

U.S. Fish & Wildlife Service

# Canaan Valley National Wildlife Refuge

*Draft Comprehensive Conservation Plan/  
Environmental Assessment*

*Executive Summary*

*May 2010*



*Front cover:*

*Freeland Beaver Pond*  
Frank Ceravalo

*Cheat Mountain Salamander*  
Kent Mason

*Canaan Valley Wild School*  
Vern Patterson

*Red Admiral Butterfly*  
USFWS

*Back cover:*

*Freeland Beaver Pond*  
Frank Ceravalo



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

The *U.S. Fish and Wildlife Service* is the principal Federal agency responsible for conserving, protecting, and enhancing fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The Service manages the 95-million acre National Wildlife Refuge System comprised of more than 545 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological services field stations. The agency enforces Federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal Assistance Program which distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

Comprehensive Conservation Plans provide long term guidance for management decisions and set forth goals, objectives, and strategies needed to accomplish refuge purposes and identify the Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.

# Canaan Valley National Wildlife Refuge

## *Draft Comprehensive Conservation Plan and Environmental Assessment*

### Abstract

**Type of action:** Administrative

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

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This Draft Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) for the Canaan National Wildlife Refuge fully compares four management alternatives. Its nine appendixes provide additional information supporting our analysis.

### **Alternative A.— Current Management:**

This “no action” alternative, required by regulations under the National Environmental Policy Act of 1969, would simply extend the way we now manage the refuge over the next 15 years. It also provides a baseline for comparing the three “action” alternatives. We would maintain our present levels of approved refuge staffing. We would continue the priorities of the biological program including shrubland and grassland management for migratory birds, protection of threatened and endangered species, red spruce and balsam fir community restoration, upland and wetland habitat restoration, invasive plant monitoring and eradication, and rare plant and animal conservation. We would continue to offer a hunt program in accordance with State seasons and we would continue to provide opportunities for wildlife observation and photography, environmental education and interpretation, as staffing and funding allows. Finally, we would continue to collaborate with partners to promote the natural resources of Canaan Valley.

### **Alternative B.— Emphasis on Focal Species (Service-preferred):**

This alternative represents the combination of actions we believe most effectively achieves the purposes and goals of the refuge. For each habitat-type objective we identify “focal species” whose life and growth requirements would guide management activities. We would balance the conservation of a mixed forest matrix landscape with the management of early successional habitats and the protection of wetlands. We would increase access for deer hunting to remove more deer from the refuge and reduce deer browse. We would officially open the refuge to fishing by amending 50 CFR 32.68, and we would increase opportunities for wildlife-dependent recreational uses by, for example, promoting trail connectivity and offering more programming. Funding and staffing would increase to support enhanced biological and public use programs.

### **Alternative C.— Emphasis on Expanding Priority Public Uses**

Under this alternative, we would emphasize the expansion of priority public uses. We would create a cross-valley trail that would run east-west through the northern part of the valley, and we would allow limited off-trail use in a designated area. The biological objectives are similar to Alternative B with the exception of increased emphasis on grassland management with reduced emphasis on forest stand improvement and restoration. Funding and staffing would increase beyond Alternative B to support expanded public use programs.

### **Alternative D.— Focus on Managing for Historic Habitats**

This alternative strives to restore and maintain the ecological integrity of historic natural communities within the refuge. No particular species would be the focus of management. Rather, management would range from passively to actively manipulating vegetation to create or hasten mature forest structural conditions. New visitor infrastructure, including trails, would be limited to already-disturbed areas. We would add a law enforcement officer position to the staff to help enforce stricter limitations on visitor use.

## Table of Contents

Abstract . . . . .	i
Introduction . . . . .	Sum-1
Proposed Action . . . . .	Sum-1
Purpose and Need for Action . . . . .	Sum-1
Brief History and Purposes for Establishing the Refuge. . . . .	Sum-1
Refuge Setting and its Resources . . . . .	Sum-3
Refuge Vision and Goals . . . . .	Sum-5
Alternatives Considered, Including the Service-preferred Alternative. . . . .	Sum-6
Actions Common to All of the Alternatives . . . . .	Sum-7
Description of Each Alternative. . . . .	Sum-9
Alternative A – Current Management. . . . .	Sum-9
Alternative B – Service-preferred Alternative: Focal Species . . . . .	Sum-13
Alternative C – Emphasis on Priority Public Uses. . . . .	Sum-17
Alternative D – Focus on Managing for Historical Habitats . . . . .	Sum-21
Summary Comparison of Management Actions by Alternative . . . . .	Sum-24
Environmental Consequences. . . . .	Sum-45
Summary Impacts Comparison of the Alternatives. . . . .	Sum-47

## List of Maps

<b>Map 1</b>	Canaan Valley National Wildlife Refuge Ownership Status . . . . .	Sum-2
<b>Map 2</b>	Canaan Valley National Wildlife Refuge Project Analysis Area. . . . .	Sum-4
<b>Map 3</b>	Alternative A – Proposed Habitat Management . . . . .	Sum-10
<b>Map 4</b>	Alternative A – Public Use . . . . .	Sum-11
<b>Map 5</b>	Alternative A – Hunt Map . . . . .	Sum-12
<b>Map 6</b>	Alternative B – Proposed Habitat Management . . . . .	Sum-14
<b>Map 7</b>	Alternative B – Public Use . . . . .	Sum-15
<b>Map 8</b>	Alternative B – Hunt Map . . . . .	Sum-16
<b>Map 9</b>	Alternative C – Proposed Habitat Management . . . . .	Sum-18
<b>Map 10</b>	Alternative C – Public Use. . . . .	Sum-19
<b>Map 11</b>	Alternative C – Hunt Map . . . . .	Sum-20
<b>Map 12</b>	Alternative D – Proposed Habitat Management . . . . .	Sum-22
<b>Map 13</b>	Alternative D – Public Use . . . . .	Sum-23

## List of Tables

<b>Table 1</b>	Summary Comparison of Management Actions by Alternative. . . . .	Sum-24
<b>Table 2</b>	Summary Impacts Comparison of the Alternatives . . . . .	Sum-47

## Introduction

As part of its Congressional mandate, the U.S. Fish and Wildlife Service (Service; we, our) conserves habitat and protects fish, wildlife and plants on the more than 545 refuges in the National Wildlife Refuge System (Refuge System), in cooperation with the American public, States, and our other partners in conservation. On the public lands in that System, “Wildlife Comes First.”

The Canaan Valley National Wildlife Refuge (Canaan Valley refuge) comprises 16,183 acres in eastern Tucker County, West Virginia. Canaan Valley contains a wetlands complex of about 8,400 acres, making it the largest wetlands system in West Virginia. Of these total wetlands, 5,573 acres are located within the refuge. The headwaters of the Little Blackwater River, 13 miles of the Blackwater River, and many miles of other tributaries are also within the refuge boundaries.

We prepared a Draft Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) to describe and analyze four alternatives for managing the refuge for the next 15 years. Each alternative proposes varying strategies to achieve important objectives in managing habitat, species, and public use. This document summarizes the draft CCP/EA.

## Proposed Action

We propose to implement a CCP for the refuge that best represents the combination of actions we believe would most effectively achieve the purposes and goals of the refuge and would best contribute to conserving Federal trust resources in West Virginia and the central Appalachians.

From all the alternatives examined, we have selected as our preferred alternative the one that, in our professional judgment, would best accomplish all of the actions above.

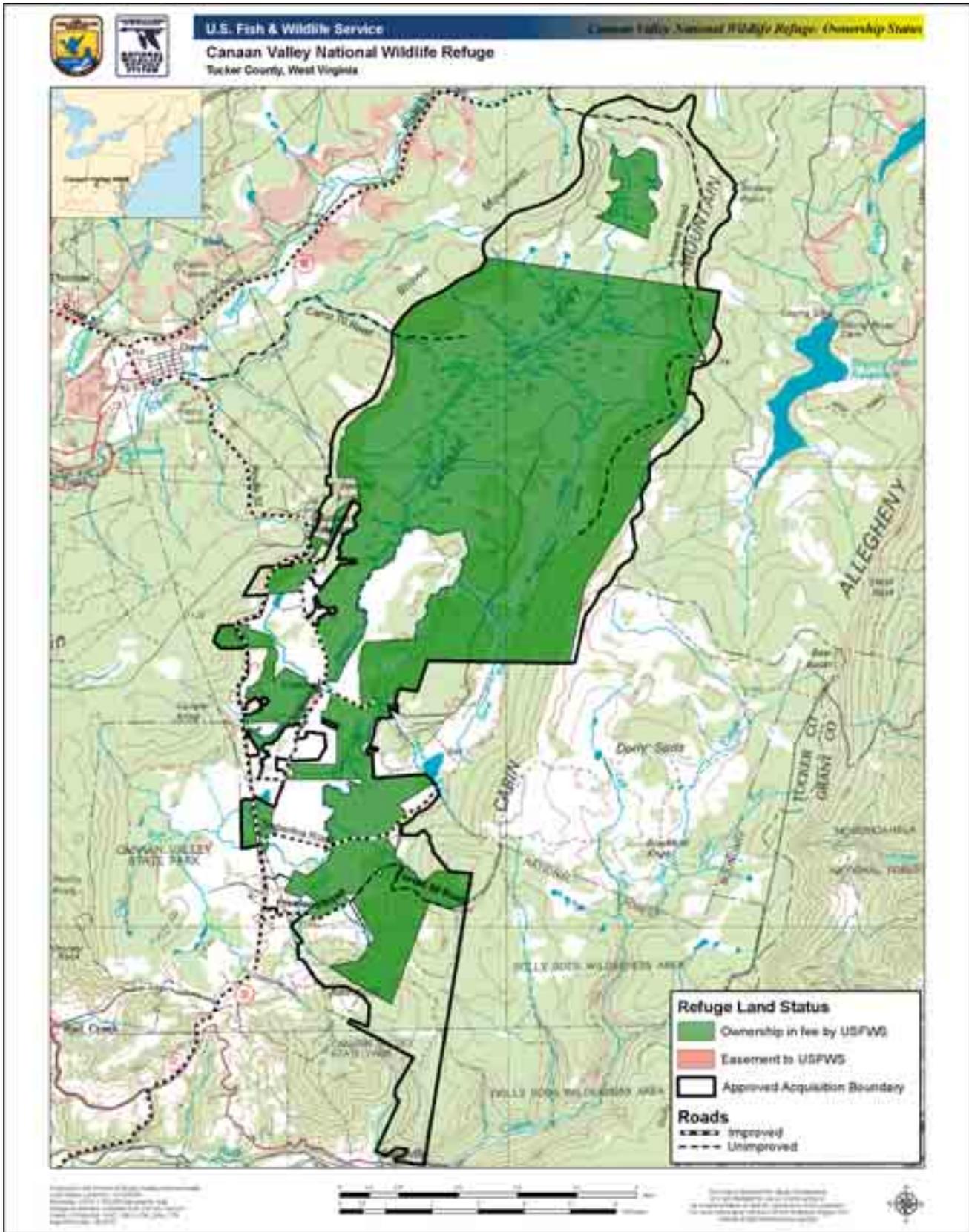
Alternative B. Emphasis on Focal Species (Service-preferred alternative): This Service-preferred alternative manages refuge habitats for selected focal species and improves existing opportunities for wildlife-dependent recreation.

## Purpose and Need for Action

There are several reasons why we need this CCP. The National Wildlife Refuge System Improvement Act of 1997 requires us to write a CCP for every national wildlife refuge to help fulfill the mission of the Refuge System. In addition, the refuge’s 1994 Station Management Plan is 15 years old. Since that document’s publication, the refuge land base has grown significantly, and its management priorities have evolved. The Indiana bat (*Myotis sodalis*), which was federally listed as endangered in 1967, and the Cheat Mountain salamander (*Plethodon nettingi*), which was federally listed as threatened in 1989, are both found on the refuge and are now management priorities. The West Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*) was removed from the federal list of endangered species in September 2008 but continues to be of management concern. Since the refuge’s establishment, we have developed strong partnerships vital to our continued success, and we must convey our vision for the refuge to those partners and the public. All of these reasons clearly underscore the need for the strategic direction a CCP provides. To help us resolve management issues and public concerns, our planning process incorporates input from natural resource agencies of West Virginia, affected communities, individuals, organizations, our partners, and the public.

## Brief History and Purposes for Establishing the Refuge

The establishment of Canaan Valley National Wildlife Refuge was first approved in an Environmental Impact Statement (EIS) released on May 30, 1979. However, the Service decided to await the outcome of litigation surrounding a proposed storage hydroelectric facility before pursuing any further action. The approval of the refuge was affirmed by the Service in a 1994 Final Environmental Assessment and Finding of No Significant Impact on July 11, 1994, which confirmed the adequacy of the previously-approved 1979 EIS. The refuge was officially established when the first tract of land was acquired on August 11, 1994. See Map 1 for current refuge ownership status.



The Service established the refuge for the following purposes and under the following authorities:

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources...” (Fish and Wildlife Act of 1956; 16 U.S.C. 742f(a) (4));

“... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions” (Emergency Wetlands Resources Act of 1986; #16 U.S.C. 3901(b));

“... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).c.

## Refuge Setting and its Resources

Canaan Valley refuge is located in Tucker and Grant Counties, West Virginia, and sits in the Canaan Valley, 3,200 feet above sea level in the Allegheny Mountains (see Map 2). The habitats on the refuge are grouped into three broad habitat types: wetlands, early successional habitats, and upland forest. The wetland communities in Canaan Valley are diverse. A mosaic of shrub swamps, peatlands, and wet meadows provide habitat to a variety of passerines, shorebirds, waterfowl, amphibians, reptiles, and mammals, including swamp sparrow, southern bog lemming, Indiana bat, and American woodcock. A variety of ducks, fish, marsh birds, and other mammals use the open water habitats. The Blackwater River flows through the valley and is stocked with non-native brown and rainbow trout. Native brook trout spawn in several tributaries of the Blackwater River. Upland habitats in Canaan Valley refuge include a variety of early successional habitats such as managed grasslands, old field, shrubland, and a matrix of forested habitats consisting of northern hardwood forest and conifer (spruce)/mixed forest.

Outdoor recreational opportunities abound within the large network of public lands located within Canaan Valley. These public lands include the Canaan Valley refuge, Monongahela National Forest, Blackwater Falls State Park, and Canaan Valley State Park. Popular activities include hunting, camping, mountain biking, fishing, whitewater rafting and canoeing. Winter recreational activities are another major attraction in Tucker County with several public and private entities providing opportunities for downhill skiing, cross-country skiing, and snowshoeing.

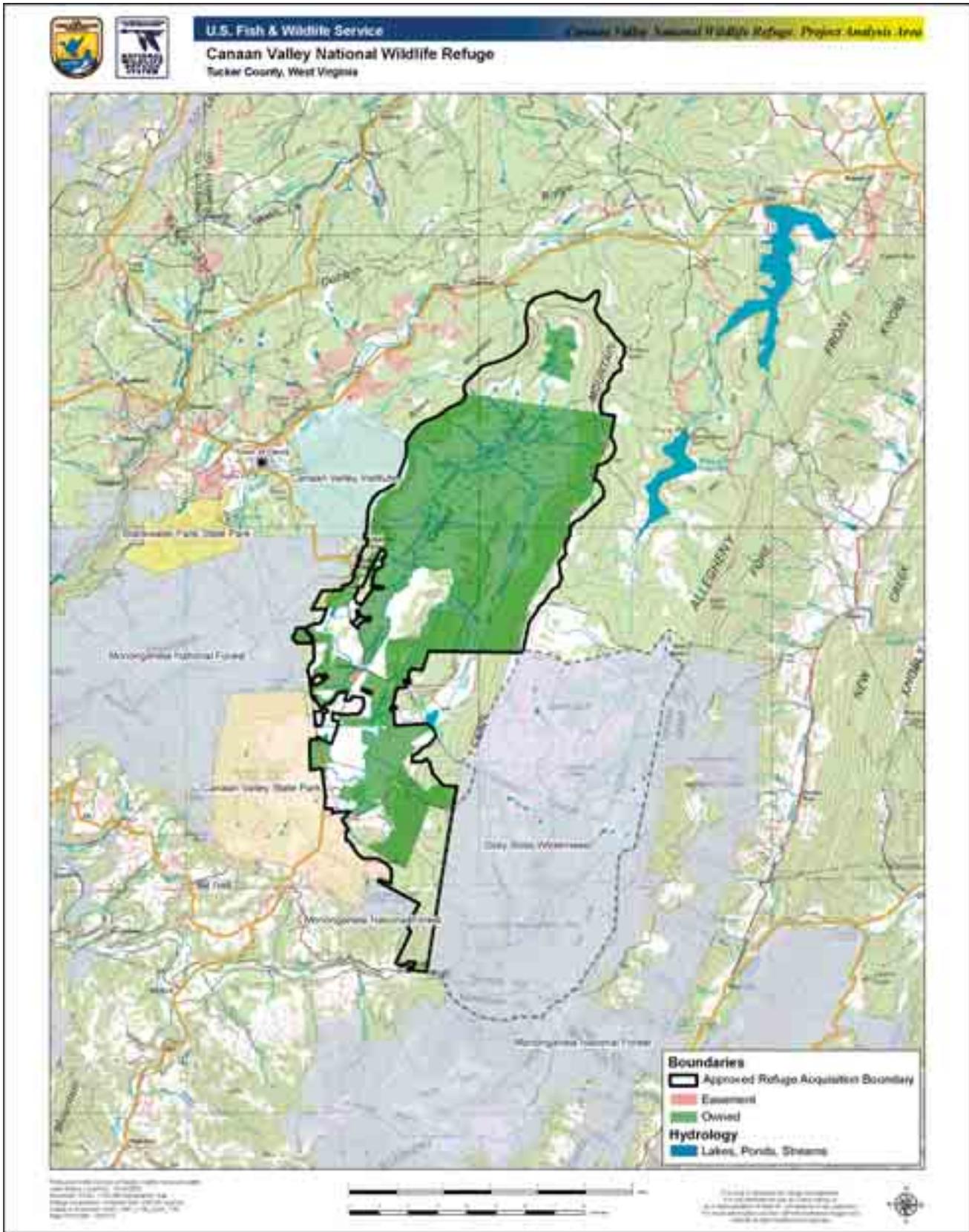
The towns of Davis (pop. 624), Thomas (pop. 452) and Parsons (pop. 1,463) are located within Tucker County and are the closest communities to the refuge. The city of Elkins (pop 7,032) within nearby Randolph County serves as the recreation gateway community to the Monongahela National Forest with nearby access to the refuge. Government was the largest employer in Tucker County and the second largest employer in Elkins in 2006. Construction, manufacturing, retail trade and the finance, insurance, real estate and information industries were other main industries providing employment in Tucker County. The city of Elkins plays a major role in the economic impacts of the refuge because the majority of the staff resides there. The current staff consists of seven permanent, full-time employees stationed on the refuge, plus two term employees and one seasonal employee.

For a full description of refuge resources, refer to Chapter 2 of the draft CCP/EA.



USFWS

Bobolink



## Refuge Vision and Goals

### Vision

*“Canaan Valley National Wildlife Refuge showcases the largest contiguous, high elevation wetland complex in West Virginia and harbors a vast assemblage of rare plants and animals normally associated with more northern latitudes. The refuge conserves, protects, and manages a mosaic of wetland, forested, and early successional habitat that supports migratory birds and threatened and endangered species. As a steward of a significant portion of the headwaters, the Refuge ensures the integrity of the natural resources of the upper Blackwater River watershed. Refuge habitats and wildlife are conserved and managed through research and collaboration with federal, state, and local conservation partners.*

*As an integral part of the surrounding community, the Refuge provides high quality, safe, wholesome, and diverse opportunities for education and recreation, especially hunting and wildlife observation. The refuge experience fosters public interest in the beauty and unique character of Canaan Valley, an appreciation of fish and wildlife ecology, plant ecology, and stewardship of the natural world. Visitors develop a greater understanding and appreciation for the mission of the National Wildlife Refuge System and refuge management programs, and for the importance of protecting lands for wildlife conservation.”*

### Goals

Our planning team developed the following goals for the refuge after a review of legal and policy guidelines, the Service mission, regional plans, refuge purposes, our vision for the refuge, and public comments. All of these goals fully conform with and support national and regional mandates and policies.

**Goal 1:** Maintain and perpetuate the ecological integrity of the Canaan Valley wetland complex to ensure a healthy and diverse wetland ecosystem providing a full range of natural processes, community types, and native floral and faunal diversity.

*Field trip for 1st graders*



Marquette Crockett

**Goal 2:** Perpetuate the ecological integrity of upland northern hardwood and northern hardwood-conifer forests to sustain native wildlife and plant communities including species of conservation concern, to develop late-successional forest characteristics, and to perpetuate the biological diversity and integrity of upland forest ecosystems.

**Goal 3:** Provide and promote through active management a diversity of successional habitats in upland and wetland-edge shrublands, grasslands, old fields, and hardwood communities to sustain early successional and shrubland specialists such as golden-winged warbler, American woodcock, brown thrasher, eastern towhee, field sparrow, and other species of concern.

**Goal 4:** Enable visitors of all abilities to enjoy opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge habitats, wildlife, and cultural history.

**Goal 5:** Collaborate with partners to promote the natural resources of Canaan Valley and the mission of the National Wildlife Refuge System.

### **Relating Goals, Objectives, and Strategies**

Refuge goals and objectives define each of the management alternatives identified below. Developing refuge goals was one of the first steps in our planning process. By design, they are less quantitative, and more prescriptive, in defining the targets of our management. All of the goals appear in each of the alternatives.

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

Strategies are specific actions, tools, techniques, or a combination of those that we may use to achieve the objective. We will evaluate most of the strategies further as to how, when, and where refuge step-down plans should implement them.

## **Alternatives Considered, Including the Service-preferred Alternative**

Alternatives are packages of complementary objectives and strategies designed to meet refuge purposes and goals, and the Refuge system mission, while responding to the issues and opportunities identified during the planning process. We fully analyze in this draft CCP/EA four alternatives which characterize different ways of managing the refuge over the next 15 years. We believe these alternatives represent a reasonable range of alternative proposals for managing the refuge.

Alternative A satisfies 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 B, C and D.

Alternative B, the Service-preferred alternative, presents the combination of actions we believe most effectively achieves the purposes and goals of the refuge. For each habitat-type objective we identify “focal species” whose life and growth requirements would guide management activities. We would increase access to wildlife-dependent recreational uses by improving access for deer hunting, officially opening the refuge to fishing, promoting trail connectivity, and offering more programming. Funding and staffing would increase to support enhanced biological and public use programs.

Alternative C emphasizes the expansion of priority public uses. We would create a cross-valley trail that would run east-west through the northern part of the valley, and we would allow limited off-trail use in a designated area. The biological objectives are similar to Alternative B with the exception of increased emphasis on grassland management with reduced emphasis on forest stand improvement and restoration. Funding and staffing would increase beyond Alternative B to support expanded public use programs.

Alternative D strives to restore and maintain the ecological integrity of historic natural communities within the refuge. No particular species would be the focus of management. Rather, management would range from passively to actively manipulating vegetation to create or hasten mature forest structural conditions. New visitor infrastructure, including trails, would be limited to already-disturbed areas. We would add a law enforcement officer position to the staff to help enforce stricter limitations on visitor use.

**Actions Common to All of the Alternatives**

Although the alternatives differ in many ways, they share some similarities. Below are highlights of some of the actions common to all alternatives. For a full list of actions common to all the alternatives, refer to Chapter 3 of the draft CCP/EA.

**Developing Refuge Step-down Plans**

All alternatives include the same schedule for completing five refuge step-down plans most relevant to the planning process. The Habitat Management Plan (HMP) will be assigned as the first priority to be completed. The HMP will define management areas, treatment units, types or methods of treatment, and timing for management actions.

**Appropriateness and Compatibility Determinations**

The Appropriateness policy describes the initial decision process the Refuge Manager follows when first considering whether or not to allow a proposed use on a refuge. The Refuge Manager must find a use is appropriate before undertaking a compatibility review of the use. This policy clarifies and expands on the Compatibility policy (603 FW 2.10D(1)), which describes when Refuge Managers should deny a proposed use without determining compatibility. If we find a proposed use is not appropriate, we will not allow the use and will not prepare a compatibility determination. Appendix B includes draft appropriateness and compatibility determinations to support Alternative B, the Service preferred alternative.

For proposed uses not considered during the preparation of this CCP, we will apply the procedure contained in this policy and make an appropriateness finding without additional public review and comment. However, if we find a proposed use is appropriate, we must still determine that the use is compatible. The compatibility determination includes an opportunity for public involvement.

**Reserved Rights**

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 over 37 reserved rights listed in realty files for land owned by the refuge. We would follow policy guidance when any of these reserved rights are exercised, and we would coordinate with all private parties exercising their rights to ensure the protection of refuge resources. We would issue special use permits as necessary to manage these uses and to ensure that impacts to refuge resources are as minimal as possible.

**Distributing Refuge Revenue Sharing Payments**

We would continue to pay annual refuge revenue sharing payments to Tucker and Grant counties based on the acreage and the appraised value of refuge lands in their jurisdiction. Payments will be made in accordance with the law, changes in the appraised market value of refuge lands, or new appropriation levels dictated by Congress.

**Cultural Resources**

We would ensure compliance with Section 106 of the National Historic Preservation Act, evaluate the potential to impact archeological and historical resources as required, and consult with the respective State Historic Preservation Offices (SHPOs). Compliance may require any or all of the following: a State Historic Preservation Records survey, literature survey, or field survey.

**Land Acquisition**

We would continue to pursue acquisition from willing sellers of the 8,932 acres of land that remains privately owned in the refuge's approved acquisition boundary. We would manage the acquired lands by the goals, objectives, and strategies under the approved alternative. Any management activities considered will relate directly to priority migratory birds, threatened and endangered species protection and to the other purposes for which the refuge was established.

**Invasive Species**

We would ensure no new invasive plant species become well established, and we would manage and control the spread of what does exist. Approved herbicides will be used when determined by the refuge manager to be necessary and reviewed by the regional office. We would develop a list of species of greatest concern on the refuge, identify priority areas with which to be vigilant, and establish monitoring and treatment strategies

**Monitoring and Abatement of Wildlife and Plant Diseases**

We would continue to abide by the Refuge Manual (7-RM 17.3) and any specific directives for monitoring and abating wildlife and plant diseases. Our three objectives include managing the wildlife and plant populations and habitats so the likelihood of disease contraction and contagion are minimized; providing for early detection and identification of disease mortality; and minimizing losses of wildlife from disease outbreaks.

Wildlife diseases of concern are avian influenza (H5N1) and chronic wasting disease (CWD). A contingency plan for dealing with avian influenza was adopted in 2006. A CWD management plan was approved in 2006. Monitoring efforts have not confirmed CWD presence in deer anywhere but Hampshire County in West Virginia.

**Protecting Wetland and Rare Plant Communities**

We would continue to protect the refuge's wetland complex, one of the most important management and conservation responsibilities. We would protect at least 73 documented plant species of concern and the unique and rare plant communities found on the refuge.

Within 3 years of acquiring property with a structure, we would determine if the structure is surplus and we would remove surplus structures if funding is available. Within 5 years of CCP approval, we would inventory all access roads, logging roads, and skid trails within the refuge and implement procedures to retire and restore unnecessary forest interior and secondary roads. Within 3 years of acquiring access roads, logging roads or skid trails, we would implement procedures to retire and restore any unnecessary roads. All sites will be restored to natural habitat conditions.

**Landscape Conservation Partnerships**

We would continue to participate in land conservation partnerships to permanently protect and sustain Federal trust resources and other unique natural resource values in Canaan Valley and in the Allegheny Highlands ecosystem. We would improve connectivity between existing conservation tracts and preserve public access. The list of existing and potential partners is extensive and includes the Service, other federal agencies, state agencies, private conservation organizations, local communities, private landowners, and private businesses.

**Climate Change**

The refuge recognizes that conditions related to global climate change may affect our ability to meet long term biological objectives. Across the Appalachian region, current observations have shown average temperatures to have risen more than 1.5° F; winter average temperatures by 4° F. In general, spring is arriving earlier, summers are growing hotter, and winters are becoming warmer and less snowy.

Areas like Canaan Valley that are experiencing changes in average temperatures could serve as some of the more important and resilient areas of the Appalachians due to higher elevations, existing and potential future plant communities, and frost pocket conditions. For example, the refuge's active role in spruce restoration on the refuge and throughout the region is thought to be a way to help reduce the severity of climate stresses on the variety of rare and endemic species associated with these forests and high elevation wetlands.

The Service currently has a draft Strategic Plan for addressing climate change which will help guide refuge actions including planning, strategic habitat conservation, and adaptive management practices that will help us address climate change effects on refuge resources. Generally the refuge will continue to work with partners and encourage research and monitoring activities which will help build an information base with which to monitor changes and develop strategies to mitigate significant impacts over time. We will use adaptive management to evaluate conditions as they relate to our ability to meet our management objectives and integrate new management decisions into existing plans based on sound science and best professional judgment.

## **Description of Each Alternative**

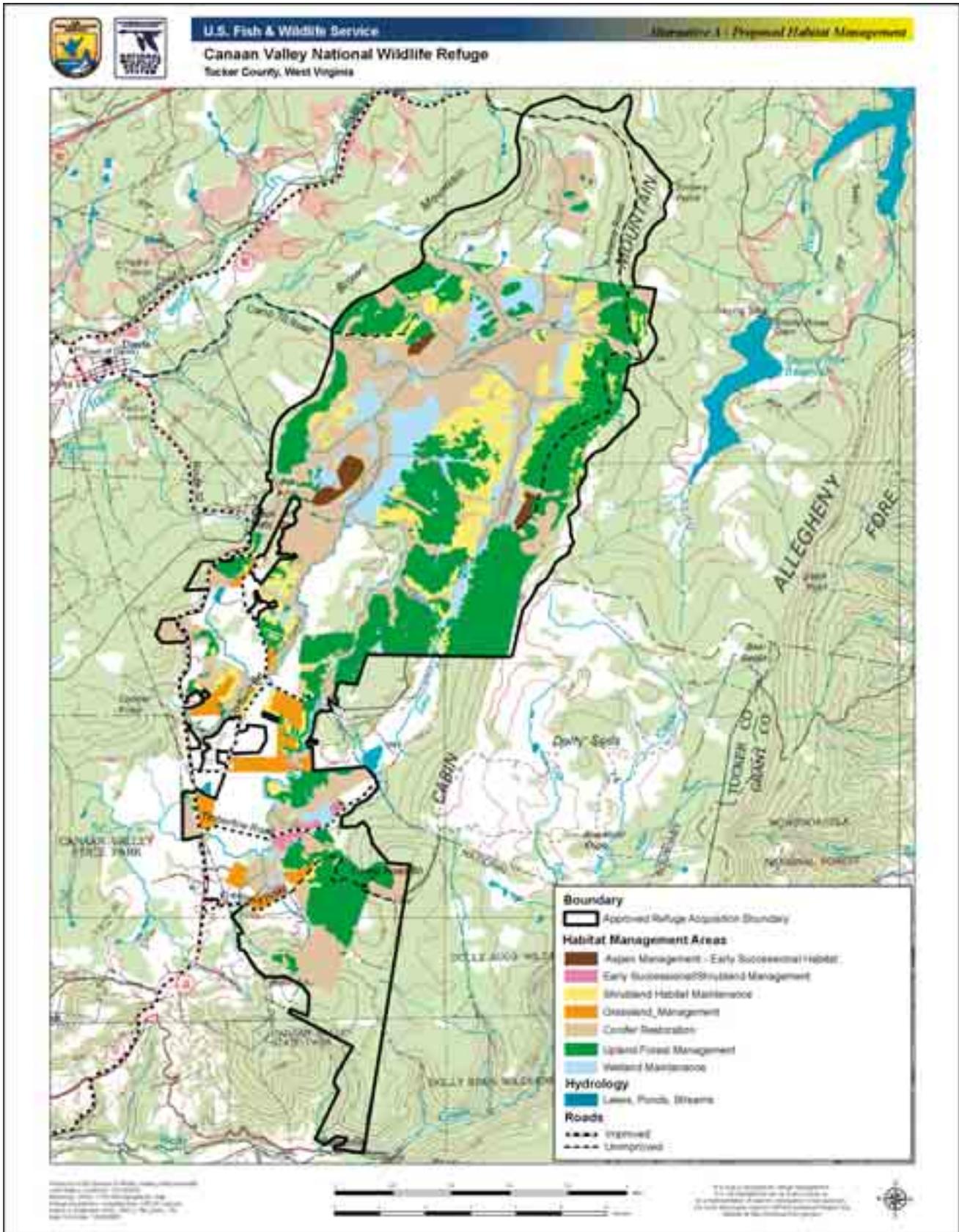
Below is a summary description of each of the four alternatives. Each alternative description is followed by a set of maps that illustrates the proposed strategies for habitat management and public use. Following these summary descriptions is a summary comparison matrix of actions by alternatives. For a more detailed description of each alternative, refer to Chapter 3 of the draft CCP/EA.

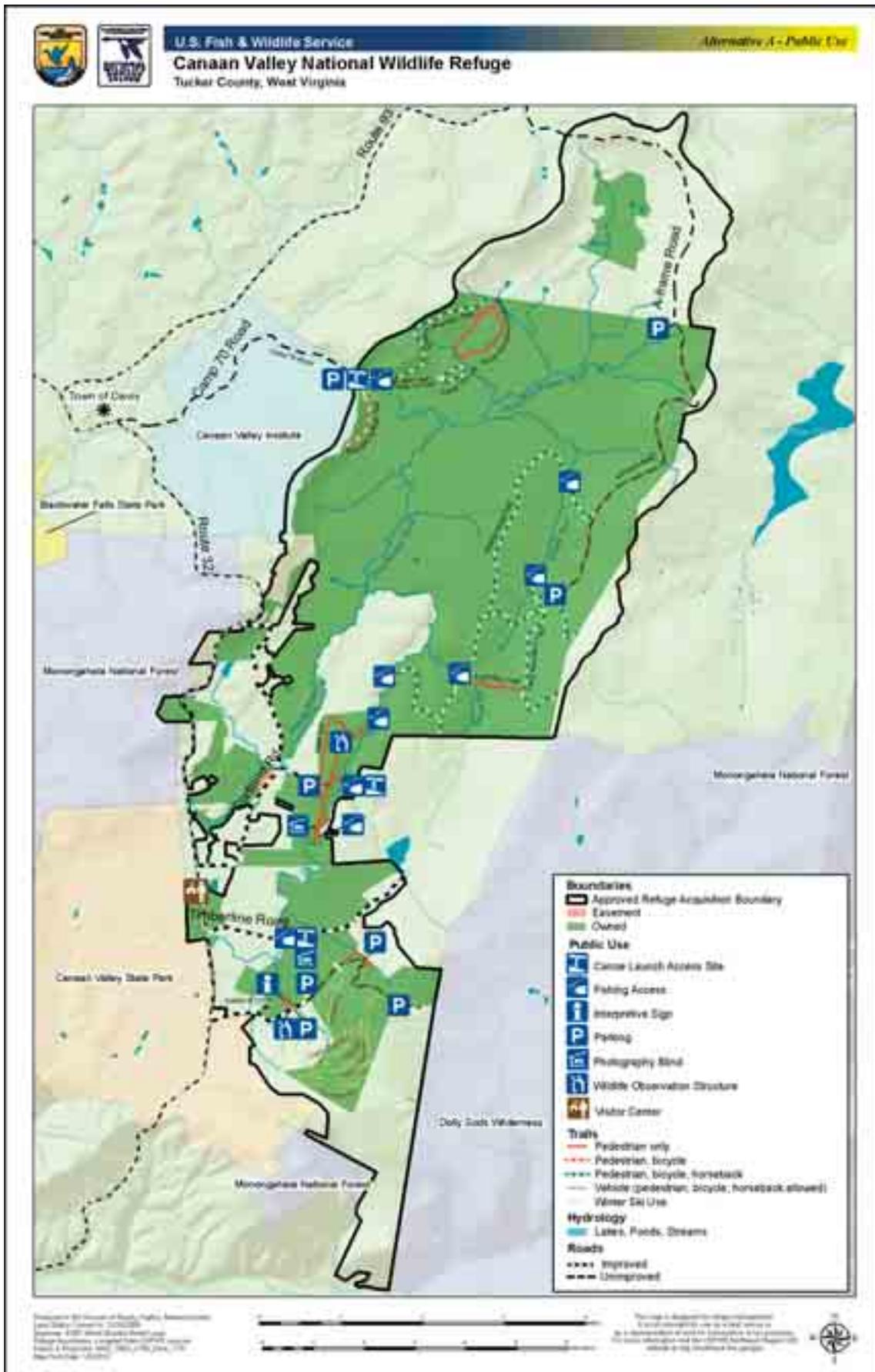
### **Alternative A – Current Management**

Alternative A describes our existing management priorities and activities, and serves as a baseline for comparing and contrasting alternatives B, C and D. Alternative A portrays current, planned, and approved management activities. It would continue the priorities of the biological program, including shrubland and grassland management for migratory birds, protection and monitoring of threatened and endangered species, red spruce and balsam fir community restoration, upland and wetland habitat restoration, invasive plant monitoring and eradication, and rare plant and animal conservation. Specifically, we would continue to monitor resident populations of Cheat Mountain salamanders, and we would continue to survey for Indiana bats. The refuge would also continue to gather baseline data on ecosystems and plant communities, and would manage refuge lands with the most sustainable strategies.

Under alternative A we would continue to allow hunting on the refuge according to State seasons. We would also continue to provide opportunities for wildlife observation, photography, environmental education and interpretation, as staffing and funding allows. To facilitate these public uses, we allow bicycling and horseback riding on designated refuge trails, and cross-country skiing and snowshoeing on all refuge trails. We expect a 10 percent increase in visitor use under this alternative due to an increased desire among the general public for outdoor recreation. Finally, we would continue to collaborate with partners to promote the natural resources of Canaan Valley.

The current refuge staff of 7 full-time employees (FTEs) and two temporary employees would not change.







## Alternative B – Service-preferred Alternative: Focal Species

Alternative B is the alternative our planning team favors for implementation. It includes an array of management actions that, in our professional judgment, work best towards achieving the refuge’s purposes, the vision and goals, and would make an important contribution to conserving Federal trust resources of conservation concern in West Virginia and the central Appalachians.

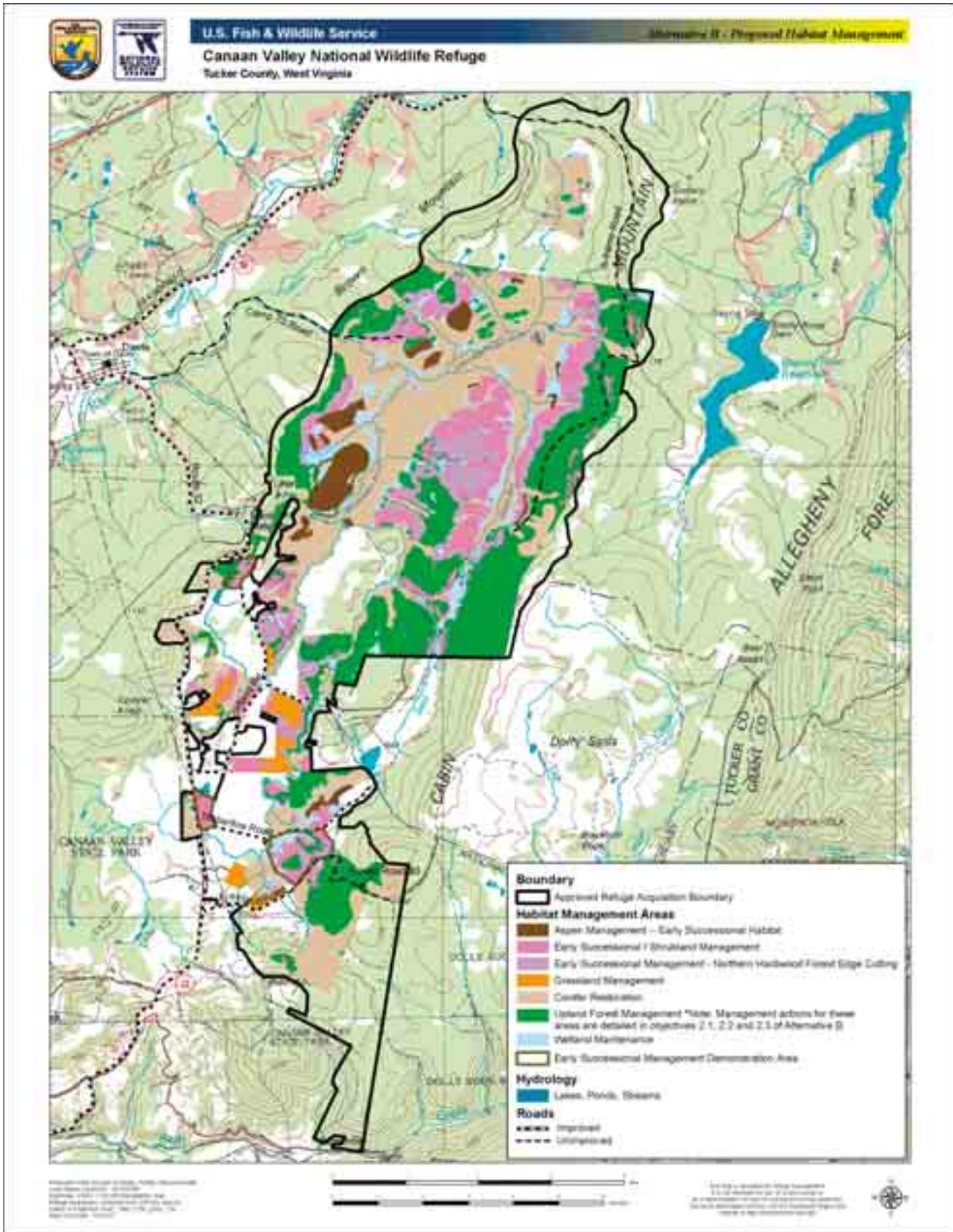
This alternative is designed to balance the conservation of a mixed forest matrix landscape with the management of early successional habitats and the protection of wetlands for which we believe the refuge can make the most important ecological contribution within the Canaan Valley watershed, Allegheny Highlands and the Refuge System. The habitat types we describe support a wide variety of Federal trust resources, in particular, birds of conservation concern identified in the BCR 28 region, Physiographic Area 12 and wetlands. For each habitat type objective we identify “focal species”, whose life and growth requirements would guide management activities in that respective habitat type. Focal species represent species whose habitat needs, in our opinion, broadly represent the habitat requirements for a majority of other Federal trust species and native wildlife and plants dependent on that respective habitat type. See Appendix E of the draft CCP/EA for a full description of the process for selecting focal species and priority habitats for the refuge. Also, alternative B addresses the Refuge System’s mandate to consider managing refuge habitat under the Biological Integrity, Diversity and Environmental Health Policy (601 FW 3) (2001). Finally, we would designate 754 acres of the refuge’s central wetland complex as a Research Natural Area.

Under alternative B the hunt program would remain virtually the same as it is now, except that the refuge would facilitate the removal of more deer from refuge lands by opening more lands to rifle use and by providing a shuttle to transport bagged deer. We would officially open the refuge to fishing by amending 50 CFR 32.68, and we would promote fishing opportunities. To facilitate opportunities for wildlife observation and photography we would create trail connections that would offer longer trail routes and that would allow users to travel from the north end of the refuge to the south end. We would expand the visitor center hours and we would build a new environmental education pavilion. We would also increase the number of environmental education and interpretation programs being offered on and off the refuge. As a result of this increase in infrastructure for visitor services we expect that visitor use would increase by 15 percent. To support expanded biological and visitor services programs, we would expand the staff to 12.5 employees.

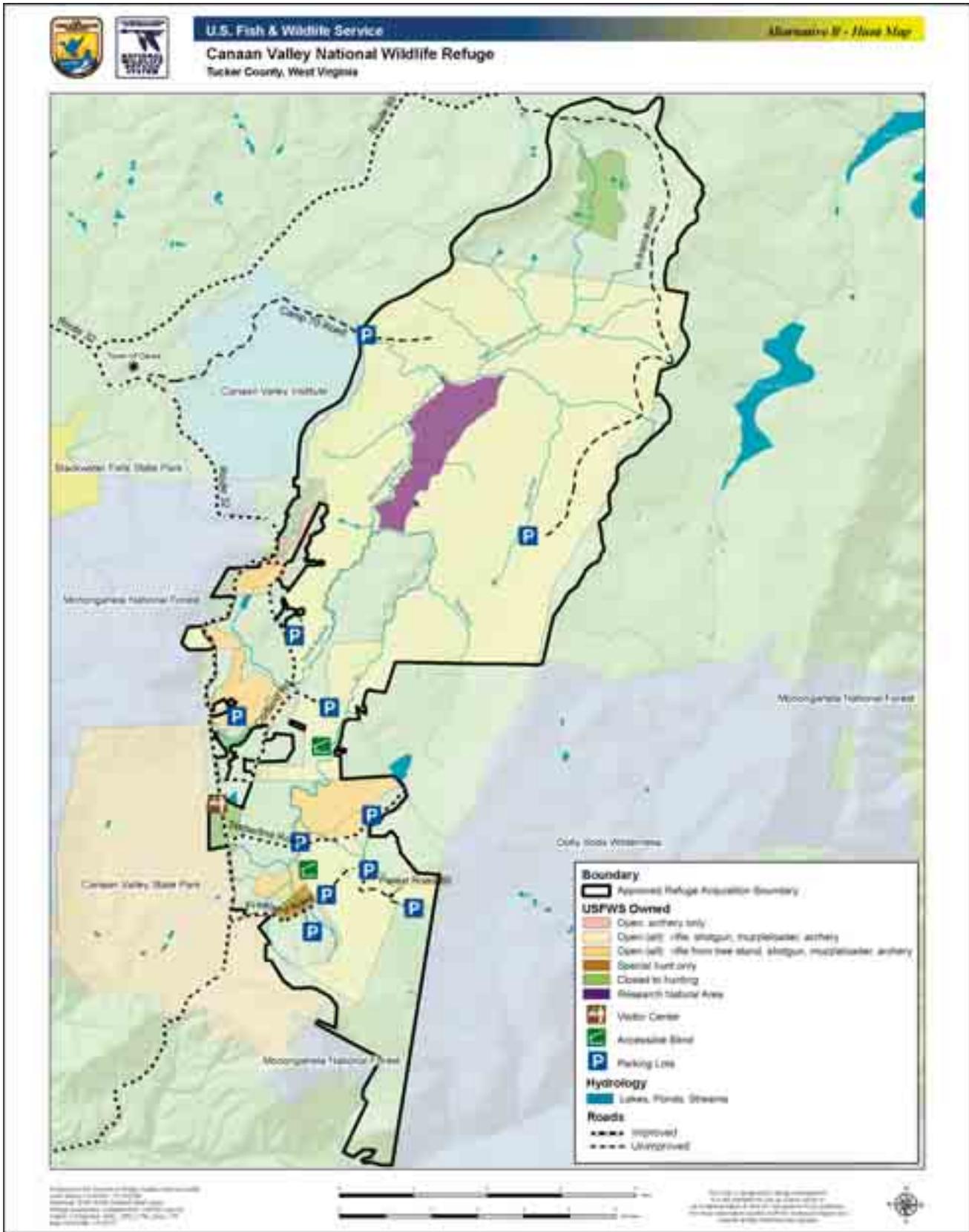


Ken Sturm/USFWS

*Buck*







## Alternative C – Emphasis on Priority Public Uses

In alternative C, we would increase access and infrastructure to support more priority public uses than any of the other alternatives. We would create a cross-valley trail that would run east-west through the northern part of the valley, in addition to the Swinging Bridge to Cortland Road trail proposed in alternative B that would take visitors from the north end of the refuge to the south end of the refuge. We would allow limited off-trail use in a designated area and we would maintain the Camp 70/Delta 13 road for vehicular use.



Ken Sturm/USFWS

*Installing a bridge over  
Glade Run*

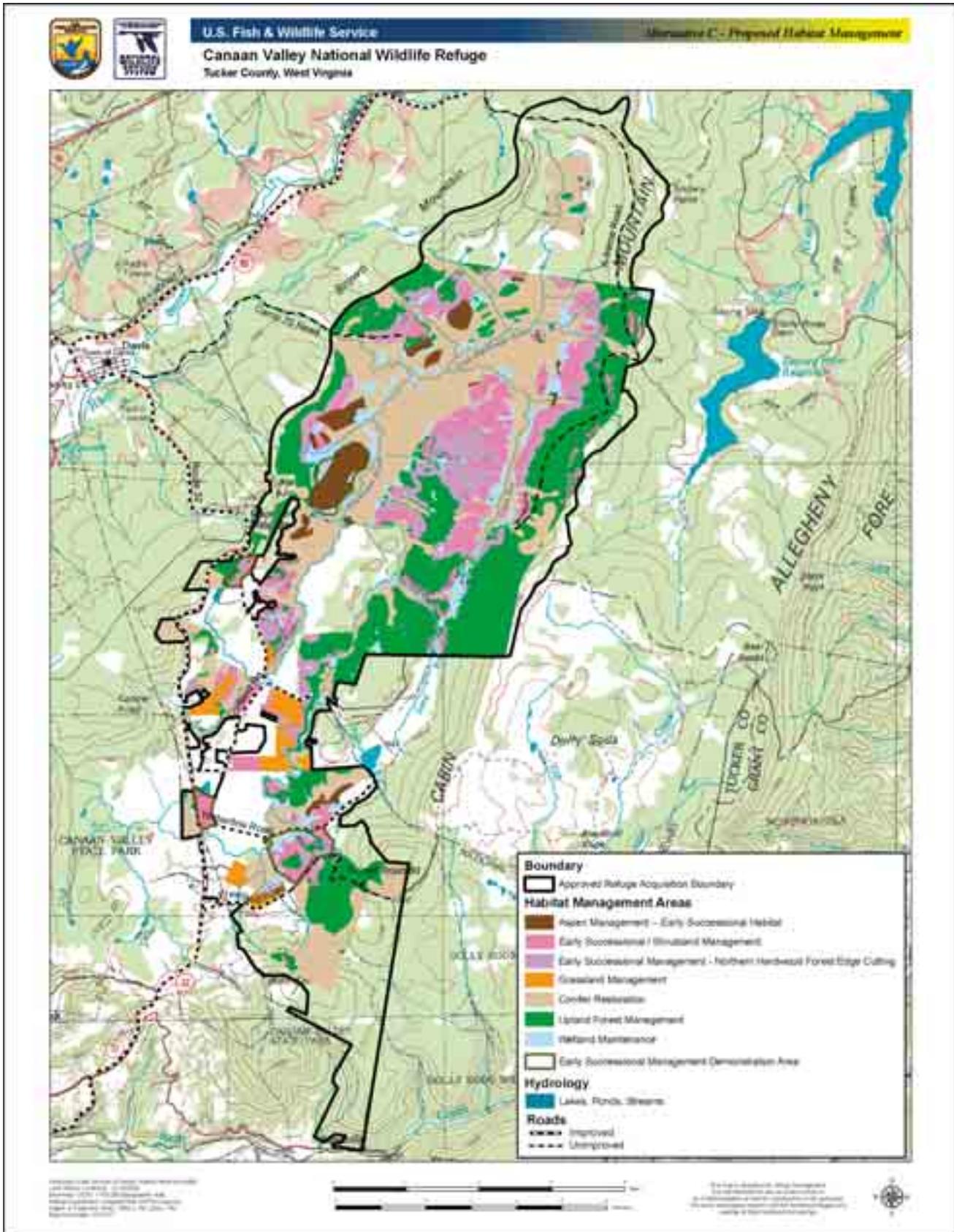
Under this alternative we would expect a 20 percent increase in visitor use, because of the additional trail and other visitor services-related projects. In order to support the expanded visitor services program in this alternative, we would add another permanent park ranger position instead of a biological technician. Similar to alternative B, we would convert our two term positions (park ranger and administrative assistant) into full time, permanent positions, and we would add a refuge operations specialist position and a permanent seasonal maintenance worker. We therefore propose in this alternative to have a staff of 13.5 employees, compared to a staff of 12.5 employees in alternative B.

Within the biological objectives, differences are more subtle and emphasize early successional habitat management over forest stand

improvement. Recommendations for funding allocations reflect the de-emphasis of forest restoration. Although the Biological Integrity and Diversity policy would still guide some management of the forested and unique wetland plant communities, this management would mostly be in the form of protection and conservation rather than restoration to actively encourage historical plant communities and processes. Similar to alternative B, we would designate a Research Natural Area, but that area would be 593 acres in alternative C, compared to 754 acres in alternative B.

Two strategies which are common to all objectives under this alternative are:

- Increased invasive species monitoring and control operations. With an increase in public access and infrastructure development we anticipate a greater need for monitoring and control of invasive plants. This would relate to an increase in staff time and station funding related to this activity and would reduce time and funding in other biological program areas.
- A monitoring plan would be developed to evaluate the impact of increased public use on refuge resources. Initially this would be limited to measurable impacts to trail conditions, plant communities, erosion and other physical indices. However, we would work to conduct and encourage additional research on changes in wildlife behavior, distribution, nest success, fitness, and other aspects of the wildland/human interface which could lead to more informed decisions on how public access and use affects the resources the refuge was established to protect.







## Alternative D – Focus on Managing for Historical Habitats

This alternative strives to establish and maintain the ecological integrity of natural communities within the refuge. Ecological integrity is defined by having all native species present, ecological processes and natural disturbance events occurring within their respective distribution, abundance, or frequency, and natural range of variability, characteristic of that community type under natural conditions. A natural community with high integrity is also defined as being resilient and able to recover from severe disturbance events. Management under alternative D would range from passive, or “letting nature take its course,” to actively manipulating vegetation to create or hasten the development of mature forest structural conditions shaped by natural disturbances. Under this alternative, no particular wildlife species would be a focus of management.

As a priority, we would implement studies, consult experts, and conduct literature reviews, to further refine our knowledge of disturbance patterns and structural conditions in both wetland and upland natural communities. Our wetland management would also pursue restoration projects where past land uses have altered historical plant communities or hinder natural hydrological flow and wetlands development, such as the presence of rail grades along the valley floor. We would create the same 754-acre Research Natural Area as we would in alternative B.

The acquisition of the remaining 8,932 acres from willing sellers within the current approved refuge acquisition boundary is integral to the success of alternative D. Acquiring these remaining acreages would bring the refuge’s total land base to a little less than 25,000 acres. Experts have suggested that 25,000 contiguous acres connected hydrologically and in a relatively undisturbed condition, is a reasonable approximation of the minimum size within which ecological processes, structure, and function, including the disturbance events identified above, could occur naturally (Anderson 1999; Roe and Ruesink 2004). Even though acquiring the remaining acreage within the acquisition boundary would fall short of the recommended total acreage, it would secure protection of approximately 66% of the Canaan Valley watershed, including protecting half of the major tributaries of the upper Blackwater River.

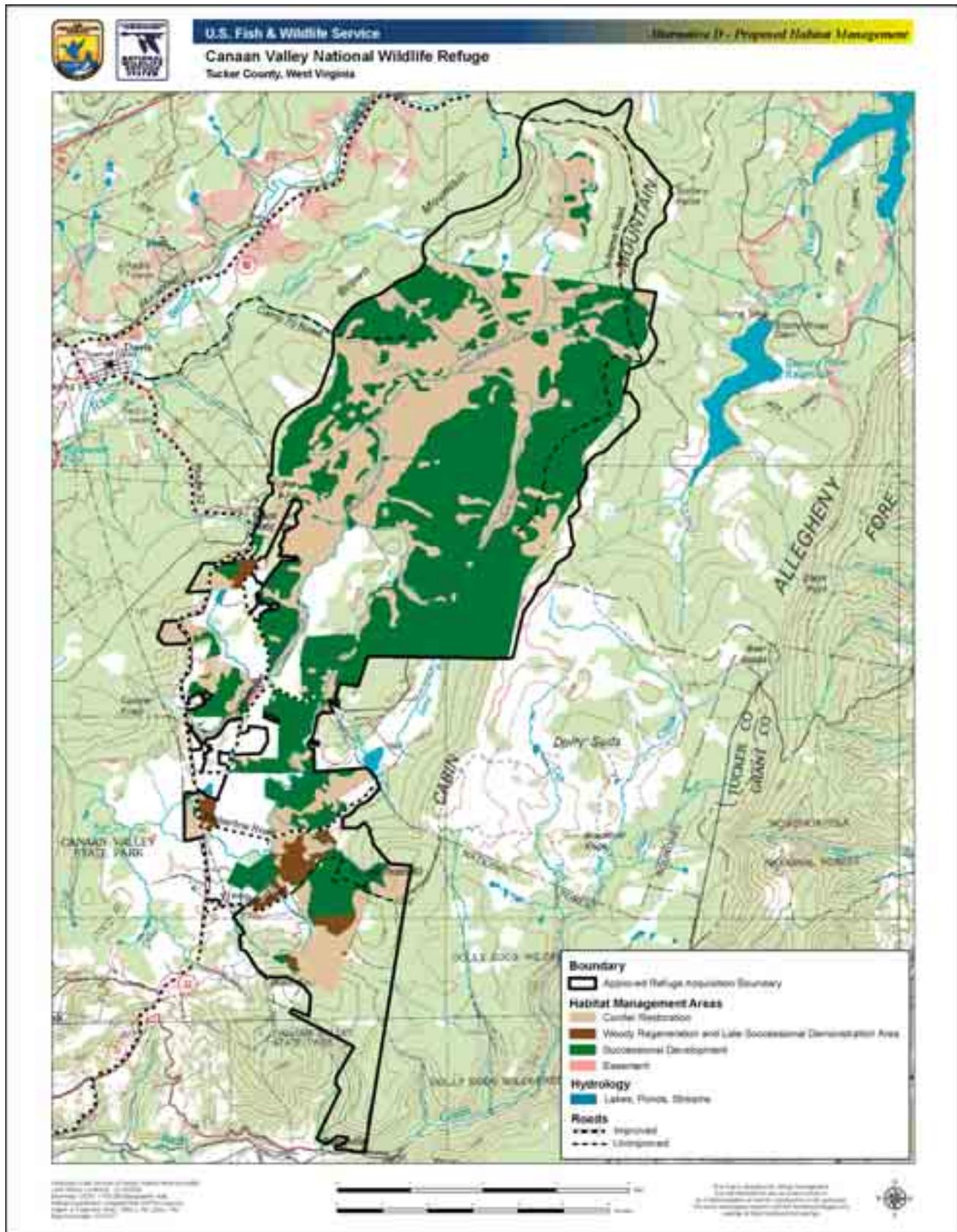
Compared to alternatives B and C proposals for visitor services programs and refuge uses, alternative D would limit new infrastructure for wildlife observation, photography, and interpretation to already-disturbed areas. Any new infrastructure would occur around the refuge headquarters and visitor’s center facility, the Freeland tract, and roadside pullouts along A-frame road. However, alternative D would enhance hunting and fishing opportunities in similar ways as alternative B and C. The refuge would also continue the furbearer trapping program under special use permit to emphasize natural furbearer population dynamics as well as the protection of rare plant communities. Under this alternative we would expect a 10 percent increase in visitor use, which is the same as alternative A.

Similar to alternatives B and C, we would convert our two term positions (administrative assistant and park ranger) into full time, permanent positions and we would add another permanent park ranger position and a seasonal maintenance position. We would also add a law enforcement officer position to help enforce stricter limitations on visitor use. Hunting strategies in alternative D are the same as for alternative B. Refer to map 8 for details.

*Canaan Valley NWR Wild School 2009*



Ken Sturm/USFWS





**Table 1: Summary Comparison of Management Actions by Alternative**  
 The table below highlights actions which distinguish each alternative and shows how the actions relate to our goals and how they address the significant issues identified in Chapter 1. Please refer to Chapter 3 in the draft CCP/EA for a complete description of each alternative including the rationales and anticipated timing of implementation of strategies listed below.

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<i>Staffing</i>			
Refuge manager (GS-13) Deputy refuge manager (GS-11/12) Supervisory biologist (GS-12) Biologist (GS-9/11) Park ranger (GS-7/9/11) Term biological technician (GS-7) Law enforcement officer (GS-7/9) Maintenance worker (WG-10) Term administrative assistant (GS-4)	<i>In addition to Current Management:</i> Make biological technician position permanent (GS-7) Make administrative assistant permanent (GS-5) Add a refuge operations specialist (GS-5/7/9) Add a park ranger (GS-7/9) Add a permanent seasonal maintenance worker (WG-7) Add a biological technician (GS-7)	<i>In addition to Current Management:</i> Make biological technician position permanent (GS-7) Make administrative assistant permanent (GS-5) Add a refuge operations specialist (GS-5/7/9) Add 2 park rangers (GS-7/9) Add a permanent seasonal maintenance worker (WG-7) Add a permanent full time maintenance worker (WG-7)	<i>In addition to Current Management:</i> Make biological technician position permanent (GS-7) Make administrative assistant permanent (GS-5) Add a park ranger (GS-7/9) Add a permanent seasonal maintenance worker (WG-7) Add a full time law enforcement officer (GS-7/9)

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 1:</b> Maintain and perpetuate the ecological integrity of the Canaan Valley wetland complex to ensure a healthy and diverse wetland ecosystem providing a full range of natural processes, community types, and native floral and faunal diversity.</p>			
<p><i>Forested, Shrub and Herbaceous Wetlands and Open Water (all wetlands)</i></p>			
<p>Continue to map and evaluate wetland areas impacted by erosion, sedimentation, and hydrologic disturbance.</p>	<p><i>In addition to alternative A:</i></p> <p>Permit and encourage deer hunting to maintain a population that is within the ecological carrying capacity of the landscape.</p>	<p><i>In addition to alternative B:</i></p> <p>Promote increased deer harvest by opening vehicle access to southern Middle Ridge.</p>	<p><i>In addition to alternative B:</i></p> <p>Decrease the deer population by providing increased deer hunting seasons or other control techniques.</p>
<p>Continue to minimize all refuge activities that would cause unnecessary disturbance to refuge wetland communities.</p>	<p>Identify locations where existing rail grades, road grades, and trails have altered natural hydrologic processes, evaluate and remediate so that natural processes are restored and soil erosion is reduced.</p>		<p>Work with adjacent large landowners to implement site-appropriate deer hunting programs.</p>
<p>Continue to work with partners (universities, colleges, NGOs, and federal and state agencies) on wetland monitoring and research projects.</p>	<p>Identify appropriate ecological integrity index metrics of the wetland complex and wildlife communities that depend on these habitats. Use metrics to monitor wetland complex and provide information for adaptive management actions.</p>		
<p>Continue to conduct baseline species and vegetation monitoring and inventories, as funding allows.</p>			

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 1 (cont.):</b> Maintain and perpetuate the ecological integrity of the Canaan Valley wetland complex to ensure a healthy and diverse wetland ecosystem providing a full range of natural processes, community types, and native floral and faunal diversity.</p>			
<p><i>Forested Wetlands</i></p>			
<p>Continue to work with volunteers and partners to support conifer propagation and planting projects in wetland and riparian communities focusing on areas with existing spruce/fir.</p> <p>Continue to support research to evaluate spruce restoration techniques and prioritize locations for restoration activities.</p> <p>Continue targeted beaver trapping program to prevent beaver impacts to riparian and wetland conifer forest communities.</p> <p>Continue to maintain and monitor balsam fir exclosures to evaluate impacts of deer browse on balsam fir reproduction, growth, and the success of associated wetland plant species.</p> <p>Continue acoustical monitoring efforts to detect foraging locations of Indiana bats during breeding and migration seasons.</p>	<p><i>In addition to alternative A:</i></p> <p>Work with partners to evaluate and implement methods for controlling balsam woolly adelgid.</p> <p>Construct deer exclosures to protect balsam fir seedlings from deer browsing and implement deer density surveys.</p> <p>Survey for Indiana bat presence and habitat use along 90% of riparian and wetland communities and determine appropriate conservation and management actions.</p> <p>Implement forest management techniques to improve the quality of at least 20% of potential Indiana bat habitat.</p> <p>Conduct beaver pond use and development surveys to determine potential of plant community loss through beaver activity.</p> <p>Issue special use permits for public beaver trapping to prevent prolonged inundation of high priority locations.</p>	<p><i>In addition to alternative B:</i></p> <p>Funding and facilitation of the propagation and planting of balsam fir and red spruce seedlings will rely solely upon grants and partnerships.</p> <p>Deer exclosures built to protect balsam fir seedlings will be visible from public use trails for increased educational opportunities.</p> <p>Public opportunities for beaver trapping will be maximized in all refuge areas to prevent prolonged inundation of rare plant communities.</p>	<p><i>In addition to alternative B:</i></p> <p>Prioritize conifer restoration within station budget to ensure continual funding for seedling acquisition, silvicultural procedures and contracts to complete project work.</p> <p>Beaver trapping will be conducted by refuge staff or contractors if public trapping is not sufficient to accomplish management goals.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Goal 1 (cont.):</b> Maintain and perpetuate the ecological integrity of the Canaan Valley wetland complex to ensure a healthy and diverse wetland ecosystem providing a full range of natural processes, community types, and native floral and faunal diversity.			
<i>Shrub and Herbaceous Wetlands</i>			
Continue passive management on the 5,060 acres of this habitat type.	Conduct acoustical monitoring surveys along streams and beaver ponds to detect presence of Indiana bats.  Continue to work with partners to propagate alder seedlings to plant to increase patch size and suitable management areas.	<i>In addition to alternative B:</i>  Beaver trapping public opportunities will be maximized in all refuge areas to prevent prolonged inundation of rare plant communities.	<i>In addition to alternative B:</i>  Beaver trapping and control will be conducted by refuge staff or contractors if public trapping is not sufficient to accomplish management goals.
<i>Open Water / Aquatic</i>			
Continue to work with WVDNR and other partners to support inventories of cold water habitat to document persistence of native brook trout and reidside dace.  Use the framework provided in the Interagency Status Report on the Fisheries Resources of the Upper-Blackwater River in West Virginia to plan future management actions on stream and river habitats.  Continue to allow the dynamic nature of beaver pond formation and evolution where bottomland forested and rare plant communities are not threatened.  Continue to inventory and monitor priority wildlife and plant species in this habitat type.  Continue acoustical monitoring efforts to detect foraging locations of Indiana bats.	<i>In addition to alternative A:</i>  Survey stream and river segments to document locations of existing populations of brook trout and reidside dace.  Identify, prioritize and conduct restoration in riparian corridors with less than 90% forest cover within a 100 meter and 500 meter buffer of the stream or spring.  Identify effective management techniques for enhancing brook trout populations and develop a management plan for implementing the strategies.  Evaluate need and feasibility of translocating reidside dace from elsewhere in the state to suitable locations within the refuge.	Same as alternative B.	<i>In addition to alternative B:</i>  Increase canopy cover in 20% of identified priority riparian corridors by planting native tree and tall shrub species, using local seed source when possible, and allowing the regeneration through natural succession of woody species.

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 1 (cont.):</b> Maintain and perpetuate the ecological integrity of the Canaan Valley wetland complex to ensure a healthy and diverse wetland ecosystem providing a full range of natural processes, community types, and native floral and faunal diversity.</p>			
<p><i>Research Natural Area (RNA)</i></p>			
<p>No RNA established.</p>	<p>Establish an 754 acre RNA be bounded generally by the by the western edge of the wetland complex along the Blackwater River to the south and, Middle Ridge to the East and a portion of Glade Run to the north.</p> <p>Complete a site specific management plan for the Blackwater Research Natural Area.</p> <p>Conduct outreach to research agencies and institutions to develop an active program for wetland related research activities within the BRNA.</p> <p>Permit deer hunting as regulated by the refuge Hunt Plan and EA.</p>	<p>Establish a 593 acre RNA bordered by the Blackwater River to the west, Glade Run to the north, Middle Ridge on the east and a drainage through the wetland from Middle Ridge on the south.</p>	<p>Same as <i>alternative B.</i></p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 2:</b> Perpetuate the ecological integrity of upland northern hardwood and northern hardwood-conifer forests to sustain native wildlife and plant communities including species of conservation concern, to develop late-successional forest characteristics, to perpetuate the biological diversity and integrity of the upland forest ecosystem.</p>			
<p><i>Northern Hardwood Forest</i></p>			
<p>Continue to work with partners to evaluate management options for promoting mature forest characteristics, forest species diversity and understory development.</p> <p>Continue to conduct breeding bird surveys in forest communities to monitor trends especially for birds of conservation concern.</p> <p>Protect the core spruce dominated forests from disturbance, fragmentation, or invasive species infestation.</p> <p>Continue to work with partners to experiment with methods to achieve late-successional characteristics.</p>	<p><i>In addition to alternative A:</i></p> <p>Identify and map locations of forest fragmentation including logging roads and locations with less than 600 meter radius forest cover and prioritize locations for restoration.</p> <p>Reduce fragmentation by obliterating and re-contouring old logging roads and planting tree seedlings to reduce number of fragmented forest gaps by 50%.</p> <p>Work with partners to manage deer densities on refuge and surrounding lands in Canaan valley that support understory woody and herbaceous forest development and protection.</p> <p>Locate forest seep communities and glade spurge populations and develop monitoring protocols to indicate the communities' and species' persistence.</p> <p>Develop and implement monitoring plan for presence and of forest pests and respond to the threats as practicable with the best current management strategies available.</p> <p>Establish 5 deer exclosures with controls to act as refugia for browse-sensitive herbaceous and woody species and demonstrate the severity of deer browse pressure on the forest ecosystem in Canaan.</p>	<p><i>Same as alternative B except:</i></p> <p>The propagation and planting of native tree seedlings will rely on grant funding, partnerships, and volunteers to support the restoration program.</p> <p>Natural regeneration of woody species and development of mid-story shrub and sapling structure within northern hardwood forests will rely on increased deer harvest in recently logged forest rather than planting.</p> <p>Management will focus on improving access and hunter pressure and increase survival of shrub and tree saplings.</p> <p>Management will be passive to allow for the successional development of mature forest characteristics.</p>	<p><i>In addition to alternative B:</i></p> <p>Promote natural regeneration of woody species and development of mid-story shrub and sapling structure within northern hardwood forests by reducing excessive deer browse pressure and planting red spruce seedlings.</p> <p>Identify adjacent landowners with forest cover and develop watershed-based forest conservation strategies with these partners that will ensure forested connectivity between the refuge and adjacent forested lands.</p> <p>Plant native upland tree seedlings to reduce the area of anthropogenic forest gaps by 75%.</p> <p>Establish a woody regeneration and late-successional development demonstration area in existing upland forest to highlight and interpret experimental management strategies.</p> <p>Develop and implement a forest management plan which includes treatment prescriptions to increase the late-successional target characteristics of 50% of the even-aged northern hardwood forest stands.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 2 (cont.):</b> Perpetuate the ecological integrity of upland northern hardwood and northern hardwood-conifer forests to sustain native wildlife and plant communities including species of conservation concern, to develop late-successional forest characteristics, to perpetuate the biological diversity and integrity of the upland forest ecosystem.</p>			
<p><i>Northern Hardwood Forest (cont.)</i></p>			
	<p>Conduct inventory and monitoring projects to evaluate habitat management strategies for improving structure for focal species.</p> <p>Improve forest structure through canopy gap creation, thinning or other silvicultural operations to increase age class diversity.</p> <p>Identify and map stands with late-successional characteristics by compiling regionally-appropriate indicator characteristics and surveying stands for presence of these indicators.</p>		<p>Establish a woody regeneration and late-successional development demonstration area in existing upland forest to highlight and interpret experimental management strategies.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 2 (cont.):</b> Perpetuate the ecological integrity of upland northern hardwood and northern hardwood-conifer forests to sustain native wildlife and plant communities including species of conservation concern, to develop late-successional forest characteristics, to perpetuate the biological diversity and integrity of the upland forest ecosystem.</p>			
<p><i>Conifer (Spruce) / Mixed Forest</i></p>			
<p><i>In addition to Current Management alternative strategies for Northern Hardwood Forest:</i></p> <p>Continue to identify locations where upland spruce forest is isolated and occurs in small patches for targeted planting efforts.</p> <p>Continue to work with partners, particularly through the Red Spruce MOU agreement, to collect, store, and propagate red spruce seed for conservation efforts on and off refuge property.</p> <p>Continue to support conifer restoration primarily through grant and partner funds.</p> <p>Continue to monitor populations of Cheat Mountain salamander and WV northern flying squirrel to document persistence, reproductive success, and to identify new occupied habitat.</p> <p>Continue to restore red spruce in and adjacent to occupied Cheat Mountain salamander habitat.</p> <p>Continue to cooperate with the multi-agency red spruce-northern hardwood ecosystem MOU.</p> <p>Continue to work with partners to research habitat limitations, habitat improvement and mitigation options and the impacts of current management on CMS and WV/NFS populations as identified in recovery plans.</p>	<p><i>In addition to alternative A:</i></p> <p>Conduct inventory and monitoring projects to evaluate habitat management strategies for improving structure for focal species.</p> <p>Protect core spruce area from disturbance, fragmentation, or invasive species infestation in the core of the spruce-dominated forests.</p> <p>Work with partners to experiment with methods to achieve late-successional characteristics.</p> <p>Develop and implement a forest understory habitat management plan which encourages shrub and sapling understory growth across large tracts of spruce dominated forest, retaining coarse woody debris and minimal removal of overstory cover.</p> <p>Improve habitat structure for refuge focal species through thinning or other stand improvement operations.</p> <p>Collaborate with land management agencies and adjacent landowners to increase connectivity of spruce stands across management boundaries.</p> <p>Identify, connect, and enlarge spruce stands by under-planting existing vegetation with spruce seedlings.</p>	<p><i>Same as alternative B except:</i></p> <p>Management will be passive to allow for the successional development of mature forest characteristics.</p> <p>Continue to allow a limited number of public use trails and public access in spruce-dominated forests.</p> <p>Disturbance to and establishment of invasive species in this habitat type will be reduced by informing public users through education and interpretation programs rather than limiting access.</p> <p>Emphasis for spruce restoration sites will be located adjacent to public use trails to increase education and outreach opportunities.</p> <p>Propagation and planting of native tree seedlings will rely on grant funding and partnerships to support the restoration program.</p>	<p><i>In addition to alternative B:</i></p> <p>Develop and implement a reforestation plan to rehabilitate closed trails and logging to protect those areas from disturbance, fragmentation, and invasive species infestation.</p> <p>Develop and implement a silvicultural habitat management plan which includes establishing research plots with partners and addresses the recruitment and regeneration of shrubs, trees, and herbaceous ground cover and the development of late-successional forest characteristics.</p> <p>Conduct treatments in 75% of available areas, ensuring minimal removal of overstory cover and retention of coarse woody debris.</p> <p>Establish a woody regeneration and late-successional development demonstration area in existing upland forest to highlight and interpret experimental management strategies.</p> <p>Develop and implement a silvicultural habitat management plan which identifies and prioritizes areas for planting red spruce seedlings.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 2 (cont.):</b> Perpetuate the ecological integrity of upland northern hardwood and northern hardwood-conifer forests to sustain native wildlife and plant communities including species of conservation concern, to develop late-successional forest characteristics, to perpetuate the biological diversity and integrity of the upland forest ecosystem.</p>	<p><i>Conifer (Spruce) / Mixed Forest (cont.)</i></p>		
	<p>Identify and prioritize areas with great potential for spruce regeneration with emphasis given to suitable soils and aspect, proximity to existing spruce stands and riparian areas, and gaps and fragmentation created by old logging roads.</p> <p>Work with partners to maintain and perpetuate a source of red spruce seedlings available for planting on the refuge.</p> <p>Locate and monitor Cheat Mountain salamander populations, understand the impediments to the viability of the populations, and remediate the habitat to increase the population's viability.</p>		

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 3:</b> Provide and promote through active management, a diversity of successional habitats in upland and wetland-edge shrub land, old field, and hardwood communities to sustain early successional and shrub land specialists such as the gold-winged warbler, American woodcock, brown thrasher, eastern towhee, field sparrow, and other species of concern.</p>	<p>Same as alternative B.</p>	<p>Same as Forested Wetlands strategies in Goal 1.</p>	
<p><i>Forested Wetlands / Aspen Woodlands</i></p>			
<p>Continue to conduct rotational aspen patch cutting for improved aspen clone development.</p> <p>Continue to monitor the success of regeneration cuts relative to deer herbivory and site conditions.</p> <p>Continue breeding bird surveys, especially for birds of conservation concern.</p>	<p><i>In addition to alternative A:</i></p> <p>Conduct landbird point counts and woodcock singing ground surveys to assess performance of managed aspen habitats for meeting fundamental objective (3.1) and to determine need for future management actions.</p> <p>Develop and implement a HMP detailing aspen management for successional wildlife habitat with an emphasis on improving breeding and foraging habitat for American woodcock, golden-winged warbler, and other migratory birds.</p> <p>Monitor beaver and continue to manage beaver populations adjacent to aspen management areas to prevent excessive damage consistent with the furbearer management plan.</p> <p>Work with partners to establish early successional management demonstration sites which include aspen communities.</p> <p>Identify and designate aspen stands where perpetuation of natural succession to forested swamps will occur.</p> <p>Manage up to 5-10 acres of aspen annually through block cutting to promote early successional habitat.</p>		

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 3 (cont.):</b> Provide and promote through active management, a diversity of successional habitats in upland and wetland-edge shrub land, old field, and hardwood communities to sustain early successional and shrub land specialists such as the gold-winged warbler, American woodcock, brown thrasher, eastern towhee, field sparrow, and other species of concern.</p>			
<i>Northern Hardwood Forest</i>			
<p>Continue passive management of this habitat type.</p>	<p>Conduct landbird point counts during breeding and survey areas during migration to assess management actions.</p> <p>Develop and implement HMP for successional forest management within transitional hardwood forest communities.</p> <p>Develop and implement a monitoring plan to evaluate regeneration success relative to deer browse impacts and fern encroachment.</p> <p>Use silvicultural practices to create openings, promote understory development, and sustain early successional habitat for American Woodcock and Eastern Towhee and other early successional species.</p> <p>Work with partners to establish early successional management demonstration sites which include even aged stand management of forest edges.</p> <p>Manage 10-15 acres of northern hardwood forest edge habitat annually to promote early successional habitat. Areas will be surveyed prior to cutting for presence of Indiana bats.</p>	<p>Continue passive management of this habitat type.</p>	<p>Continue passive management of this habitat type.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 3 (cont.):</b> Provide and promote through active management, a diversity of successional habitats in upland and wetland-edge shrub land, old field, and hardwood communities to sustain early successional and shrub land specialists such as the gold-winged warbler, American woodcock, brown thrasher, eastern towhee, field sparrow, and other species of concern.</p>	<p><b>Alternative B:</b> Species Focus</p>	<p><b>Alternative C:</b> Emphasis on Expanding Priority Public Uses</p>	<p><b>Alternative D:</b> Focus on Managing for Historic Habitats</p>
<i>Shrubland and Old Field</i>			
<p>Continue to manage shrub communities to increase habitat structural diversity and provide singing grounds for American woodcock.</p> <p>Continue to document and monitor rare plant species locations and populations associated with shrubland habitat.</p> <p>Continue to mow low shrub cover within established hawthorn savannah to promote low herbaceous cover for foraging habitat for American Woodcock.</p> <p>Promote shrubland restoration at Thompson tract, including planting native shrub species to accelerate habitat development.</p> <p>Continue to evaluate alder regeneration plots.</p> <p>Continue to conduct breeding bird surveys in shrub communities to monitor trends especially for birds of conservation concern.</p>	<p><i>In addition to alternative A:</i></p> <p>Conduct land bird point counts during breeding, migration, or winter to assess performance of managed shrub and old field habitats.</p> <p>Mow or graze spirea, St. Johnswort, and other fast-growing shrub communities on a two to four year rotation to maintain singing ground habitat for American woodcock.</p> <p>Develop and implement a shrub and old field habitat management plan.</p> <p>Establish at least one demonstration area, accessible and visible from public access roads or trails, to demonstrate early successional management techniques and wildlife habitat response.</p> <p>Allow succession to occur on 216 acres of managed grassland and 2482 acres of old field habitat to maintain and increase shrub land habitat.</p> <p>Identify and prioritize suitable locations for alder planting, conduct experimental plantings, and monitor results.</p> <p>Identify locations where alder communities occur in unsaturated and drier soils, prioritize and conduct experimental cutting for alder regeneration.</p>	<p><i>Same as alternative B except:</i></p> <p>Manage 20% of old field habitats through rotational mowing to set back shrub encroachment and maintain an open, old field habitat.</p> <p>Establish at least two demonstration areas, easily accessible and visible from public access roads or trails, to demonstrate early successional management techniques and wildlife habitat response.</p>	<p><i>In addition to Goal 2 Northern Hardwood Forest strategies for this alternative:</i></p> <p>Develop and implement a shrub and old field habitat management plan.</p> <p>Establish four woody regeneration and late successional development areas for research, education, and interpretation.</p> <p>Develop and implement a plan to maintain persistence of glade spurge populations where they occur in old field communities reverting to shrubland and forest.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 3 (cont.):</b> Provide and promote through active management, a diversity of successional habitats in upland and wetland-edge shrub land, old field, and hardwood communities to sustain early successional and shrub land specialists such as the gold-winged warbler, American woodcock, brown thrasher, eastern towhee, field sparrow, and other species of concern.</p>			
<p><i>Managed Grasslands</i></p>			
<p>Manage 531 acres of grassland by a combination of mowing, haying, or burning on a 3-5 year rotation, or as necessary, to maintain productive breeding habitat for grassland obligate bird species.</p> <p>Ensure at least 40% of refuge grasslands are allowed to remain in unmown grasses or herbaceous cover to provide forage and cover for migration habitat.</p> <p>Continue to conduct breeding bird surveys in grassland communities to monitor trends especially for birds of conservation concern.</p> <p>Continue to cooperate with partners to investigate site fidelity and dispersal of refuge nesting grassland species.</p>	<p><i>In addition to alternative A:</i></p> <p>Manage 315 acres of grassland by a combination of mowing, haying, or burning on a 3-year cycle or as needed to reduce woody encroachment focused on breeding areas for grassland obligate bird species.</p> <p>Ensure at least 80% of field acres are available as standing grassland during migration.</p> <p>Remove fragmentation and edge effects and consolidate adjacent fields into larger units to increase the percentage of effective interior habitat.</p> <p>Assess managed grasslands to migrating land birds and raptors.</p> <p>Work with partners to establish early successional management demonstration sites which include grassland habitat.</p> <p>Work with private landowners to encourage late haying and mowing of grasslands adjacent to refuge property.</p> <p>Work with private landowners to develop conservation easements and other land protection incentives to maintain grassland habitat in the surrounding area.</p>	<p><i>Same as alternative B except:</i></p> <p>Manage 341 acres of grassland by a combination of mowing, haying, grazing or burning on a 3-year cycle or as needed to reduce woody encroachment focused on breeding areas for grassland obligate bird species.</p>	<p><i>In addition to Goal 3 Shrubland strategies for this alternative:</i></p> <p>No grassland management. All 531 acres of grassland are moved towards early successional shrubland habitat.</p> <p>Plug ditches in managed grassland unit on Freeland, Harper, and Beal tracts.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 4:</b> Visitors of all abilities enjoy opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding and enjoyment of refuge habitats, wildlife, and cultural history.</p>			
<p><i>Hunting</i></p>			
<p>Continue to provide quality, safe, compatible hunting opportunities according to state regulations and seasons through a refuge permit system.</p> <p>Continue to allow night hunting for raccoon.</p> <p>Prohibit hunting, except spring gobbler, from the end of February through the beginning of September.</p> <p>Maintain two accessible hunt blinds. If the demand for those blinds exceeds our supply, implement a lottery system.</p> <p>Limit the number of hunt permits if data shows a need to do so to preserve the quality of the hunt.</p> <p>Continue to allow the use of pursuit dogs per state regulations, with up to 6 dogs per hunting party.</p> <p>Continue to permit hunt dogs off-leash, provided they are collared with owner ID, and under the control of the owner.</p> <p>Continue to provide parking in designated areas for hunters.</p>	<p><i>In addition to alternative A and within 5 years of final CCP approval:</i></p> <p>Modify “no rifle zones” to allow more rifle hunting consistent with public safety.</p> <p>Streamline the hunt permitting system.</p> <p>Increase white-tailed deer harvest by assisting hunters with extraction of deer from remote areas with a deer pick-up shuttle system.</p> <p>Promote outreach and education programs to increase understanding of the importance of doe hunting and the impacts of overabundant deer.</p> <p>Open the Beall gate to allow hunters vehicle access to North Beall Road (no ATVs).</p> <p>Close the Research Natural Area to all hunting except for a management deer hunt.</p> <p>Gather deer population data and work with WV DNR, surrounding landowners, hunt clubs and other partners to reduce the deer herd in Canaan Valley by encouraging cooperative, managed deer hunts.</p>	<p>Same as alternative B.</p>	<p>Same as alternative B except:</p> <p>Remove rail, ring-necked pheasant, Wilson’s snipe, American coot, common moorhen, and rabbit from the list of species hunted.</p> <p>Eliminate night hunting for raccoon.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Goal 4 (cont.):</b> Visitors of all abilities enjoy opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding and enjoyment of refuge habitats, wildlife, and cultural history.			
<i>Hunting (cont.)</i>			
<p>Work with adjacent land managers and the WV DNR to encourage cooperative, managed deer hunts.</p>	<p><i>Within 5-10 years of CCP approval:</i></p> <p>Work with the state legislature and state representatives more closely on deer related issues, solutions and legislative proposals.</p> <p>Work with the state to permit special antlerless hunts on the refuge.</p> <p>Require a special use permit for rabbit hunting.</p>		
<i>Fishing</i>			
<p>Continue to promote quality fishing opportunities in state jurisdictional areas and according to state regulations.</p> <p>Allow fishing where approved roads or trails provide access to state jurisdictional waterways or other water bodies on the refuge.</p> <p>Continue to maintain the ADA-compliant fishing platform along Timberline Road and promote awareness of this new platform.</p> <p>Continue to participate in the County's fishing derby.</p> <p>Continue to participate in the HOFNOD Expo.</p>	<p><i>In addition to alternative A:</i></p> <p>Officially open the refuge for fishing.</p> <p>Work with interagency fisheries groups to manage for native fish and quality fisheries.</p> <p>Educate anglers on the proper use and disposal of non-native aquatic bait.</p> <p>Improve signage directing public to designated approved fishing locations.</p> <p>Provide informational brochures and/or signs that promote awareness of refuge-specific and state fishing regulations.</p> <p>Work with Canaan Valley Institute (CVI) to construct an ADA-compliant fishing platform on Camp 70 Road, on the Service's property or on CVI's property.</p>	<p><i>Same as alternative B.</i></p>	<p><i>Same as alternative B, except:</i></p> <p>Work with State and other partners to stock only native fish species in the Blackwater River in Canaan Valley.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 4 (cont.):</b> Visitors of all abilities enjoy opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding and enjoyment of refuge habitats, wildlife, and cultural history.</p>			
<p><i>Wildlife Observation and Photography</i></p>			
<p>Continue to provide 31 miles of roads and trails open throughout the year for visitors.</p>	<p><i>In addition to alternative A and within 5 years of CCP approval:</i></p>	<p>Same as alternative B except:</p>	<p>Same as alternative B except:</p>
<p>Continue to permit White Grass Inc. to run a commercial cross-country skiing and snowshoeing operation with 10 miles of trails on Service-owned lands.</p>	<p>Visitors will continue to be allowed to walk with dogs on refuge trails but leashes must be no longer than 8 feet.</p>	<p>Create a Cross Valley Trail from the Brown Mountain Overlook trail through the north railroad grade to A-Frame Road.</p>	<p>Close the Cabin Mountain spur trail and Cabin Mountain trail beyond Sand Run trail.</p>
<p>Complete a boardwalk loop at the Freeland trail.</p>	<p>Consider converting the special use permit for commercial cross-country skiing and snowshoeing to a concession.</p>	<p>If the refuge were to gain jurisdiction over the Camp 70/Delta 13 Road, we would permit vehicles to drive into the valley to a parking area. We would consider options for improving visitor access, such as installing an accessible observation platform.</p>	<p>Close the Powderline and a section of Three-Mile trail to completely revegetate Cheat Mountain salamander habitat.</p>
<p>Continue to work with the refuge-volunteer-based Adopt-a-Trail program and with Tucker County Trails to maintain and improve trail conditions, signs, and blazing.</p>	<p>Construct an interpretive kiosk and parking area where A-frame Rd. enters the refuge.</p>	<p>Allow off-trail use by permit for pedestrian, cross country skiing and snowshoeing access in a designated area on Sundays during the hunt season. We would issue a maximum of 25 permits per month.</p>	<p>Do not add a connection from Swinging Bridge Trail to Cortland Road.</p>
<p>Maintain unimproved boat launches at two locations, one on Timberline Road and one at Camp 70.</p>	<p>Allow overnight parking by permit on Forest Road 80 for visitors accessing and camping in Dolly Sods.</p>	<p>Open all of Brown Mountain Overlook Trail for biking.</p>	<p>Do not permit off-trail anywhere on the refuge, except for hunting.</p>
<p>Continue to prohibit overnight parking.</p>	<p>Revegetate edges of Powderline Trail and part of Three-Mile Trail to improve habitat for Cheat Mountain salamanders. Look into trail diverters and other methods for improving salamander habitat.</p>		
<p>Continue to permit limited off trail use by non-hunters through issuance of Special Use Permits.</p>	<p>Close the Freeland Tract to hunting (except for special deer hunts), fishing, and walking with dogs, to provide additional, high-quality opportunities for wildlife viewing and study.</p>		
<p>Continue to permit leashed dogs on refuge trails.</p>			

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 4 (cont.):</b> Visitors of all abilities enjoy opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding and enjoyment of refuge habitats, wildlife, and cultural history.</p>	<p><b>Wildlife Observation and Photography (cont.)</b></p> <p>Coordinate with CVI and other partners to connect Swinging Bridge trail to Cortland Road for pedestrian and bicycle access.</p> <p>Upon transfer of the Beall Bridge and the adjoining property to the Service, connect the Beall trails to the Middle Valley Trails and allow access for bicycle, equestrian, and pedestrian use. Emergency vehicles may cross the bridge to respond to emergencies in Timberline.</p> <p>Work with White Grass Ski Touring Center to improve trail signs to encourage visitors to stay on designated ski trails.</p> <p>Consider re-routing or modifying steep trails to make them more stable and to minimize erosion.</p> <p><i>Within 5 to 10 years of CCP approval:</i></p> <p>Construct a photo/observation blind along the trail at the end of A-Frame Rd.</p> <p>Initiate discussions with the state park about the possibility of connecting the refuge Visitor Center to Canaan Valley State Park via a trail.</p> <p>Work with Tucker County Trails on connecting Camp 70 Loop Trail and Brown Mountain Overlook Trail. Permit bicycle access on the western portion of the Brown Mountain Overlook Trail.</p> <p>Install kiosk and directional signs to direct visitors toward boat access points.</p>		

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 4 (cont.):</b> Visitors of all abilities enjoy opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding and enjoyment of refuge habitats, wildlife, and cultural history.</p>			
<p><i>Wildlife Observation and Photography (cont.)</i></p>			
	<p><i>Within 10 to 15 years of CCP approval:</i></p> <p>Improve two launch sites for canoes, kayaks, or other hand-launched boats at Old Timberline Road and the Camp 70 Road pullout.</p> <p><i>Throughout the life of the CCP:</i></p> <p>Coordinate with adjacent land owners to form a “Heart of the Highlands” trail system, which will promote trail connectivity among public and private lands throughout the region.</p> <p>Work with WVDOT to gain jurisdiction over the Delta 13/Camp 70 Road so the Service can repair the road and maintain a trail open to pedestrian, equestrian, and bicycle use.</p>		

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 4 (cont.):</b> Visitors of all abilities enjoy opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding and enjoyment of refuge habitats, wildlife, and cultural history.</p>			
<p><i>Environmental Education and Interpretation</i></p>			
<p>Continue to work with Tucker County Connections on their 5th-grade three-day "camp."</p> <p>Work with local girl scouts on their summer day camp.</p> <p>Provide an annual "Wild School Day" refuge experience for all local 6th-grade students.</p> <p>Master Naturalists meet on the refuge for their training once a month from April through December.</p> <p>College students work with us to restore native forests with two tree planting weekends per year.</p> <p>Assist teachers and youth group leaders with refuge field trips upon request whenever staff is available.</p>	<p><i>In addition to alternative A and within 5 years of CCP approval:</i></p> <p>Hire a park ranger (GS 7/9) to support expanded programs and expanded Visitor Center hours.</p> <p>Double the number of students using the refuge.</p> <p>Develop a self-guided interpretive trail on the Freeland Trail.</p> <p>Present at least three off-site exhibits and up to three off-site programs annually.</p> <p>Develop a professional traveling exhibit.</p> <p>Offer 30-50 on-site interpretive programs annually.</p> <p>Open the Visitor Center seven days per week during times of peak visitation and at least three days per week during the rest of the year.</p>	<p>Same as alternative B except: Construct the Environmental Education pavilion on Freeland tract and open the Visitor Center 7 days a week all year round.</p>	<p>Same as alternative B.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Goal 4 (cont.):</b> Visitors of all abilities enjoy opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding and enjoyment of refuge habitats, wildlife, and cultural history.</p>			
<p><i>Environmental Education and Interpretation (cont.)</i></p>			
<p>Provide a small curriculum library where teachers may find lessons to teach about the environment.</p> <p>Offer a variety of interpretive programs, and interpretive signs on trails.</p> <p>Continue to provide Visitor Center exhibits that illustrate the variety of habitats on the refuge and in the local area in general, and that promote the mission of the Service and of the National Wildlife Refuge System.</p> <p>Continue to open the visitor center 4 days per week.</p> <p>Continue to recruit local and part-time resident volunteers to help staff the visitor center.</p> <p>Continue to employ a STEP to help staff the visitor center on Saturdays.</p>	<p>Design and construct or re-allocate space to designate a larger meeting room in the vicinity of the visitor center.</p> <p><i>Within 5 to 10 years of CCP approval:</i></p> <p>Develop and present at least three environmental education teacher workshops annually.</p> <p>With additional staff, advertise and present 12 or more field trips for school children on the refuge per year.</p> <p>Plan and construct an environmental education pavilion at the Beall Trail, near the Blackwater River.</p> <p>Choose a location on the Blackwater River for a floating platform if needed for student pond studies.</p> <p>Expand the refuge's reach to communities that are within an hour's drive of the refuge, such as Elkins, Oakland, and/or Petersburg, by presenting 6-8 programs in these school districts per year.</p> <p>Develop additional interpretive signage for other trails and kiosks.</p> <p>Develop one reception area for the combined needs of the office and visitor center.</p> <p>Construct a trailer pad and recruit work camper volunteers to help staff the Visitor Center.</p>		

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Goal 5:</b> Collaborate with partners to promote the natural resources of Canaan Valley and the mission of the National Wildlife Refuge System.			
<i>Outreach and Communication</i>			
<p>Continue the following to facilitate communication with the community and stakeholders.</p> <p>Participate in public lands working group.</p> <p>Write news articles for the Parsons Advocate and Elkins Intermountain.</p> <p>Write articles for the Timberdoodle.</p> <p>Write articles and post announcements in newsletters of the valley's homeowners associations.</p> <p>Conduct outreach to adjacent landowners.</p> <p>Participate in community outreach events such as HOFNOD and Forest Festival.</p> <p>Build working partnerships with NGOs and municipalities and through the Private Lands program at the West Virginia FWS Field Office.</p> <p>Continue to take interactive traveling exhibits to local festivals as time and staff permit.</p>	<p><i>In addition to alternative A:</i></p> <p>Hold an annual public open house (preferably in the fall).</p>	<p><i>Same as alternative B.</i></p>	<p><i>Same as alternative B.</i></p>

## Environmental Consequences

### Conducting Additional NEPA Analysis

Table 2 summarizes the environmental consequences we predict on selected resources as a result of implementing the four management alternatives. Chapter 4 in the draft CCP/EA provides our detailed analysis of impacts on important resources. We evaluate direct, indirect, short-term, beneficial and adverse effects likely to occur over the 15-year life span of the plan. Beyond that planning horizon, we give a more speculative description of those effects. We do not predict any irreversible or irretrievable commitment of resources or significant adverse cumulative effects, nor do we expect any action would adversely affect short-term uses of the environment or its long-term productivity.



Ken Sturm/USFWS

*Bigcove Beaver Pond*

### Effects on Socioeconomic Environment

In support of analyzing the socioeconomic consequences of the actions proposed in the four draft CCP/EA alternatives, we enlisted the assistance of social scientists and economists from the U.S. Geological Survey (USGS)–Fort Collins Science Center. Their analysis provides a means of estimating and comparing how current management under alternative A, and proposed management under alternatives B, C, and D, could affect the local and regional socioeconomic environment. The economic impacts were assessed using the Impact Analysis for Planning (IMPLAN) regional input-output modeling system developed by the U.S. Forest Service. The model uses information such as refuge revenue sharing payments, anticipated refuge visitor expenditures in the local community, refuge local purchases, and potential refuge economic activities. IMPLAN reports effects for the following categories: local output (e.g. the change in local sales or revenue), personal income (e.g. the change in employee income in the region generated from a change in regional output), and employment (e.g. the change in the number of jobs generated from a change in regional output). For a full report of the economic impacts, see appendix H of the draft CCP/EA.

In the beginning of the planning process, social scientists from USGS conducted a stakeholder assessment. The first step in the stakeholder evaluation was identification of the key groups and individuals with an interest or role in the Canaan Valley refuge planning process. One hundred stakeholders were identified and invited to meet with USGS researchers one-on-one at Canaan Valley State Park in late winter of 2007. Each stakeholder was given a set

of 47 statements about key refuge issues and asked to sort and rank these statements from “strongly agree” to “strongly disagree.” Five prevailing perspectives were identified related to these key Refuge issues: The Ecological Preservation Perspective emphasizes protecting wildlife and habitats, with wetland protection being especially important. The Recreational Access Perspective places the greatest emphasis on recreational access to the refuge. The Traditional Wildlife Management Perspective emphasizes management for game species such as deer, grouse, and woodcock. The Wildlife First/ Recreation Second Perspective is primarily concerned with protecting wetlands and water quality, acquiring lands within the refuge acquisition boundary, and controlling invasive species. Finally, the Economic Development Perspective is primarily concerned with maintaining and improving the economic vitality of the valley. The information gathered in the USGS stakeholder analysis was used to predict the potential social impacts of the proposed alternatives on these different perspectives (see table below). This information was also used to develop management scenarios (i.e., alternatives) that take into consideration the different preferences of each perspective.

Refer to the Impacts table (Table 2) for more information on the effects on the social environment.



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*Sunrise at Canaan Valley NWR*

**Table 2: Summary Impacts Comparison of the Alternatives**

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Air Quality</b>			
<i>Impacts that would not vary by Alternative</i>			
<p>No adverse affects to regional air quality, regardless of management alternative. None of the alternatives would violate EPA standards; all four would be in compliance with the Clean Air Act. None of the proposed management alternatives would affect visibility. Although we would conduct prescribed burns to manage grassland and invasive species, we would monitor and control the burning carefully to keep the risk of wildfire low. When using herbicides we will take all precautions with respect to wind conditions, time of day, and proper equipment to ensure that we expose only target plants to the chemical. We will make responsible energy use fundamental in the development and operation of our lands and facilities, as well as in contractor and commercial visitor services.</p>			
<p>Proposed refuge management activities would neither substantively benefit nor adversely affect currently good local and regional air quality, with no violations of federal or state Clean Air Act standards, no impacts to nearby Class I areas, and no cumulative effects on regional ozone or particulate matter pollutant levels.</p> <p>Minor air quality benefits from the air pollutant filtering effects of 16,183 acres of upland, riparian and wetlands vegetation and from adopting energy efficient practices. There would be a negligible reduction in atmospheric carbon due to the sequestering effects of 6,962 forested acres.</p> <p>Limited ground disturbing activities and limited introduction of new emissions sources will minimize impacts.</p> <p>10 percent increase in annual refuge visits by motor vehicle would cause a minor increase in air emissions in the long term and contribute minimally to potential cumulative effects.</p>	<p>Effects similar to alternative A. No substantive change in air quality; no violation of standards; no impacts to Class I areas, and no cumulative effects. Locally more minor long-term benefits than alternative A but also more potential short-term adverse effects.</p> <p>Benefits would increase from maintaining additional forested acres within acquisition boundary.</p> <p>Forest restoration and stand enlargement would increase carbon sequestration benefits.</p> <p>Trail, infrastructure, and parking lot construction would cause minor short-term, localized impacts from vehicle and equipment emissions and dust during construction.</p> <p>A 15 percent increase in annual visitation would result in more motor vehicles and therefore higher local air pollutant emission levels than in alternative A over the longer term, and would increase the potential for cumulative effects.</p>	<p>Alternative C would have benefits similar to alternative B, although increased short-term, localized impacts are expected from increases in visitor use and additional trail and infrastructure construction activities.</p>	<p>Alternative D would have the greatest long-term benefits to air quality through the long-term predominance of mature forest stands and increased forest restoration minimally increasing carbon sequestration.</p> <p>Impacts from infrastructure and parking lot construction are similar to alternative B.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Hydrology and Water Quality</b>			
<i>Impacts that would not vary by Alternative</i>			
<p>Acquisition and conservation of more than 8,932 additional acres of wildlife habitat within the acquisition boundary would further benefit water resources because acquisition would increase watershed protection, which would ensure the integrity of wetland habitats. Stringent precautions in conducting refuge management activities such as herbicide application would prevent chemical contamination of water directly through leaks or spills or indirectly through soil runoff.</p> <p>Alternative A would provide minor watershed benefits and cause minimal adverse effects to refuge hydrology and water quality. Acquiring 8,949 additional acres of upland forest, wetlands and other lands within the acquisition boundary would increase protection of the watershed.</p> <p>Stringent precautions in conducting refuge management activities would prevent chemical contamination of water directly through leaks or spills or indirectly through soil runoff.</p> <p>An increase in visitor use activities might cause river and stream soil sedimentation and petroleum product contamination. Public outreach on that and other issues such as invasive aquatic weeds, invasive fish, and lead contamination would help mitigate that risk.</p>	<p>Local hydrology would improve through road reconstruction, road removal, culvert removal, and hydrologic restoration of wetland complexes.</p> <p>Designation of a 754-acre Research Natural Area (RNA) would benefit wetlands and associated rivers and streams by preserving wetland plant communities and rare plant species.</p> <p>Trail, infrastructure, and parking lot construction would cause minor short-term, local effects from soil runoff and sedimentation.</p> <p>A refuge-run shuttle service would minimally impact Glade and/or Sand Run during the first 3 days of deer-gun season.</p>	<p>Benefits from alternative C would lessen from increases in public use and construction activities.</p> <p>Designation of a 593-acre RNA would benefit wetlands and associated rivers and streams by limiting human intervention, preserving wetland plant communities and rare plant species.</p> <p>Additional trail, road (Camp 70 improvement) and infrastructure construction would increase potential for short-term effects to hydrology and water quality from soil erosion and siltation.</p> <p>Impacts of a refuge-run shuttle service would increase in comparison to alternative B by expanding the number of days in operation.</p> <p>Impacts to the refuge's water resources would increase from opening a 2,330-acre off-trail use zone. To minimize impacts, only 25 special use permits will be issued per month during the refuge's hunting season. Information obtained from special use permits will allow refuge personnel to monitor and perform remediation.</p>	<p>Alternative D would have impacts from increased visitation and outreach efforts similar to alternative A.</p> <p>Alternative D would have benefits from designating a RNA</p> <p>Impacts from construction and a refuge-run shuttle service are similar to alternative B.</p> <p>There is no off-trail use zone in alternative D so degradation of water resources would be eliminated.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Soils</b>			
<i>Impacts that would not vary by Alternative</i>			
<p>Maintaining native vegetation cover in all alternatives will stabilize soils and minimize erosion. Adverse impacts to soils would likely occur from restoration activities, habitat management, invasive species control, refuge infrastructure construction, and activities related to wildlife observation and photography. To minimize impacts, we would use best management practices; conduct all prescribed burns under a strict prescription and in optimal weather conditions; permit haying and mowing only in dry grassland areas and only on a rotational basis; use approved herbicides to control invasive plants; and limit public use to designated areas or zones.</p>			
<p>Soil stability has improved since refuge acquisition due to the prohibition of all vehicles from sensitive habitats and allowing vehicle access only on designated roads.</p> <p>Minor, short-term, localized soil disturbance (i.e., compaction, erosion) from native species replanting, prescribed burning, haying/mowing, herbicide application, hydroaxing and heavy equipment use, and other management practices. The refuge will follow best management practices (BMPs) to minimize impacts to soils.</p> <p>Visitor use in the form of hiking, biking, and horseback riding would impact soils through compaction, erosion, and sedimentation. Impacts are minimized by using a trail/route checklist to determine whether an existing or new trail meets established criteria.</p> <p>The refuge is most constrained under alternative A from implementing methods to reduce soil loss from wetland areas impacted by erosion and sedimentation.</p>	<p>Alternative B would increase long term benefits to soils through reclamation of natural soil productivity on restored wetlands and uplands, and obliterating, recontouring and revegetating old logging roads and trails.</p> <p>Minor short-term, localized soil compaction and long-term loss of productive soil where soils are removed or surfaced for visitor infrastructure and trails. No construction except boardwalk pilings for trail access would be done in wetlands; boardwalks over saturated areas would protect wetland soils and sensitive vegetation.</p> <p>A refuge-run shuttle service would increase the potential for soil sedimentation and streambank erosion.</p>	<p>Benefits to soils from alternative C would lessen from increases in public use and construction activities.</p> <p>Additional trail (Brown Mountain overlook to A-Frame Road), road (Camp 70 improvement), and infrastructure construction would increase potential for short-term localized impacts to sensitive wetland soils. To minimize long-term impacts no construction except boardwalk pilings for trail access would be done in wetlands; boardwalks over saturated areas and a bridge over the Little Blackwater River would protect wetland soils and sensitive vegetation.</p> <p>Increased potential for soil sedimentation and streambank erosion because of the off-trail use zone and the expanded time frame for the refuge-run shuttle service.</p>	<p>Impacts to soils are similar to alternative B. However, soils would benefit from a decrease in trail miles, limiting vehicle access, and limiting visitor use to designated roads and trails.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Socioeconomic Environment</b>			
<i>Impacts that would not vary by Alternative</i>			
<p>Total economic impacts associated with refuge operations across all alternatives represent well less than one percent of total income and total employment in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge's public use related economic activity occurs. For social impacts, there are no actions that would not vary by alternative.</p>			
<p>Refuge management activities directly related to all refuge operations generate an estimated \$1.62 million in local output, 15.6 jobs and \$344 thousand in personal income in the local economy. Including direct, indirect, and induced effects, all refuge activities under alternative A would generate total economic impacts of \$1.95 million in local output, 20.9 jobs and \$442.7 thousand in personal income.</p> <p><i>Hunting:</i> helps maintain healthy animal populations, reduces deer browse, and supports a local cultural activity. The use of pursuit dogs may be considered inhumane. Permitting hunters off-trail and permitting hunting dogs off-leash may be seen as unfair to other users. User conflicts may arise between hunters and non-hunters, but hunt seasons occur during a time of year when the refuge typically experiences low visitation. Safety issues are minimized by enforcing state and refuge hunting regulations.</p>	<p>Refuge management activities directly related to all refuge operations generate an estimated \$1.71 million in local output, 16.3 jobs and \$361.6 thousand in personal income in the local economy. Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of \$2.05 million in local output, 21.9 jobs and \$465.9 thousand in personal income.</p> <p><i>Hunting:</i> Same benefits as Alternative A, plus an increase in the available areas on the refuge that are open for hunting would provide more hunting opportunities, could increase hunter satisfaction, and could encourage hunters who might not otherwise participate. An increase in hunting may result in additional user conflicts between hunters and non-hunters. Providing shuttles, improving roads, and investing in other improvements for hunting access would use budget dollars that could support other refuge activities and users.</p>	<p>Refuge management activities directly related to all refuge operations generate an estimated \$1.93 million in local output, 18.4 jobs and \$405.5 thousand in personal income in the local economy. Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of \$2.32 million in local output, 24.6 jobs and \$523.2 thousand in personal income.</p> <p><i>Hunting:</i> Same as alternative B.</p>	<p>Refuge management activities directly related to all refuge operations generate an estimated \$1.67 million in local output, 15.9 jobs and \$352.3 thousand in personal income in the local economy. Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of \$2.01 million in local output, 21.4 jobs and \$453.6 thousand in personal income.</p> <p><i>Hunting:</i> Same benefits as alternative B, plus this alternative may decrease user conflicts because fewer species would be hunted, possibly resulting in fewer hunters. However, eliminating some species from the hunt list may adversely impact hunters.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Socioeconomic Environment (cont.)</b></p> <p><i>Impacts that would not vary by Alternative (cont.)</i></p>			
<p>Total economic impacts associated with refuge operations across all alternatives represent well less than one percent of total income and total employment in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge's public use related economic activity occurs. For social impacts, there are no actions that would not vary by alternative. (cont.)</p>			
<p><i>Fishing:</i> Participating in fishing events provide the benefit of connecting the community to the outdoors, which may lead to an increased appreciation of the refuge and its resources, and of the natural world in general. Fishing access is limited to places where roads or trails cross a waterway, which may limit opportunities for some visitors.</p>	<p><i>Fishing:</i> Increased benefits compared with alternative A, because in alternative B we would officially open the refuge to fishing and actively promote fishing and provide access, more signage, and education programs. Slightly increased adverse impacts compared with alternative A from enhancing and promoting the refuge's fishing program, which would require expenditures that could be used for other public benefits.</p>	<p><i>Fishing:</i> Same as alternative B</p>	<p><i>Fishing:</i> Increased benefits compared with alternative A because this alternative provides the opportunity to fish native-only streams, which may appeal to some anglers and may provide high-quality fishing experiences. Slightly adverse impacts because fishing may be limited and some anglers may choose to fish elsewhere.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Socioeconomic Environment (cont.)</b></p> <p><i>Impacts that would not vary by Alternative (cont.)</i></p>			
<p>Total economic impacts associated with refuge operations across all alternatives represent well less than one percent of total income and total employment in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge's public use related economic activity occurs. For social impacts, there are no actions that would not vary by alternative. (cont.)</p>			
<p><i>Wildlife Observation &amp; Photography:</i> Continuing to offer wildlife observation and photography opportunities on 31 miles of roads and trails may lead visitors to gain a deep appreciation for refuge resources. No increase in public use opportunities may lead to deterioration of the community's attitude towards and support for the refuge and its mission.</p>	<p><i>Wildlife Observation &amp; Photography:</i> Increased benefits compared with alternative A because of increased infrastructure for public use, an additional 4.8 miles of trails, and more looped trails. This may increase visitation and improve visitor satisfaction, as well as increase return visits, which may positively impact the local economy. Revegetating the edges of some ski trails to improve habitat may be seen as beneficial from an ecological preservation perspective, but harmful from a recreational perspective because it would narrow ski trails. Increasing trail connectivity by building more trails may be seen as an adverse impact by visitors who are concerned with protecting wetlands and other resources. Additional visitor amenities may take funds away from other priorities, cause additional user conflicts, or cause more disturbance to wildlife, therefore diminishing the quality of wildlife viewing for others.</p>	<p><i>Wildlife Observation &amp; Photography:</i> Increased benefits for recreational users compared to the other alternatives because there would be more trails miles and more trail connections, including a cross-valley trail. There would also be an off-trail use zone. The cross-valley trail may be cost-prohibitive to implement in a way that protects fragile wetland habitat. Of all of the alternatives, this alternative most increases access opportunities for mountain bikers, which may negatively impact hikers, horseback riders, and other user groups.</p>	<p><i>Wildlife Observation &amp; Photography:</i> Closing some refuge trails would decrease access and connectivity in comparison to alternatives B and C.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Socioeconomic Environment (cont.)</b>			
<i>Impacts that would not vary by Alternative (cont.)</i>			
<p>Total economic impacts associated with refuge operations across all alternatives represent well less than one percent of total income and total employment in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge's public use related economic activity occurs. For social impacts, there are no actions that would not vary by alternative. (cont.)</p> <p><i>Environmental Education and Interpretation:</i>                      This alternative exposes a large number of people to the refuge because of the emphasis on on-site and off-site programs. This could lead to a broader understanding of and support for the refuge mission and refuge resources. Recruiting local volunteers provides the benefit of keeping the visitor center open more days per week, which allows the refuge to provide programs and information on a more frequent basis. On and off-site programs entail additional budget costs and use resources that could be available for other refuge programs. Opening the visitor center only four days a week is of concern to members of the public who believe that the center should be open on weekend days, because that is the time of highest potential visitation.</p> <p><i>Outreach &amp; Partnerships:</i> Beneficial impacts from using a variety of venues and forums to communicate with the public, which helps refuge staff develop relationships with a variety of individuals and groups. Minimal adverse impacts because outreach activities divert staff time and effort away from other management activities.</p> <p><i>Environmental Education and Interpretation:</i>                      Increased beneficial impacts compared with alternative A because the refuge would provide additional interpretative trails and signs, thus increasing the quality of visitor experiences. Hiring additional staff for visitor services may also increase visitor satisfaction because of increased outreach to schools and increased opportunities to learn more about the refuge. Adverse impacts from expenses incurred from designing and maintaining additional interpretative trails and an environmental education pavilion, thus diverting resources from management activities. Also, increased use of the refuge may impact refuge resources and habitats.</p> <p><i>Outreach &amp; Partnerships:</i> Increased beneficial impacts compared with alternative A, because the refuge would host an annual open house which would improve relationships with the community and provide mutual learning experiences. Adverse impacts are the same as alternative A.</p> <p><i>Environmental Education and Interpretation:</i>                      Increased beneficial impacts compared with alternative B because the refuge would open the visitor center 7 days a week year round. This would provide maximum opportunities for visitation and may increase satisfaction with refuge services. Slightly increased adverse impacts compared with alternative B because it will cost more to operate an expanded public use program, thus diverting funds from other management activities.</p> <p><i>Outreach &amp; Partnerships:</i> Same as alternative B.</p> <p><i>Environmental Education and Interpretation:</i>                      Same as alternative B, except the closing of portions of some commercial cross-country skiing and snowshoeing trails may mean that the refuge would not be able to offer the same level of environmental education and interpretation programming during the winter at the White Grass location.</p> <p><i>Outreach &amp; Partnerships:</i> Same as alternative B.</p>			

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Socioeconomic Environment (cont.)</b>  <i>Impacts that would not vary by Alternative (cont.)</i>			
Total economic impacts associated with refuge operations across all alternatives represent well less than one percent of total income and total employment in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge's public use related economic activity occurs. For social impacts, there are no actions that would not vary by alternative. (cont.)			
<p><i>Staffing:</i> The current staffing level of 7 full-time employees and 2 term employees allows the refuge to stay within budget and does not require budget increases. However, current staff numbers are inadequate to perform all needed refuge functions.</p>	<p><i>Staffing:</i> Increasing staff to 12 full-time employees and one temporary employee increases the refuge's capacity to perform its functions and contributes to local employment and local economic development. However, funding additional positions would require a larger refuge budget, and may use funds that could be used to support other refuge activities.</p>	<p><i>Staffing:</i> Slightly increased beneficial and adverse impacts compared to alternative B from an increase of one employee.</p>	<p><i>Staffing:</i> Same impact as alternative B.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Upland Habitats</b>			
<i>Impacts that would not vary by Alternative</i>			
<p>Regardless of the alternative selected, we will use standard and effective habitat management techniques to conduct forest, shrubland, and grassland management activities in the refuge uplands. Whenever practicable, we will replace non-native plant species with native species to restore the ecological integrity of the refuge. Management activities would cause no major mortality or loss in local populations, because actions occur on a rotational basis, meaning no major habitat components would change completely in any one year. Continuing red spruce and balsam fir restoration would provide long-term benefits, outside the 15-year scope of this plan, to Cheat Mountain salamanders and West Virginia northern flying squirrels.</p> <p>Alternative A would benefit uplands through the continued management and protection of the refuge's 10,482 acres of northern hardwood forest, conifer spruce/mixed forest, shrublands, old fields and grasslands.</p> <p>Some risk of short-term, localized impacts on these habitats from native species replanting, prescribed burning, haying/mowing, herbicide application, hydroaxing and heavy equipment use, and other management practices. The refuge would use at a minimum all BMPs recommended by state, federal, and Non-Governmental Organizations</p> <p>The refuge protects and manages 6,616 acres of northern hardwood forest and conifer spruce/mixed forest. Red spruce and balsam fir restoration would provide long-term benefits by increasing forested acres.</p> <p>The refuge protects 3,335 acres of shrubland and old fields, and actively manages 35 acres that benefit wildlife species such as migratory songbirds and American woodcock.</p> <p>Managing up to 531 grassland acres on a rotational basis would provide a habitat mosaic benefiting multiple wildlife and plant species and providing cover for breeding and migrating birds.</p>	<p>In addition to alternative A, alternative B would increase management and restoration efforts in uplands.</p> <p>Increasing the harvest of white-tailed deer would further benefit upland plant communities.</p> <p>Impacts to upland habitats and associated wildlife would increase with increased number of trails, trail miles, visitor infrastructure, and increased visitor use.</p> <p>Increasing conifer spruce/mixed forest habitat, reforesting logging roads, and incorporating silvicultural methods in stand management would benefit forests by improving stand health, reconnecting fragmented forest blocks, and increasing overall acreage.</p> <p>Conversion of forest islands and edges to early-successional habitat would benefit associated species, like American woodcock and Eastern towhee.</p> <p>Early-successional focal species would benefit most from actively managing 853 acres of shrubland habitat, which includes allowing succession to occur on 216 acres of grassland.</p>	<p>Impacts to upland habitats and associated wildlife would be greatest in alternative C with increased number of trails, trail miles, visitor infrastructure, access to an off-trail use zone, and increased visitor use.</p> <p>Benefits to upland forests are similar to alternative B although forest stands would not benefit from forest stand improvement measures and would be reliant on white-tailed deer harvest.</p> <p>The range of red spruce would continue to expand toward pre-20<sup>th</sup> century conditions but at a much slower rate than in the other alternatives.</p> <p>Impacts to shrubland habitats would be similar to alternative B.</p> <p>Impacts to grassland habitats would be similar to alternative B.</p>	<p>Alternative D would provide the greatest benefit to forested habitats through passive management to achieve late-successional forest characteristics.</p> <p>Increased flexibility in the control of white-tailed deer would be most beneficial to refuge plant communities and associated wildlife.</p> <p>Long-term benefits to upland forests would increase in comparison to alternative B from an increase in forested acres relating to succession of shrubland, old field, and grassland habitats.</p> <p>Early successional and shrubland dependant species would receive short-term benefits from succession but ultimately would be displaced as habitats continue to succeed to northern hardwood forest. Displacement may adversely affect local and regional population goals set by the BCR.</p> <p>Certain populations of rare plant communities and plant species, like glade spurge, would be affected by reducing extent and frequency of occurrence. A management plan to minimize affects to glade spurge populations will be developed.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Upland Habitats (cont.)</b> <i>Impacts that would not vary by Alternative (cont.)</i>			
<p>Regardless of the alternative selected, we will use standard and effective habitat management techniques to conduct forest, shrubland, and grassland management activities in the refuge uplands. Whenever practicable, we will replace non-native plant species with native species to restore the ecological integrity of the refuge. Management activities would cause no major mortality or loss in local populations, because actions occur on a rotational basis, meaning no major habitat components would change completely in any one year. Continuing red spruce and balsam fir restoration would provide long-term benefits, outside the 15-year scope of this plan, to Cheat Mountain salamanders and West Virginia northern flying squirrels. (cont.)</p>	<p>The conversion of 215 grassland acres to shrubland habitat would be considered adverse to the overall objective of maintaining the grassland cover type. Impacts would be negligible because the refuge will concentrate on providing higher quality grassland habitat through reducing interior fragmentation and managing in ≥50 acre habitat blocks.</p>		<p>Alternative D would provide the least benefit to grasslands as they would not be managed and would succeed through the successional stages, eventually displacing grassland dependent wildlife species. Grassland- and area-dependent species (e.g. Henslow's sparrows) would benefit in the short-term but would be displaced within 10 years.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<p><b>Freshwater and Wetland Habitats</b></p> <p><i>Impacts that would not vary by Alternative</i></p>			
<p>Regardless of which CCP alternative we select, we would develop a Habitat Management Plan for wetland habitats, and we would mitigate any potential for major unplanned changes in vegetation by continuously monitoring our vegetation types and updating our Geographic Information System database. A trapping program in all alternatives would maintain furbearer populations at levels compatible with the habitat and with refuge objectives, and minimize beaver damage to plant communities and refuge roads and trails. Indirect impacts could result from the activity of placing traps as it could disturb or displace migratory birds utilizing wetlands for wintering or foraging habitat during seasonal migrations. Direct impacts would include the harvest of targeted species, and the potential to harvest non-targeted species.</p>			
<p>Alternative A would benefit wetlands through the continued management and protection of 5,573 acres. Rare plant communities would benefit from active habitat management such as beaver trapping and the harvest of white-tailed deer.</p> <p>Over the long-term, the risk of erosion and water quality problems would increase with increased visitor use. However, impacts are minimized because visitor use is limited to designated roads and trails.</p> <p>Some risk of short-term, localized impacts on these habitats from native species replanting, prescribed burning, haying/mowing, herbicide application, hydroaxing and heavy equipment use, and other management practices. The refuge would use at a minimum all BMPs recommended by state, federal, and Non-Governmental Organizations. Impacts would be minimized by conducting operations when the ground is frozen, hand carrying equipment and using chainsaws rather than using heavy equipment for planting activities whenever possible.</p> <p>The 347 acres of forested wetlands would receive long-term benefits from red spruce and balsam fir planting efforts by improving forested wetland habitat and increasing overall acreage.</p>	<p>Benefits would increase in alternative B through the remediation of impacted wetland areas, increased harvest of white-tailed deer, designating a 754-acre RNA, and the development of an ecological integrity index that would improve wetland function and monitor changes in relation to climate change and restoration activities.</p> <p>There would be short-term impacts from trail, environmental education pavilion, and boardwalk construction to wetlands and long-term impacts from habitat loss where trails cross wetlands. The refuge will use BMPs for construction to minimize impacts to wetlands and the Blackwater River.</p> <p>Benefits to forested wetlands are similar to alternative A.</p> <p>Skidsteer vehicles would be used to construct white-tailed deer exclosures. The refuge would limit the extent and duration of use in wetter soil types to minimize impacts, and it would use additional measures (e.g. using rubber mats) to minimize impacts. Short-term impacts would be offset by long-term benefits to red spruce and balsam fir stands by increasing seedling survival rates and stand acres.</p>	<p>Additional trail (Brown Mountain overlook to A-Frame Road), road (Camp 70 improvement) and infrastructure construction would increase potential for short-term localized impacts to sensitive wetlands that contain rare and sensitive plant communities. To minimize long-term impacts on the Brown Mountain Overlook to A-Frame road trail, the refuge would construct a boardwalk in areas where sensitive wetland soils and plants would be affected by foot traffic and a bridge will be placed over the Little Blackwater River where the riverbank would be susceptible to erosion.</p> <p>Designation of a 593-acre RNA would benefit wetlands and associated rivers and streams by preserving wetland plant communities and rare plant species.</p> <p>Impacts of dispersed use within the off-trail use zone would be minimized as wetlands consist of only 4% of the total area.</p> <p>Impacts to forested wetlands are similar to alternative B.</p> <p>Impacts to forested wetlands-aspen woodlands are similar to alternative B.</p> <p>Impacts to open water and aquatic habitats are similar to alternative B.</p>	<p>Benefits in alternative D are similar to alternative B.</p> <p>Impacts would not be as extensive as alternative B or C because some trails would be closed and visitors would be restricted to designated trails. This would benefit associated wetlands by limiting disturbance and the spread of invasive species.</p> <p>Benefits to forested wetlands include an increase in overall size from passive management, thus expanding a globally rare community type.</p> <p>Impacts to aspen woodlands are similar to alternative D.</p> <p>Impacts to shrub and herbaceous wetlands are similar to alternative B.</p> <p>Impacts to open water and aquatic habitats are similar to alternative B.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Freshwater and Wetland Habitats (cont.)</b> <i>Impacts that would not vary by Alternative (cont.)</i>			
Regardless of which CCP alternative we select, we would develop a Habitat Management Plan for wetland habitats, and we would mitigate any potential for major unplanned changes in vegetation by continuously monitoring our vegetation types and updating our Geographic Information System database. A trapping program in all alternatives would maintain furbearer populations at levels compatible with the habitat and with refuge objectives, and minimize beaver damage to plant communities and refuge roads and trails. Indirect impacts could result from the activity of placing traps as it could disturb or displace migratory birds utilizing wetlands for wintering or foraging habitat during seasonal migrations. Direct impacts would include the harvest of targeted species, and the potential to harvest non-targeted species. (cont.)			
<p>Selective patch cuts within acres of aspen woodlands would create short and long-term benefits by improving habitat for a diversity of wildlife species and focal wildlife species.</p> <p>Benefits to rare plant communities and wildlife from beaver management of 685 acres and 55 stream miles outweigh decreased open water acreage that will result from beaver management activities.</p>	<p>Aspen stand management and establishment of demonstration sites would cause short-term negligible, localized impacts.</p> <p>Impacts to open water and aquatic habitats are similar to alternative A.</p> <p>Reforestation of riparian corridors would increase benefits to riparian wetlands by improving connectivity and increasing corridor width.</p> <p>Disturbance to wildlife and plant species would be minimized by protecting beaver ponds and adjacent habitats from disturbance.</p>		

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Fisheries Habitats and Resources</b> <i>Impacts that would not vary by Alternative</i>			
Regardless of which management alternative we select, the Blackwater River watershed fisheries will continue to benefit from Service protection of the part of the watershed that provides good cover, food, and breeding habitat. Prescribed burning to maintain grasslands and silvicultural practices used to restore and enhance upland forested ecosystems may cause short-term, minimal, localized increases in turbidity. Controlling invasive plants with herbicides would not affect fisheries because the herbicide we would use is not toxic to fish or invertebrates, and quickly absorbs to suspended and bottom sediments. A law enforcement presence would help prevent the illegal taking of fish, littering, or trespassing.			
<p>Protecting 166 acres of streams, rivers, and open water within the Blackwater River watershed will benefit refuge fisheries watershed protection.</p> <p>Stocking non-native brown trout impacts native brook trout populations by shifting microhabitat use, altering vertical distribution, and in some cases has preceded the disappearance of native brook trout populations.</p> <p>Refuge visitors who boat and fish may cause localized, minor, short-term impacts by disturbing the bottom substrate in shallow areas. Discarded items such as fishing line, lures, and plastic containers present a risk for waterfowl and other birds. Brochures and signage would notify those visitors of proper precautions, including retrieving broken line and lures and carrying out all trash.</p>	<p>Short and long-term benefits to refuge fisheries would be expected from wetland and riparian area restoration activities.</p> <p>Increasing visitor use would directly impact native fish populations through increased fishing pressure and indirectly through trail degradation at river and stream crossings.</p> <p>Construction and restoration projects may cause localized, short-term effects to fish populations through increased soil erosion and sedimentation into refuge waterways. The refuge will adhere to BMPs to minimize any potential impacts.</p>	<p>Benefits from alternative C, although similar to alternative B, would lessen in the short-term from increased refuge construction projects and in the long-term from increased visitor use.</p>	<p>Benefits from alternative D are the same as alternative B plus:</p> <p>Increased benefits to native fish from limited vehicle access, decreased trail miles, decreased visitor use, and working with WVDNR to stock native fish in the Blackwater River.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Threatened and Endangered Species</b> <i>Impacts that would not vary by Alternative</i>			
<p>In all alternatives, the refuge will continue to protect known populations of Cheat Mountain salamanders and continue to conduct surveys to locate undocumented populations. Cheat Mountain salamander monitoring and research, conducted by the refuge and partners, will continue to focus on better understanding their habitat limitations, ways to improve their habitat, and mitigation to further recovery efforts on the refuge and other sites where populations are known or are likely to occur. On the refuge, long-term benefits to Cheat Mountain salamander populations are expected from red spruce restoration projects designed to increase acreage and connectivity of suitable habitat where populations have been documented. Under all alternatives, the continued maintenance of commercial cross-country skiing and snowshoeing trails would perpetuate a narrow trail corridor through occupied salamander habitat. However, the corridor itself is not considered suitable living habitat for the salamander and it is anticipated that the presence of the corridor does not completely limit movements across this trail. The refuge will continue monitoring efforts for Indiana bats to determine foraging locations and extent of use on the refuge and conduct mist-netting surveys to verify presence of Indiana bats under all alternatives.</p>			
<p>Long-term benefits to Cheat Mountain salamander populations are expected from red spruce restoration projects by increasing acreage and connectivity of suitable habitat.</p> <p>Indiana bat surveys would increase knowledge of their presence and habitat use, providing long-term benefits by focusing restoration on their habitat requirements. If roosting colonies exist on the refuge, disturbance from visitor use would affect Indiana bats.</p>	<p>Additional benefits to Cheat Mountain salamander populations would be expected from reforestation of logging roads and edges of cross-country ski trails (Powderline and Three-Mile), and installing trail diverters.</p> <p>Restoration in riparian, early-successional and forested wetland habitats would benefit Indiana bats by increasing and improving foraging habitat.</p> <p>The refuge's management activities are not likely to adversely affect Cheat Mountain salamanders or Indiana bats.</p>	<p>Benefits and impacts are similar to alternative B for Cheat Mountain salamanders.</p> <p>If Indiana bat maternity or roosting colonies exist within the off-trail use zone (open during hunting season), visitor disturbance could affect those colonies. The refuge will minimize impacts by increasing monitoring efforts to determine Indiana bat presence.</p>	<p>Alternative D would have the greatest long-term benefits to Cheat Mountain salamanders. Immediately closing and completely reforesting Powderline and Three-Mile cross-country ski trails would recreate microhabitat conditions necessary for salamander occupation.</p> <p>Benefits to Indiana bats would be similar to alternative B.</p>

Alternative A: Current Management	Alternative B: Species Focus	Alternative C: Emphasis on Expanding Priority Public Uses	Alternative D: Focus on Managing for Historic Habitats
<b>Public Use and Access</b>			
<i>Impacts that would not vary by Alternative</i>			
<p>Regardless of alternative, we would continue to allow compatible, wildlife-oriented public uses including hunting, fishing, observing, and photographing wildlife through hiking, biking, vehicle driving and horseback riding. We would also continue to allow cross-country skiing and snowshoeing to facilitate wildlife observation and photography in the winter, when access on foot is difficult. We would continue to provide the public with wildlife interpretation and environmental education opportunities. To support public use, we would continue to maintain the refuge facilities including the refuge headquarters, visitor's center, parking lots, observation platforms, hunt blinds, kiosks, and trails. We will evaluate public use sites and programs periodically to assess whether they are meeting the objectives, and to prevent site degradation. A refuge trail monitoring plan addresses the potential physical impacts of trail beds, including percent trail incision, exposed roots and puddles.</p>			
<p>The refuge would continue to allow compatible, wildlife oriented public uses including hunting, fishing, observing and photographing wildlife through hiking, biking, and horseback riding. We also allow cross-country skiing and snowshoeing to facilitate wildlife observation and photography in the winter.</p> <p>Adverse impacts from permitting leashed dogs to accompany visitors on refuge trails are the greatest under this alternative because there is no stipulation on leash length.</p>	<p>Increased visitation and increased opportunities for consumptive and non-consumptive uses would combine to increase the risk of human-wildlife conflicts and habitat damage, minor accidents that will require law enforcement assistance, and parking issues during times of heavy use.</p> <p>Leash length for dogs would be 8 feet, thus minimizing the zone of disturbance from dogs who accompany visitors.</p>	<p>Impacts are similar to alternative B. However, the extent of impacts and disturbance to wildlife and habitats would increase from: an off-trail use zone, additional trail construction and use, and increased visitation by consumptive and non-consumptive users.</p> <p>Adverse impacts from permitting leashed dogs to accompany visitors on refuge trails are the same as alternative B.</p>	<p>Alternative D would have benefits and minimal impacts similar to alternative A.</p> <p>Adverse impacts from permitting leashed dogs to accompany visitors on refuge trails are the same as alternative B.</p>

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