discussion and rationale under alternative B, objective 5.1.

**Strategies**

Same as alternative B.

**Inventory and Monitoring Activities**

Same as alternative B.

**3.7 Comparison of Alternatives**

The following table displays the comparison of alternatives A, B, and C as discussed throughout this chapter. See table 3-1 at the beginning of this chapter for a summary of the acreage comparisons.

**Table 3.3 Comparison of Alternatives**

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<p><b>Goal 1. Forest Habitat</b> Protect, enhance, and restore the ecological integrity of inner coastal plain forest ecosystems of the lower James River to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient in anticipation of climate change.</p>			
<p><b>Objective 1.1: Pine-dominated Forest</b></p>	<p><b>Objective 1.1.A</b> Over the life of the plan, promote general forest health on 2,653 acres of pine-dominated forest for the benefit of roosting, foraging, and nesting bald eagles, wild turkey, cavity-nesting avian species, various hawk species, and native mammalian species.</p>	<p><b>Objective 1.1.B</b> Over the life of the plan, promote transformation of up to 2,651 acres of pine-dominated forest towards a mature pine savanna with 80 to 100 trees per acre containing mature trees with a minimum average DBH of 10 inches, an open mid-story, and an understory with an average diversity of 23 plant species per square meter to increase resident brown-headed nuthatch populations and breeding populations of Chuck-will's-widow.</p>	<p><b>Objective 1.1.C</b> This habitat is not present under alternative C (0 acres).</p>
	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Identify areas within pine-dominated forest that are prime bald eagle habitat.</li> <li>Protect potential nest and roost trees to ensure ideal bald eagle habitat would continue to exist on the refuge.</li> <li>Thin dense stands of re-generating pines to maintain unencumbered views from bald eagle nest or roost trees.</li> <li>Do not harvest trees 24-inch DBH or greater.</li> <li>Protect mast bearing species (e.g., oak) from fire impacts if possible through regulation of fire intensity and seasonality of burns.</li> <li>Reduce the risk of wildfire occurrences by using a regimen of pine thinning and prescribed fire to reduce 1 hour and 10 hour fuels by 50 percent and 100 hour fuels by 25 percent.</li> <li>Reduce tree density (from more than 1,000 trees per acre to 400 trees per acre), releasing</li> </ul>	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Protect potential nest and roost trees to ensure ideal bald eagle habitat would continue to exist on the refuge.</li> </ul> <p><i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>Protect 75 percent of trees with 24-inch DBH or greater.</li> <li>Protect snags that do not pose a threat to safety of refuge operations. Create dead trees in the interior of management units to replace snags that are removed.</li> <li>Actively work to remove the mid-story through mechanical and fire treatments to promote development of pine savanna habitat. Promote an open understory of savanna habitat by mimicking natural fire regimes.</li> <li>Seed 1 to 1.5 acre decks used in logging operations with native grasses (e.g., broomsedge) to limit woody regrowth between thinning operations.</li> </ul>	<p><b>Strategies</b> None.</p> <p><b>Inventory and Monitoring Activities</b> None.</p>

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<p><b>Objective 1.1: Pine-dominated Forest (cont.)</b></p>	<p>stagnated trees from resource competition to promote a healthier, robust stand of mixed pine and hardwoods, and to promote species and structural diversity.</p> <ul style="list-style-type: none"> <li>• Conduct prescribed burns in a manner that mimics natural fire regimes to reduce the potential for catastrophic wildfire, forest pests, and forest diseases.</li> <li>• In areas that are not prime bald eagle habitat, conduct regeneration burns to promote a fire-tolerant mixed pine and hardwood community, to emphasize structure.</li> <li>• Seed 1 to 1.5 acre decks used in logging operations with native grasses (e.g., broomsedge) when operations cease to limit woody regrowth between thinning operations.</li> </ul> <p><b>Inventory and Monitoring Activities</b>  <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Conduct annual forest breeding bird point count survey.</li> </ul>	<p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Investigate longleaf pine restoration options by planting longleaf pine seedlings and/or saplings in widened thinning corridors areas as part of the existing forest management actions.</li> </ul> <p><i>Within 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Perform active thinning and fire management projects to reduce tree density to 200 trees per acre and allow release of pines to increase DBH of mature trees to a minimum average DBH of 10 inches (25.6 cm).</li> </ul> <p><b>Inventory and Monitoring Activities</b>  <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Conduct annual forest breeding bird point count survey.</li> </ul> <p><i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>• Coordinate with regional forester to conduct regular timber assessments.</li> </ul> <p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Conduct baseline inventory and identify long-term monitoring protocols for brown-headed nuthatch and breeding Chuck-will's-widow populations.</li> </ul> <p><i>Within 10 to 15 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Assess survivorship and cost-effectiveness of planting longleaf pine seedlings and/or saplings.</li> </ul>	

3.7 Comparison of Alternatives

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<b>Objective 1.2: Transitional Dry Hardwood Forest</b>	<b>Objective 1.2.A</b> This habitat is not present under alternative A (0 acres).	<b>Objective 1.2.B</b> This habitat is not present under alternative B (0 acres).	<b>Objective 1.2.C</b> Over the life of the plan, promote the transition of up to 2,609 acres of pine-dominated forest towards a dry hardwood forest dominated by oak and hickory, and no more than 20 percent pine per acre, to increase breeding populations of black-and-white warblers and ovenbirds.
	<b>Strategies</b> None.  <b>Inventory and Monitoring Activities</b> None.	<b>Strategies</b> None.  <b>Inventory and Monitoring Activities</b> None.	<b>Strategies</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Protect potential nest and roost trees to offer benefits for bald eagle use on the refuge.</li> </ul> <i>Throughout the life of the plan:</i> <ul style="list-style-type: none"> <li>Remove no more than 50 percent of hardwood trees with a DBH of 24 inches or greater.</li> <li>Remove no more than 80 percent of pine trees with a DBH of 24 inches or greater.</li> </ul> <i>Within 10 years of CCP approval:</i> <ul style="list-style-type: none"> <li>Use selective cut forestry and associated best management practices to promote dry hardwood (oak/hickory/pine) conversion using an incremental, gradual, and phased approach.</li> <li>Use clear cut forestry and associated best management practices in young, dense pine stands, where trees are stagnated or underperforming, and are less than 9 inches DBH.</li> </ul> <i>Within 5 to 15 years of CCP approval:</i> <ul style="list-style-type: none"> <li>Chemically, mechanically, and manually treat pine and regenerating pine to reduce seed stock and regrowth to stand levels of no more than 20 percent pine per acre.</li> <li>Use prescribed burning to promote dry hardwood species through fuel reduction in advance of hardwood plantings and control measures.</li> </ul> <b>Inventory and Monitoring Activities</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Continue annual breeding bird survey.</li> </ul>

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<b>Objective 1.2: Transitional Dry Hardwood Forest (cont.)</b>			<p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Conduct baseline inventory and identify long-term monitoring protocols for breeding black-and-white warblers and ovenbirds.</li> <li>• Develop focused, long-term studies to assess wildlife impacts and success of transitioning pine-dominated forest to dry hardwood forest.</li> </ul>
<b>Objective 1.3: Moist Hardwood Forest</b>	<p><b>Objective 1.3.A</b> Over the life of the plan, maintain the existing 775 acres of moist hardwood forest to support nesting, roosting, and feeding by native species, including wild turkey, neotropical migratory birds, gray squirrels, and white-tailed deer.</p> <p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Protect all native trees.</li> <li>• Not thin any moist hardwood forested areas.</li> <li>• Limit activities (e.g., human and mechanical) that would disturb bald eagles.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Conduct annual forest breeding bird point count survey.</li> </ul>	<p><b>Objective 1.3.B</b> Over the life of the plan, maintain 775 acres of moist hardwood forest with 75 percent ground cover in leaf litter, 50 percent mid-story cover from more than 10 native species, and 30 percent mature trees with a minimum DBH of 20 inches to protect year-round habitat for eastern box turtle and nesting habitat for breeding red-shouldered hawks and wood thrushes.</p> <p><b>Strategies</b> <i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>• Limit activities (e.g., human and mechanical) that would disturb bald eagles and other forest dwelling species during the nesting season.</li> <li>• Limit disturbance of forest floor to protect wildlife species dependent on this microhabitat.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Conduct annual forest breeding bird point count survey.</li> </ul> <p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Conduct baseline inventory and identify long-term monitoring protocols for eastern box turtle, wood thrush, and red-shouldered hawk.</li> <li>• Conduct periodic habitat/vegetation assessment surveys.</li> </ul>	<p><b>Objective 1.3.C</b> Over the life of the plan, maintain 775 acres of moist hardwood forest with 75 percent ground cover in leaf litter, 50 percent mid-story cover from more than 10 native species, and 30 percent mature trees with a minimum DBH of 20 inches to protect year-round habitat for eastern box turtle and nesting habitat for breeding red-shouldered hawks and wood thrushes.</p> <p><b>Strategies</b> Same as alternative B.</p> <p><b>Inventory and Monitoring Activities</b> Same as alternative B.</p>

3.7 Comparison of Alternatives

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<b>Objective 1.4: Floodplain Forest</b>	<b>Objective 1.4 A</b> Over the life of the plan, maintain the existing 633 acres of floodplain forest to benefit roosting, foraging, and nesting bald eagles, wild turkey, wood ducks, and other priority wildlife species.	<b>Objective 1.4 B</b> Over the life of the plan, maintain 633 acres of floodplain forest containing 30 percent mature trees with a minimum DBH of 20 inches, 20 percent trees with DBH between 15 and 20 inches, and 3,530 to 10,600 cubic feet per hectare of coarse woody debris to promote forest health and to protect nesting and roosting bald eagles, breeding prothonotary warblers, and resident spotted salamander populations.	<b>Objective 1.4.C</b> Over the life of the plan, maintain 633 acres of floodplain forest containing 30 percent mature trees with a minimum DBH of 20 inches, 20 percent trees with DBH between 15 and 20 inches, and 3,530 to 10,600 cubic feet per hectare of coarse woody debris to promote forest health and to protect nesting and roosting bald eagles, breeding prothonotary warblers, and resident spotted salamander populations.
	<b>Strategies</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Protect native trees.</li> <li>Not thin any floodplain forest areas.</li> <li>Limit activities that would disturb bald eagles, especially during nesting season.</li> </ul> <b>Inventory and Monitoring Activities</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Conduct spring and summer shoreline bald eagle surveys.</li> <li>Conduct annual forest breeding bird point count survey.</li> </ul>	<b>Strategies</b> Same as alternative A.  <b>Inventory and Monitoring Activities</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Conduct spring and summer shoreline bald eagle surveys.</li> <li>Conduct annual forest breeding bird point count survey.</li> </ul> <i>Within 5 to 10 years of CCP approval:</i> <ul style="list-style-type: none"> <li>Conduct baseline inventory and identify long-term monitoring protocols for prothonotary warblers and spotted salamanders.</li> <li>Conduct periodic habitat/vegetation assessment surveys.</li> </ul>	<b>Strategies</b> Same as alternative A.  <b>Inventory and Monitoring Activities</b> Same as alternative B.
<b>Goal 2: Non-forest Habitat</b> Protect, enhance, and restore the ecological integrity of non-forest ecosystems to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient in anticipation of climate change.			
<b>Objective 2.1: Freshwater Marsh and Shrub Swamp</b>	<b>Objective 2.1.A</b> Over the life of the plan, maintain 82 acres of freshwater marsh and shrub swamp in current condition to support native species.	<b>Objective 2.1.B</b> Over the life of the plan, maintain and promote natural hydrology and native plant species in 82 acres of freshwater marsh and shrub swamp for resident marsh wren populations and breeding least bitterns.	<b>Objective 2.1.C</b> Over the life of the plan, maintain and promote natural hydrology and native plant species in 82 acres of freshwater marsh and shrub swamp for resident marsh wren populations and breeding least bitterns.
	<b>Strategies</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Protect all native vegetation by limiting disturbance from refuge operations and public use in freshwater marsh and shrub swamp areas.</li> </ul> <b>Inventory and Monitoring Activities</b> None.	<b>Strategies</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Protect all native vegetation by limiting disturbance from refuge operations and public use in freshwater marsh and shrub swamp areas.</li> </ul> <b>Inventory and Monitoring Activities</b> <i>Within 3 years of CCP approval:</i> <ul style="list-style-type: none"> <li>Investigate the hydrologic flow between the wetlands in the southwestern portion of the refuge</li> </ul>	<b>Strategies</b> Same as alternative B.  <b>Inventory and Monitoring Activities</b> Same as alternative B.

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<b>Objective 2.1: Freshwater Marsh and Shrub Swamp (cont.)</b>		and Powell Creek.  <i>Within 5 to 10 years of CCP approval:</i> <ul style="list-style-type: none"> <li>Conduct baseline inventory and identify long-term monitoring protocols for marsh wren and least bittern populations.</li> </ul>	
<b>Objective 2.2: Aquatic Habitats</b>	<p><b>Objective 2.2.A</b> Over the life of the plan, support efforts of partners to improve 17 acres of aquatic habitat to benefit native species and protect this habitat from being degraded.</p> <p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Implement best management practices for construction and land management activities to minimize potential release of sediment load and deposition in the James River.</li> <li>Maintain vegetated riparian areas and natural habitats.</li> <li>Collaborate with State and Federal partners to maintain fish populations suitable for wildlife consumption (i.e., bald eagles) and public recreation opportunity.</li> <li>Support partner efforts to restore federally listed Atlantic sturgeon habitat.</li> <li>Assist partners in promoting James River watershed protection and health, and contribute to the recovery of species of conservation concern (e.g., Atlantic sturgeon, alewife, blueback herring).</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Work with partners to monitor water quality stations in refuge vicinity.</li> <li>Support partner efforts to monitor federally listed Atlantic sturgeon habitat.</li> <li>Work with partners to monitor SAV.</li> </ul>	<p><b>Objective 2.2.B</b> Over the life of the plan, support efforts of partners to maintain or increase submerged aquatic vegetation in 17 acres of aquatic habitat for the benefit of native species (e.g., Atlantic sturgeon, alewife, blueback herring) and protect this habitat from being degraded.</p> <p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Implement best management practices for construction and land management activities to minimize potential release of sediment load and deposition in the James River.</li> <li>Maintain vegetated riparian areas and natural habitats.</li> <li>Collaborate with State and Federal partners to maintain fish populations suitable for wildlife consumption (i.e., bald eagles) and public recreation opportunity.</li> <li>Support partner efforts to restore federally listed Atlantic sturgeon habitat.</li> <li>Assist partners in promoting James River watershed protection and health, and contribute to the recovery of species of conservation concern (e.g., Atlantic sturgeon, alewife, blueback herring).</li> </ul> <p><i>Within 10 to 15 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Plant native species along disturbed or denuded riparian areas.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <p>Work with partners to monitor water quality stations in refuge vicinity.</p> <ul style="list-style-type: none"> <li>Support partner efforts to monitor federally listed Atlantic sturgeon habitat.</li> </ul>	<p><b>Objective 2.2.C</b> Over the life of the plan, support efforts of partners to maintain or increase submerged aquatic vegetation in 17 acres of aquatic habitat for the benefit of native species (e.g., Atlantic sturgeon, alewife, blueback herring) and protect this habitat from being degraded.</p> <p><b>Strategies</b> Same as alternative B.</p> <p><b>Inventory and Monitoring Activities</b> Same as alternative B.</p>

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<b>Objective 2.2: Aquatic Habitats (cont.)</b>		<ul style="list-style-type: none"> <li>Work with partners to monitor SAV.</li> </ul> <p><i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>Make use of the VIMS monitoring of SAV to evaluate success.</li> </ul> <p><i>Within 3 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Investigate the hydrologic flow between the wetlands in the southwestern portion of the refuge and Powell Creek.</li> </ul>	
<b>Objective 2.3: Erosional Bluff</b>	<p><b>Objective 2.3.A</b> Over the life of the plan, maintain and promote native vegetation on 3 shoreline miles to help stabilize bluffs and reduce erosion.</p> <p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Protect all standing, live or dead, native trees in erosional bluff areas by not removing vegetation and limiting mechanical equipment use in areas around waterways and steep slopes.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Opportunistically conduct informal visual surveys to monitor shoreline conditions and eroding areas.</li> </ul>	<p><b>Objective 2.3.B</b> Over the life of the plan, maintain and promote native vegetation on 3 shoreline miles to help stabilize bluffs, reduce erosion, and provide nesting substrate for breeding bank swallows.</p> <p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Protect all standing, live or dead, native trees in erosional bluff areas by not removing vegetation and limiting mechanical equipment use in areas around waterways and steep slopes.</li> </ul> <p><i>Within 10 to 15 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Investigate and employ shoreline erosion control techniques to promote bank stabilization and protect bank swallow habitat, if appropriate.</li> <li>Strategically plant key plant species (e.g., bald cypress) to break up wave energy, if appropriate.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Conduct shoreline erosion surveys and document bank loss.</li> </ul> <p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Conduct baseline inventory and identify long-term monitoring protocols for breeding bank swallow populations.</li> </ul>	<p><b>Objective 2.3.C</b> Over the life of the plan, maintain and promote native vegetation on 3 shoreline miles to help stabilize bluffs, reduce erosion, and provide nesting substrate for breeding bank swallows.</p> <p><b>Strategies</b> Same as alternative B.</p> <p><b>Inventory and Monitoring Activities</b> Same as alternative B.</p>

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<b>Objective 2.4: Non-forested Upland</b>	<b>Objective 2.4.A</b> Over the life of the plan, maintain 13 acres of non-forested upland for administrative purposes (e.g., weather station operation).	<b>Objective 2.4.B</b> Over the life of the plan, maintain 15 acres of non-forested upland for administrative purposes (e.g., weather station operation).	<b>Objective 2.4.C</b> Over the life of the plan, maintain up to 57 acres of non-forested upland s in native grasses as wildlife habitat to increase resident woodcock and northern bobwhite populations.
	<b>Strategies</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Mow at least once a year.</li> </ul> <b>Inventory and Monitoring Activities</b> None.	<b>Strategies</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Mow at least once a year.</li> </ul> <i>Within 3 years of CCP approval:</i> <ul style="list-style-type: none"> <li>Selectively cut up to 2 acres of pine-dominated forest around the weather station and manage it as non-forested upland to maintain equipment functions.</li> </ul> <b>Inventory and Monitoring Activities</b> None.	<b>Strategies</b> <i>Throughout the life of the plan:</i> <ul style="list-style-type: none"> <li>Mow once a year or more in non-forested upland managed for habitat and for administrative purposes.</li> </ul> <i>Within 10 years of CCP approval:</i> <ul style="list-style-type: none"> <li>Hand seed or plant native grasses in the former logging decks after thinning operations are complete.</li> </ul> <b>Inventory and Monitoring Activities</b> <i>Within 5 to 10 years of CCP approval:</i> <ul style="list-style-type: none"> <li>Conduct baseline inventory and identify long-term monitoring protocols for resident woodcock and northern bobwhite populations.</li> </ul>
<b>Goal 3. Cultural Resources</b> 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 lower James River.			
<b>Objective 3.1: Cultural Resource Protection</b>	<b>Objective 3.1.A</b> Over the life of the plan, minimize ground disturbance throughout the refuge.	<b>Objective 3.1.B</b> Within 5 years, use more precise information about archaeological sites to protect known sites and better inform refuge management decisions.	<b>Objective 3.1.C</b> Within 5 years, use more precise information about archaeological sites to protect known sites and better inform refuge management decisions.
	<b>Strategies</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Consult with the RHPO and SHPO regarding refuge activities that have the potential to disturb the ground.</li> <li>Ensure that refuge activities are conducted in accordance with the approved standard operating procedures for mechanical pine thinning and fire management.</li> </ul> <b>Inventory and Monitoring Activities</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Periodically monitor known cultural resource sites.</li> </ul>	<b>Strategies</b> <i>Continue to:</i> <ul style="list-style-type: none"> <li>Consult with the RHPO and SHPO regarding refuge activities that have the potential to disturb the ground.</li> <li>Ensure that refuge activities are conducted in accordance with the approved standard operating procedures for mechanical pine thinning and fire management.</li> </ul> <i>Throughout the life of the plan:</i> <ul style="list-style-type: none"> <li>Stabilize sites vulnerable to erosion.</li> <li>Conduct targeted archaeological Phase I surveys on strategically determined sensitive locations related to habitat management and survey structures on the refuge to determine eligibility for the</li> </ul>	<b>Strategies</b> Same as alternative B.  <b>Inventory and Monitoring Activities</b> Same as alternative B.

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<p><b>Objective 3.1: Cultural Resource Protection (cont.)</b></p>		<p>National Register.</p> <ul style="list-style-type: none"> <li>• Protect indigenous cultural landscapes of the moist hardwood forest, floodplain forest, freshwater marsh and shrub swamp, aquatic habitats, and erosional bluff.</li> <li>• Promote professionally qualified and permitted archaeological research and study to expand professional knowledge and understanding of the objects, their context, and relevance.</li> <li>• Assemble artifacts and field records of previous archaeological excavations on the refuge in a repository that meets Department of the Interior standards to make them available for research and interpretation.</li> </ul> <p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• In advance of conducting forest management activities, refuge staff would prepare a list of the pine-dominated stands to be logged and Service archaeologists would map and flag archaeological sites and sensitive areas with a buffer zone of 200 feet.</li> </ul> <p><b>Inventory and Monitoring Activities</b></p> <p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Establish an archaeological site monitoring program, including both a baseline assessment of the two major excavated archaeological sites, site visits, and mapping to record location information and monitor site condition.</li> </ul>	

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<p><b>Goal 4: Wildlife-dependent Recreation</b> Provide wildlife-dependent recreational opportunities for visitors to connect with nature and foster enhanced stewardship of the lower James River, Chesapeake Bay estuary, and the National Wildlife Refuge System.</p>			
<p><b>Objective 4.1: Hunting</b></p>	<p><b>Objective 4.1.A</b> Accommodate public deer hunting on the refuge for 1,370 hunter use days annually to maintain the population of white-tailed deer at a level commensurate with the biological carrying capacity of the available refuge habitat and to provide high quality wildlife-oriented recreation.</p>	<p><b>Objective 4.1.B</b> Over the next 3 to 5 years, provide high quality recreational hunting opportunities and complete all the administrative requirements to expand the existing deer hunt, add new hunts, and promote youth hunt involvement.</p>	<p><b>Objective 4.1.C</b> Over the next 3 to 5 years, provide high quality recreational hunting opportunities and complete all the administrative requirements to expand the existing deer hunt, add new hunts, and promote youth hunt involvement.</p>
	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Administer public deer hunt in accordance with the approved hunt management plan (1993) and subsequent amendments to accommodate up to: <ul style="list-style-type: none"> <li>❖ Fifty hunters to hunt on any or all days within one 19-day archery season (950 hunter use days annually).</li> <li>❖ Seventy hunters per day on each of 2 muzzleloader hunting days (140 hunter use days annually).</li> <li>❖ Seventy hunters per day on each of 4 shotgun hunting days (280 hunter use days annually).</li> </ul> </li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Monitor harvest success ratios, deer health, and safety.</li> <li>• As needed throughout the year, coordinate with VDGIF District Biologist to evaluate herd size, disease issues, and current regulations.</li> <li>• Participate in the VDGIF DMAP</li> </ul>	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Administer public deer hunt in accordance with the approved hunt management plan (1993) and subsequent amendments to accommodate up to: <ul style="list-style-type: none"> <li>❖ Fifty hunters to hunt on any or all days within one 19-day archery season (950 hunter use days annually).</li> <li>❖ Seventy hunters per day on each of 2 muzzleloader hunting days (140 hunter use days annually).</li> <li>❖ Seventy hunters per day on each of 4 shotgun hunting days (280 hunter use days annually).</li> </ul> </li> </ul> <p><i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>• Allow adaptive management of hunt days offered based on State monitoring program (DMAP) recommendations for herd management.</li> </ul> <p><i>Within 3 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Improve hunt administration processes to increase hunter participation.</li> <li>• Enhance promotion of the hunt to a larger audience, including youth.</li> <li>• Construct a four-person stationary blind along the northern peninsula of the Powell Creek trail.</li> </ul>	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Administer public deer hunt in accordance with the approved hunt management plan (1993) and subsequent amendments to accommodate up to: <ul style="list-style-type: none"> <li>❖ Fifty hunters to hunt on any or all days within one 19-day archery season (950 hunter use days annually).</li> <li>❖ Seventy hunters per day on each of 2 muzzleloader hunting days (140 hunter use days annually).</li> <li>❖ Seventy hunters per day on each of 4 shotgun hunting days (280 hunter use days annually).</li> </ul> </li> </ul> <p><i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>• Allow adaptive management of hunt days offered based on State monitoring program (DMAP) recommendations for herd management.</li> </ul> <p><i>Within 3 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Improve hunt administration processes to increase hunter participation.</li> <li>• Enhance promotion of the hunt to a larger audience, including youth.</li> <li>• Construct a four-person stationary blind along the northern peninsula of the Powell Creek trail.</li> </ul>

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<p><b>Objective 4.1: Hunting (cont.)</b></p>		<p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Complete all administrative requirements for the proposed expanded hunt program once the CCP is approved and resources are available, including developing a separate NEPA document, compatibility determination, hunt plan, and further public involvement, to accommodate up to:               <ul style="list-style-type: none"> <li>❖ Deer:                   <ul style="list-style-type: none"> <li>➢ Fifty archery hunters on any or all days within one 19-day fall archery season (950 hunter use days annually). Seventy hunters per day on each of 3 fall muzzleloader hunting days (210 hunter use days annually).</li> <li>➢ Seventy hunters per day on each of 4 fall shotgun hunting days (280 hunter use days annually).</li> <li>➢ Twenty youth hunters to participate in the 1 fall State Youth Deer Hunt Day (20 hunter use days annually).</li> </ul> </li> <li>❖ Turkey:                   <ul style="list-style-type: none"> <li>➢ Fifty hunters per day on any or all 19 days, in conjunction with the 19-day fall archery deer hunt season (950 hunter use days annually).</li> <li>➢ Seventy hunters per day on each of 3 hunt days, in conjunction with fall muzzleloader deer hunt season (210 hunter use days annually).</li> <li>➢ Twenty hunters per day on 3 days during the State's spring season (60 hunter use days annually) Twenty youth hunters on 1 spring day and 1 fall day, in conjunction with the State's Youth Turkey Hunt Day (40 hunter use days annually).</li> </ul> </li> <li>❖ Waterfowl:                   <ul style="list-style-type: none"> <li>Open one location on Powell Creek for four hunters (at least one youth per licensed adult) on each of 10 hunt days (40</li> </ul> </li> </ul> </li> </ul>	<p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Complete all administrative requirements for the proposed expanded hunt program once the CCP is approved and resources are available (including developing a separate NEPA document, compatibility determination, hunt plan, and further public involvement) to accommodate up to:               <ul style="list-style-type: none"> <li>❖ Deer:                   <ul style="list-style-type: none"> <li>➢ Fifty archery hunters on any or all days within each of two 12-day seasons (1,200 hunter use days annually). Seventy hunters per day on each of 4 muzzleloader hunting days (280 hunter use days).</li> <li>➢ Seventy hunters per day on each of 4 shotgun hunting days (280 hunter use days annually).</li> <li>➢ Twenty youth hunters to participate in the 1 fall State Youth Deer Hunt Day (20 hunter use days annually).</li> </ul> </li> <li>❖ Turkey:                   <ul style="list-style-type: none"> <li>➢ Fifty hunters on any or all days within each of two 12-day seasons, in conjunction with fall archery season (1,200 hunter use days annually).</li> <li>➢ Seventy hunters per day on each of 4 hunt days, in conjunction with fall muzzleloader deer hunt season (280 hunter use days annually).</li> <li>➢ Twenty hunters per day on 12 days within two 6-day seasons in spring (240 hunter use days annually).</li> <li>➢ Twenty youth hunters on 1 spring day and 1 fall day, in conjunction with the State's Youth Turkey Hunt Day (40 hunter use days annually).</li> </ul> </li> <li>❖ Waterfowl:                   <ul style="list-style-type: none"> <li>Same as alternative B.</li> </ul> </li> </ul> </li> <li>• Provide visitors with general information on the expanded hunting program and refuge-</li> </ul>

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<p><b>Objective 4.1: Hunting (cont.)</b></p>		<p>hunter use days annually).</p> <ul style="list-style-type: none"> <li>• Provide visitors with general information on the expanded hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote the use of lead-free ammunition.</li> <li>• Investigate the required use of lead-free ammunition for deer and turkey hunting, including identifying the impacts of lead exposure from hunting activities on wildlife and impacts of lead ammunition restrictions on hunters.</li> </ul> <p><i>Within 5 to 15 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Renovate the hunter check station with features that are similar to an old-time hunting and fishing lodge (archival hunt/fishing photos, mounts, and comfortable/downhome setting). The facility would highlight the rich history of the Service and the conservation movement and serve as a staging/registration area for all hunt programs.</li> <li>• Close a portion of the wildlife observation trail on youth waterfowl hunt days to minimize the potential for user conflicts and safety concerns.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Monitor harvest success ratios, deer health, and safety.</li> <li>• As needed throughout the year, coordinate with VDGIF District Biologist to evaluate herd size, disease issues, and current regulations.</li> <li>• Participate in the VDGIF DMAP</li> </ul> <p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Request that each waterfowl hunt participant complete the Migratory Bird Hunt Report (FWS form 3-2361).</li> </ul>	<p>specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote the use of lead-free ammunition.</p> <ul style="list-style-type: none"> <li>• Investigate the required use of lead-free ammunition for deer and turkey hunting, including identifying the impacts of lead exposure from hunting activities on wildlife and impacts of lead ammunition restrictions on hunters.</li> </ul> <p><i>Within 5 to 15 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Renovate the hunter check station with features that are similar to an old-time hunting and fishing lodge (archival hunt/fishing photos, mounts, and comfortable/downhome setting). The facility would highlight the rich history of the Service and the conservation movement and serve as a staging/registration area for all hunt programs.</li> </ul> <p><b>Inventory and Monitoring Activities</b> Same as alternative B.</p>

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<b>Objective 4.2: Wildlife Observation, Photography, Environmental Education, and Interpretation</b>	<p><b>Objective 4.2.A</b> Provide wildlife observation, photography, environmental education, and interpretation opportunities to visitors on a by-request, case-by-case basis, to offer educational experiences in ecosystem management.</p>	<p><b>Objective 4.2.B</b> Over the next 5 to 10 years, provide infrastructure within a designated area to support opportunities for visitors to participate in wildlife observation, photography, environmental education, and interpretation to improve the quality of visitor experiences.</p>	<p><b>Objective 4.2.C</b> Over the next 5 to 10 years, provide three designated areas to support opportunities for visitors to participate in wildlife observation, photography, environmental education, and interpretation to improve the quality of visitor experiences.</p>
	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Use the existing reservation system for visitor participation in refuge-sponsored and partner-sponsored programs.</li> <li>• Offer refuge-sponsored boat trips as staffing and resources allow.</li> <li>• Require participants to request a refuge-issued permit 3 business days in advance of proposed visit.</li> <li>• Issue permits for planned, unchaperoned visits to use the existing 0.5-mile trail, existing canoe/kayak launch on Powell Creek, and unimproved refuge roads.</li> <li>• Implement approved infrastructure improvement or construction projects to support public use (appendix D), in particular: <ul style="list-style-type: none"> <li>❖ Improve the canoe/kayak launch to meet VMRC's permit requirements.</li> <li>❖ Repair refuge roads.</li> <li>❖ Rehabilitate hunter check station.</li> </ul> </li> <li>• Opportunistically offer up to two on-refuge interpretive programs annually.</li> <li>• Upon request, refuge staff offers up to two off-refuge interpretive programs annually.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Monitor conditions of existing facilities and infrastructure used by visitors (e.g., trail, restrooms, kiosk).</li> </ul>	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Require participants to request a refuge-issued permit 3 business days in advance of proposed visit until signage and visitor support facility improvements are completed.</li> </ul> <p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Designate a 240-acre area adjacent to Powell Creek in which we would develop public use infrastructure.</li> <li>• Improve public parking (approximately 14,000 square feet, sufficient for 20 vehicles and a bus) and establish a trailhead that would provide access to the existing 0.5-mile trail.</li> <li>• Open public access from sunrise to sunset.</li> <li>• Improve restroom facilities and renovate hunter check station to become a visitor contact station.</li> <li>• Upgrade equipment shed to serve as an outdoor meeting space for partners promoting Service mission-related topics.</li> <li>• Partner with Prince George County Parks and Recreation Department to administer environmental education and interpretation programs.</li> </ul> <p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Improve visitor use facilities in designated areas, in particular: <ul style="list-style-type: none"> <li>❖ Extend the existing 0.5-mile trail to become a 3-mile wildlife observation trail system with: <ul style="list-style-type: none"> <li>A pedestrian walkway as part of the trail, which doubles as an observation platform along steep valleys.</li> <li>➤ An improved canoe/kayak</li> </ul> </li> </ul> </li> </ul>	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Require participants to request a refuge-issued permit 3 business days in advance of proposed visit until signage and visitor support facility improvements are completed.</li> </ul> <p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Designate two public use areas in which we would develop public use infrastructure: <ul style="list-style-type: none"> <li>❖ 240-acre area adjacent to Powell Creek.</li> <li>❖ Northern terminus of Route 640.</li> </ul> </li> <li>• Improve public parking (approximately 14,000 square feet, sufficient for 20 vehicles and a bus) and establish a trailhead that would provide access to the existing 0.5-mile trail.</li> <li>• Establish a kiosk with interpretive panels at the northern terminus of Route 640.</li> <li>• Open public access from sunrise to sunset.</li> <li>• Improve restroom facilities and renovate hunter check station to become a visitor contact station.</li> <li>• Upgrade equipment shed to serve as an outdoor meeting space for partners promoting Service mission-related topics.</li> <li>• Partner with Prince George County Parks and Recreation Department to administer environmental education and interpretation programs.</li> </ul> <p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Improve visitor use facilities in designated areas, in particular: <ul style="list-style-type: none"> <li>❖ Extend the existing 0.5-mile trail to become a 3-mile wildlife</li> </ul> </li> </ul>

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<p><b>Objective 4.2: Wildlife Observation, Photography, Environmental Education, and Interpretation (cont.)</b></p>		<p>launch.</p> <ul style="list-style-type: none"> <li>➤ An improved vehicular ingress and egress route(s) and establish two additional parking areas (combined total of approximately 7,000 square feet, sufficient for five vehicles each).</li> <li>➤ An improved access at Powell Creek to accommodate nature trail users' access to island.</li> <li>➤ Develop interpretive signs and brochures to address topics of interest including, but not limited to, bald eagle life history and recovery success, forest management, and indigenous cultural landscapes.</li> <li>➤ Construct a four-person wildlife observation/ photography blind along Powell Creek.</li> </ul> <ul style="list-style-type: none"> <li>• Provide refuge or partnered-sponsored programs throughout the year, using a reservation system only when space or equipment is limited (such as boat trips or canoe sojourns).</li> <li>• Offer two boat tours annually, specifically to observe bald eagles.</li> <li>• Develop an urban partnership to coordinate with local schools to establish regular visitation and introduce community youth to the natural resources within their county.</li> </ul> <p><i>Within the life of the plan:</i></p> <ul style="list-style-type: none"> <li>• Relocate the maintenance complex from the area of high visitor use to a more centralized, non-public location.</li> </ul> <p><b>Inventory and Monitoring Activities</b></p> <p><i>Continue to:</i></p> <ul style="list-style-type: none"> <li>• Monitor conditions of existing facilities and infrastructure used by visitors (e.g., trail, restrooms, kiosk).</li> </ul> <p><i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>• Monitor existing and newly constructed infrastructure used by</li> </ul>	<p>observation trail system with:</p> <ul style="list-style-type: none"> <li>➤ A pedestrian walkway as part of the trail, which doubles as an observation platform along steep valleys.</li> <li>➤ An improved canoe/kayak launch.</li> <li>➤ An improved vehicular ingress and egress route(s) and establish two additional parking areas (combined total of approximately 7,000 square feet, sufficient for five vehicles each).</li> <li>➤ An improved access at Powell Creek to accommodate nature trail users' access to island.</li> <li>➤ Develop interpretive signs and brochures to address topics of interest including, but not limited to, bald eagle life history and recovery success, forest management, and indigenous cultural landscapes.</li> <li>➤ Construct a four-person wildlife observation/ photography blind along Powell Creek.</li> </ul> <ul style="list-style-type: none"> <li>• Designate a third public use area by creating a 2-mile wildlife drive on Hunter Circle that would be open from sunrise to sunset.</li> <li>• Allow foot access on Hunter Circle Road.</li> <li>• Develop interpretive signs and brochures to address topics of interest including, but not limited to, bald eagle life history and recovery success, forest management, and indigenous cultural landscapes.</li> <li>• Provide refuge or partnered-sponsored programs throughout the year, using a reservation system only when space or equipment is limited (such as boat trips or canoe sojourns).</li> <li>• Offer two boat tours annually, specifically to observe bald eagles.</li> <li>• Develop an urban partnership to coordinate with local schools to establish regular visitation and</li> </ul>

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<p><b>Objective 4.2: Wildlife Observation, Photography, Environmental Education, and Interpretation (cont.)</b></p>		<p>visitors to determine use patterns and capacity limits.</p> <ul style="list-style-type: none"> <li>Monitor impacts on vegetation and wildlife within public use area and track trends, adjust public access as necessary.</li> </ul>	<p>introduce community youth to the natural resources within their county.</p> <p><i>Within the life of the plan:</i></p> <ul style="list-style-type: none"> <li>Relocate the maintenance complex from the area of high visitor use to a more centralized, non-public location.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Monitor conditions of existing facilities and infrastructure used by visitors (e.g., trail, restrooms, kiosk).</li> </ul> <p><i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>Monitor existing and newly constructed infrastructure used by visitors to determine use patterns and capacity limits.</li> <li>Monitor impacts on vegetation and wildlife within public use area and track trends, adjust public access as necessary.</li> </ul>
<p><b>Objective 4.3: Fishing</b></p>	<p><b>Objective 4.3.A</b> The refuge remains closed to fishing from its shoreline.</p> <p><b>Strategies</b> No documentation required by Service regulation or policy to maintain the refuge as closed to this use.</p> <p><b>Inventory and Monitoring Activities</b> None.</p>	<p><b>Objective 4.3.B</b> Over the next 5 years, open the refuge to year-round fishing at up to two designated locations to accommodate up to 1,460 anglers annually.</p> <p><b>Strategies</b> <i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Complete all administrative requirements for the proposed opening of the refuge to fishing once the CCP is approved and resources are available, including developing a separate NEPA document, compatibility determination, sport fishing plan, and further public involvement.</li> </ul> <p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Allow fishing (rod and hook) at up to two designated sites on Powell Creek.</li> <li>Improve and maintain access roads and parking areas for accessing both fishing locations.</li> <li>Work with partners and volunteers to improve the infrastructure at the canoe/kayak launch site to establish it as a fishing location and</li> </ul>	<p><b>Objective 4.3.C</b> Over the next 5 years, open the refuge to year-round fishing at up to three designated locations to accommodate up to 2,190 anglers annually.</p> <p><b>Strategies</b> <i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Complete all administrative requirements for the proposed opening of the refuge to fishing once the CCP is approved and resources are available, including developing a separate NEPA document, compatibility determination, sport fishing plan, and further public involvement.</li> </ul> <p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>Allow fishing (rod and hook) at three designated sites on Powell Creek. Two sites would be located on Powell Creek, and the third would be located along the northern portion of Nobles Marsh.</li> <li>Improve and maintain access roads and parking areas for accessing both fishing locations.</li> <li>Work with partners and volunteers</li> </ul>

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
<b>Objective 4.3: Fishing (cont.)</b>		<p>to facilitate non-trailerred, hand-launched boat access to Powell Creek.</p> <ul style="list-style-type: none"> <li>Provide visitors with general information on the fishing program and refuge-specific and State regulations through the refuge website, information signs, and a fishing brochure. In all materials related to the fishing program, promote use of lead-free tackle.</li> </ul> <p><b>Inventory and Monitoring Activities</b> <i>Throughout the life of the plan:</i></p> <ul style="list-style-type: none"> <li>Monitor the refuge support facilities associated with fishing.</li> <li>Coordinate with VDGIIF regarding angler regulations, fish populations, and disease notifications.</li> <li>Monitor impacts on vegetation and wildlife within public use area and track trends, adjust public access as necessary.</li> </ul>	<p>to improve the infrastructure at the canoe/kayak launch site to establish it as a fishing location and to facilitate non-trailerred, hand-launched boat access to Powell Creek.</p> <ul style="list-style-type: none"> <li>Provide visitors with general information on the fishing program and refuge-specific and State regulations through the refuge website, information signs, and a fishing brochure. In all materials related to the fishing program, promote use of lead-free tackle.</li> </ul> <p><b>Inventory and Monitoring Activities</b> Same as alternative B.</p>
<p><b>Goal 5. Partnerships</b> Develop new partnerships and strengthen existing partnerships to promote natural and cultural resource conservation and the mission of the National Wildlife Refuge System.</p>			
<b>Objective 5.1: Partnerships</b>	<p><b>Objective 5.1.A</b> Over the life of the plan, maintain existing partnerships to support habitat management activities, outreach, and wildlife-dependent recreation on the refuge.</p>	<p><b>Objective 5.1.B</b> Over the life of the plan, enhance existing partnerships and develop new partnerships with Federal, State, and local government agencies, non-government organizations, academic institutions, conservation organizations, and volunteers to fulfill mutual natural resource conservation mandates and help meet wildlife, habitat, and visitor services objectives.</p>	<p><b>Objective 5.1.C</b> Over the life of the plan, enhance existing partnerships and develop new partnerships with Federal, State, and local government agencies, non-government organizations, academic institutions, conservation organizations, and volunteers to fulfill mutual natural resource conservation mandates and help meet wildlife, habitat, and visitor services objectives.</p>
	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Maintain existing partnerships to manage forests and respond to wildfires; conduct formal and informal biological inventory, monitoring, and research; conduct cultural resource surveys; offer environmental education and wildlife interpretation programs; and maintain refuge infrastructure.</li> </ul>	<p><b>Strategies</b> <i>Continue to:</i></p> <ul style="list-style-type: none"> <li>Maintain existing partnerships to manage forests and respond to wildfires; conduct formal and informal biological inventory, monitoring, and research; conduct cultural resource surveys; offer environmental education and wildlife interpretation programs; and maintain refuge infrastructure.</li> </ul>	<p><b>Strategies</b> Same as alternative B.</p> <p><b>Inventory and Monitoring Activities</b> Same as alternative B.</p>

3.7 Comparison of Alternatives

Refuge Resource or Program	Alternative A. Current Management	Alternative B. Manage Forest Health with Pine-dominated Component; New, Enhanced, and Focused Public Use Opportunities (Service-preferred Alternative)	Alternative C. Manage Forest Health with Hardwood Conversion Component; New and Expanded Public Use Opportunities
Objective 5.1: Partnerships (cont.)		<p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Expand partnership with NPS to accomplish Captain John Smith Chesapeake NHT interpretive and resource protection goals associated with Powell Creek and indigenous cultural landscapes, as well as partnership for improving the existing canoe/kayak launch on Powell Creek.</li> </ul> <p><i>Within 5 to 10 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Expand existing partnerships individually, and in small groups, with JRA, CBF, and Virginia Master Naturalists Chapters.</li> <li>• Develop new and expand on existing partnerships with universities for research and environmental education programs.</li> <li>• Create a Friends group or develop new partnerships with other organizations in support of off-refuge environmental education.</li> <li>• Encourage long-term volunteers and seasonal volunteers by constructing a building or RV hookups near where water and electricity are available.</li> </ul> <p><b>Inventory and Monitoring Activities</b></p> <p><i>Within 5 years of CCP approval:</i></p> <ul style="list-style-type: none"> <li>• Assess effectiveness of expanded public use opportunities including youth engagement and outreach efforts, promotion of conservation messages, and visitor satisfaction.</li> </ul>	