ENVIRONMENTAL ASSESSMENT
CUMBERLAND GAP NATIONAL HISTORICAL PARK
FIRE MANAGEMENT PLAN

August 8, 2016

Submitted to:

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PUBLIC COMMENT OPPORTUNITY

Public, or external, scoping was conducted through the National Park Service (NPS) Planning, Environment and Public Comment website where a scoping notice and brochure were posted on January 4, 2016, to inform the public of the proposed project. The scoping brochure was also sent to the Cumberland Gap National Historical Park's mailing list to solicit feedback for the environmental assessment (EA). The public scoping period ended on February 3, 2016. Six comment letters or forms from the public and non-consulting governmental organizations were received during the public scoping period. Letters were also mailed to the appropriate U.S. Fish and Wildlife Service offices, three State Historic Preservation Offices (SHPO), and tribes to introduce the project and request comments. The Draft EA reflects comments received from all entities during the public scoping period.

The Fire Management Plan (FMP) EA will be available for public comments for 30 days; comments are due September 6, 2016. The park will host a public meeting on Tuesday, August 30 at the Park Visitor Center, starting at 6:30pm. The Cumberland Gap National Historical Park Visitor Center is located on U.S. Highway 25E just south of Middlesboro, Kentucky. Members of the public are encouraged to attend to learn more about the Fire Management Plan and analysis contained within the EA.

Copies of the EA will be provided to interested individuals upon request. Reviewers should provide comments on the EA during the review period. Comments on the EA should be specific and discuss the adequacy of the analysis and the merits of the alternatives discussed. Following closure of the review period, all public comments will be reviewed and analyzed prior to release of the decision document. The NPS will issue responses to any substantive comments received during the review period and will make appropriate changes to the EA as needed.

If you wish to comment on this EA please go to: http://parkplanning.nps.gov/CUGA. The "open for comment link" on the left hand side provides access to the EA. Comments can also be submitted by mail to the address below. Comments must be submitted by August 5, 2016. Comments cannot be received by email.

Superintendent
Cumberland Gap NHP
Attn: Fire Management Plan
91 Bartlett Park Road
Middlesboro, KY 40965

Before including your address, telephone number, e-mail address, or other personal identifying information in your comments, you should be aware that your entire comment (including personal identifying information) may be publically available at any time. While you may include in your comment direction to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

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Acronyms and Abbreviations

AQRV	air quality related value
BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
DO	Director's Order
EA	environmental assessment
ESF	Environmental Screening Form
FMP	Fire Management Plan
MIST	Minimum Impact Strategy and Tactics
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_x	nitrogen oxide(s)
NPS	National Park Service
NWCG	National Wildfire Coordinating Group
O_3	ozone
park	Cumberland Gap National Historical Park
Pb	lead
PM_{10}	particulate matter less than 10 microns in size
$PM_{2.5}$	particulate matter less than 2.5 microns in size
PMS	Product Management System
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

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1 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The National Park Service (NPS) is considering actions at Cumberland Gap National Historical Park (park) to manage wildland fire and conduct related fire management activities. This environmental assessment (EA) describes the effects of the proposed project on the human environment and provides an opportunity for the public to comment on the proposed project in accordance with the National Environmental Policy Act of 1969 (NEPA), Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500–1508), and other applicable laws, regulations, and policies.

NEPA requires that every federal agency conduct an analysis of impacts for "major Federal actions significantly affecting the quality of the human environment," along with alternatives to those actions. Agencies are required to make informed decisions based on analysis conducted under NEPA and input obtained from the public and interested stakeholders. This EA complies with NEPA, the U.S. Department of the Interior's NEPA regulations (43 CFR 46), and NPS Director's Order (DO) 12, its accompanying Handbook (2015), and supplemental guidance. This EA also analyzes the effects of the project on historic properties in accordance with Section 106 of the National Historic Preservation Act and federally listed species in accordance with Section 7 of the Endangered Species Act.

This document provides for review of alternatives relative to the implementation of the park's programmatic Fire Management Plan (FMP). In that context, the EA generally characterizes habitat types and special features of the park, such as federal and state listed species, proposed wilderness, and cultural resources (see Section 3 for a full description of all resources analyzed in this EA). Upon completion of this EA and FMP, project-level planning, i.e., prescribed burn plans, would be formulated with greater specificity and attention to special features associated with each project area. Endangered species consultation, unique habitat and wetland assessment, wilderness management policy, and cultural resource consultation would be conducted for each prescribed burn unit plan, where applicable. Listed species and wetlands are in discrete and limited areas in the park and, therefore, the preponderance of prescribed burning would be conducted in areas where these features are not present.

The term wildland fire is used throughout this EA, as defined in NPS Reference Manual 18: Wildland Fire Management (NPS 2014a:Chapter 2, pg. 1). The definition is summarized here for the reader. Wildland fire is a general term describing any non-structure fire that occurs in vegetation and/or natural fuels. There are two types of wildland fire: planned ignitions or unplanned ignitions. Planned ignitions are also referred to as prescribed fire or prescribed burns. Prescribed fire is any fire intentionally ignited by management under an approved plan to meet specific objectives. Unplanned ignitions are those fires not intentionally ignited by management and are also referred to as wildfire. A prescribed fire that has expanded beyond the prescribed burn plan, or escaped, is considered a wildfire. These terms are used throughout the EA and are visually summarized in Figure 1.1.

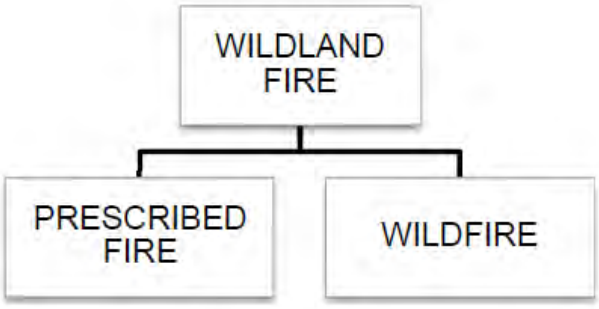

FIGURE 1.1. TYPES OF WILDLAND FIRE AS DEFINED IN NPS REFERENCE MANUAL 18 (NPS 2014A:CHAPTER 2).

1.2 PURPOSE AND NEED OF THE ACTION

The purpose of the federal action is to update the FMP for the park to comply with the NPS's wildland fire policy directives and DO 18, Wildland Fire Management. DO 18 requires that parks "with burnable vegetation must have an approved Fire Management Plan that will address the need for adequate funding and staffing to support its fire management program" (NPS 2008a). In addition, the purpose of the revision is to allow for the use of unplanned ignitions for multiple objectives, including resource benefits, and to incorporate approximately 4,000 acres of land acquired by the park since the 2004 FMP was approved (Figure 1.3).

The existing FMP for the park needs to be revised to meet current NPS policies. NPS, U.S. Department of the Interior, and interagency policies have changed since the 2004 FMP was written. Revisions and updates have been made to NPS Reference Manual 18 (NPS 2014a) to comply with the 2009 Guidance for Implementation of Federal Wildland Fire Management Policy (U.S. Department of the Interior and U.S. Department of Agriculture 2009). Federal fire policy allows wildland fires, which consist of either prescribed fire or wildfire, to be managed concurrently for multiple objectives, including resource benefit. However, wildland fires cannot be managed to accomplish resource objectives until there is an approved and current FMP. Therefore, there is a need to revise the park's FMP.

The park currently has an active prescribed fire program, which is used to reduce the threat of destructive wildfires and to achieve resource objectives. Fire management activities are needed to reduce hazardous fuels within the forest and re-establish the historic role of fire in the park, which is demonstrated by the evidence of fire occurrence in the southern Appalachians for nearly 10,000 years (Delcourt and Delcourt 1998; Hart et al. 2008; Fesenmyer and Christensen 2010; Underwood 2013). Such studies provide evidence that prehistoric fires were associated with the development of pine (*Pinus* sp.), oak (*Quercus* sp.), and chestnut (*Castanea* sp.) forests, of which pine and oak are still common in the park today.

Dendrochronology (tree-ring) studies in Kentucky, Virginia, Tennessee, and North Carolina provide additional evidence of fires that have occurred in the Appalachian region for more than 300 years (Harmon 1982; Aldrich et al. 2010; LaForest 2012; Flatley et al. 2013; McEwan et al. 2013). In general, all of these researchers have documented the frequent occurrence of fire during historic times, with an average fire return interval of 5 to 15 years, within oak and pine forests. These same studies also tell us that fires have been largely nonexistent over the past 60 to 80 years (Aldrich et al. 2010; Flatley et al. 2013; McEwan et al. 2013), which corresponds with the national fire suppression management approach starting around the early 1930s.

Researchers have documented changes to the pine and oak forests since at least the 1980s (Harmon 1982; Abrams 1992; Turrill et al. 1995; Harrod et al. 1998; Flatley et al. 2015). In general, these studies have shown that since fires have become less frequent, large numbers of shade- and fire-tolerant, and drought-intolerant

trees have "invaded" pine and oak forests in the southern Appalachians. The fire-intolerant species that most affect the park's forests include red maple (*Acer rubrum*) and black gum (*Nyssa sylvatica*), among others. Increased numbers of these species have led to heavy shading in these forests, which diminishes the ability of pines and oaks to regenerate. The lack of fire has also caused a buildup of thick duff and litter on the forest floor, which further contributes to the failure of oak and pine regeneration. Today, as the oldest pine and oak trees die from old age, windthrow, insects, etc., they are replaced by these invader species, resulting in the conversion of open, sunny pine and oak woodlands to closed forests of maple and other hardwoods.

These same processes of shading and fuel buildup have reduced the abundance and productivity of sun-loving herbs and grasses, which have largely disappeared from these forests (Harrod et al. 2000). The loss of stable, fire- and drought-resistant forests and the resultant loss of species diversity in the herb layer have tremendous negative implications for other taxa (insects, birds, reptiles, etc.) that have depended on open, fire-maintained pine and oak woodlands for hundreds or even thousands of years.

The revision of the FMP is needed to allow fire management activities to continue within the park, including the newly acquired 4,000 acres, in order to reverse the negative resource trends described above and to reduce the risk of high-intensity wildfire.

1.2.1 Fire History of the Park

Park fire history records, as reported in the Department of the Interior Wildland Fire Management Information reporting system, show that there have been 134 wildfires (unplanned events), burning approximately 3,700 acres, in the park from 1974 to 2015. Figure 1.2 shows the total acres burned by wildfires per year. Thirteen of the fire events are reported as natural ignitions and the remaining 121 wildfires are reported as human caused. The average wildfire size within the park, based on fire history data, is 28 acres, with 107 fire events reported to burn 10 acres or less. Nine fire events were more than 100 acres in size, with the two largest fires in the park's history reported at 631 acres (in 1986) and 953 acres (in 1976). On average, three unplanned fire events occur within the park annually. In 2005, the park initiated their prescribed fire program. Twenty-six prescribed burns have occurred since 2005, treating a total of 4,019 acres.

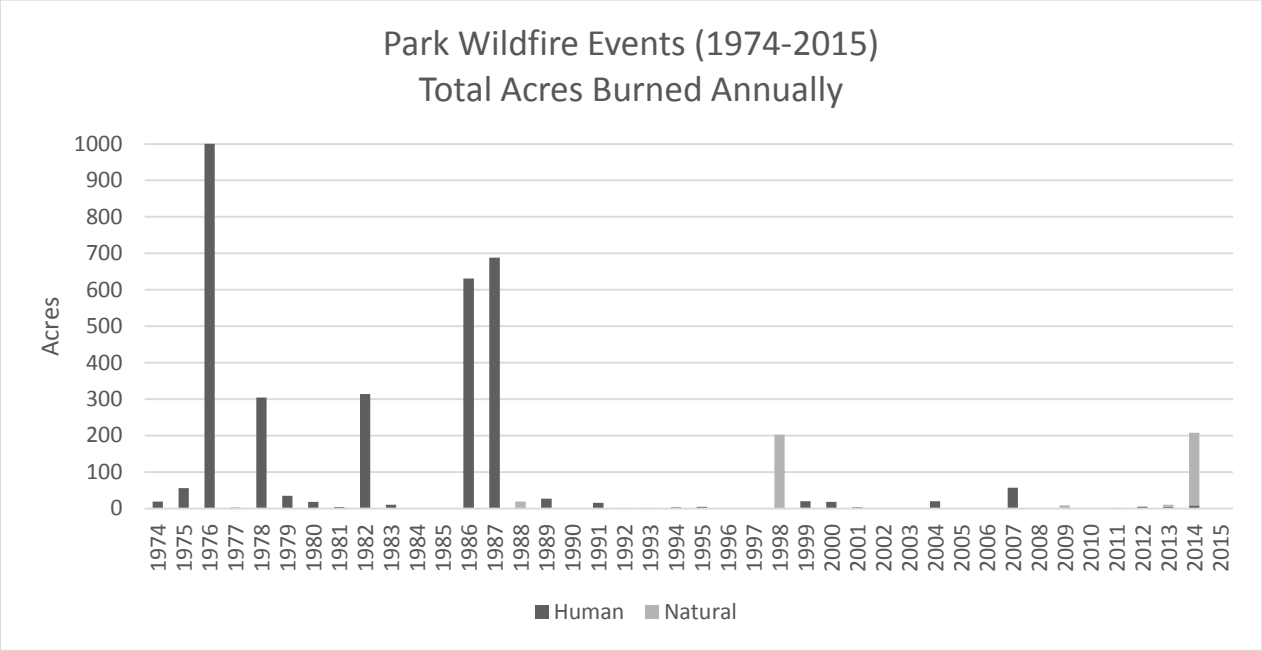

FIGURE 1.2. THE PARK'S WILDFIRE HISTORY BY FIRE CAUSE (HUMAN OR NATURAL).

1.2.2 Objectives in Taking Action

NPS Reference Manual 18 requires all parks with vegetation capable of sustaining fire develop an FMP to meet the specific resource objectives for that park and to ensure firefighter and public safety are not compromised. NPS Reference Manual 18 identifies wildland fire management activities as "essential to the accomplishment of the NPS mission" (NPS 2014a:Chapter 1, pg. 4).

NPS Reference Manual 18 cites the federal fire cohesive strategic goals:

1. Restore and maintain landscapes: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
2. Create fire-adaptive communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.
3. Respond to wildfire: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

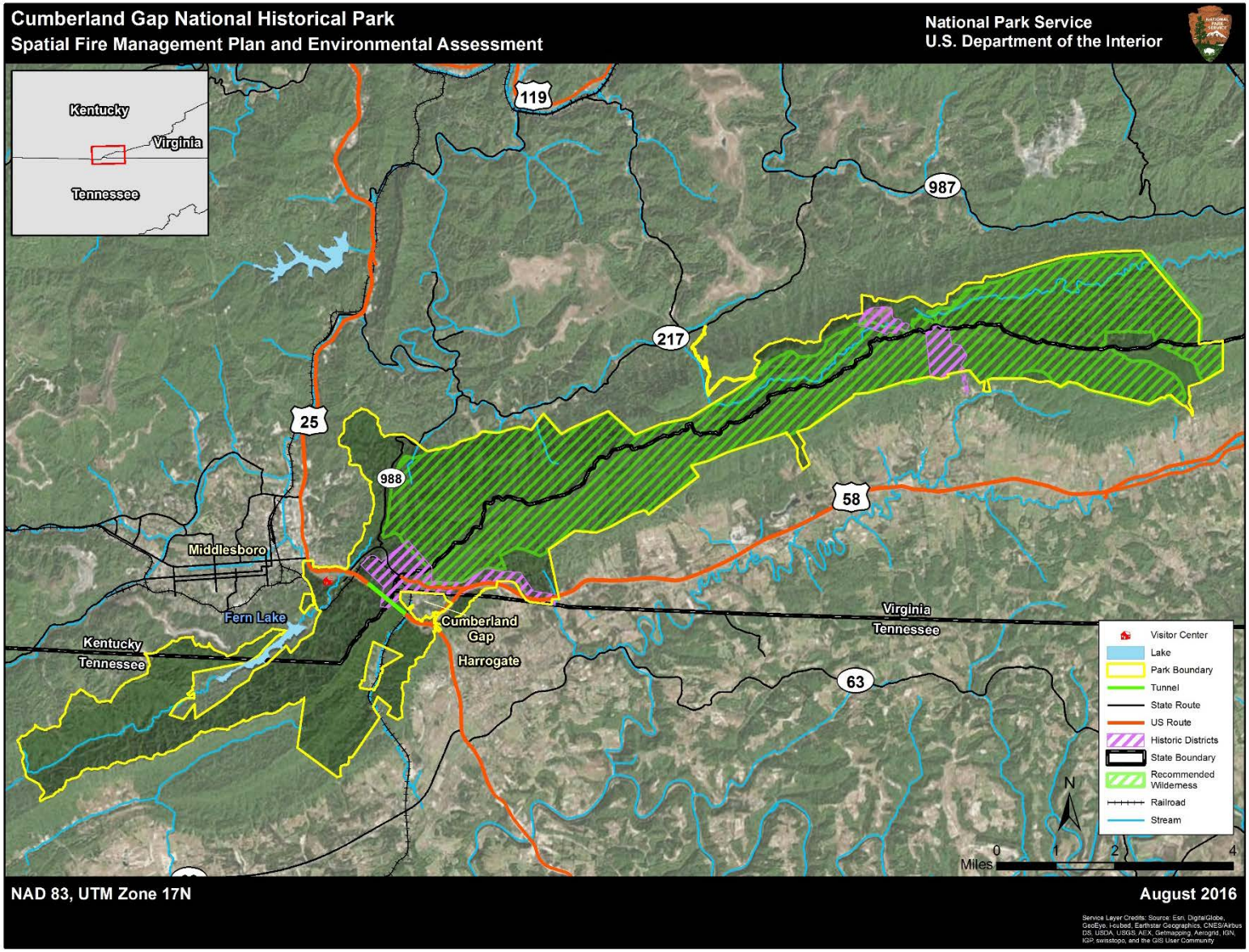

FIGURE 1.3. CUMBERLAND GAP NATIONAL HISTORICAL PARK.

1.3 SCOPING

Scoping is an early and open process to determine the scope of environmental issues and alternatives to be addressed in the EA. Both internal (with NPS staff) and external (with the public) scoping was conducted for the proposed FMP.

1.3.1 Internal Scoping

Internal scoping was conducted on November 4, 2015, by an interdisciplinary team of professionals from the park and the NPS Southeast Regional Office, including representatives from the Cumberland Gap Wildland Fire Module, fire management, resource management, law enforcement, the park superintendent, and the private contractor team responsible for writing the EA and FMP. The interdisciplinary team discussed the following project elements:

- Project overview and review of the 2004 FMP;
- Communication protocols for the project;
- The purpose and need statement and definition of project objectives;
- Issues to be discussed and analyzed in the EA;
- The NPS Environmental Screening Form (ESF); and
- Data needs for subsequent project milestones.

Internal scoping was facilitated using the NPS ESF. All resources listed on the form were thoroughly reviewed and discussed by the interdisciplinary team. The ESF was ultimately updated and used to inform the development of the Draft EA.

1.3.2 Public Scoping

The public scoping period for the FMP EA was advertised from January 4 to February 3, 2016. A copy of the public scoping brochure was posted on the NPS Planning, Environment and Public Comment website and sent to the park's mailing list. In total, six public comment letters from individuals and non-consulting governmental organizations were received during the 30-day public scoping period. Table 1.1 summarizes the nature of the public scoping comments received and a summary of how the comment is addressed in this EA.

TABLE 1.1. PUBLIC SCOPING COMMENTS RECEIVED FOR PROPOSED PROJECT

Issue	Commenter	Comment Treatment
Trail maintenance may be necessary to clear downed trees and vegetation after fire management activities occur.	Pine Mountain Trail Conference	Section 3.10 addresses impacts to visitor use and experience.
Volunteer crews could be trained to inspect and clear downed trees from trails after fire management activities occur.	Pine Mountain Trail Conference	The comment is outside the scope of the Proposed Action. Volunteer activities can be coordinated by the park as deemed necessary.
Accessible demonstration sites could be established to provide public education opportunities about the history of fire on the landscape.	Staff member from Tennessee Division of Forestry	This comment is outside the scope of the Proposed Action. Demonstration plots and other interpretive activities can be established by the park as deemed necessary.

Issue	Commenter	Comment Treatment
Fire on steep south-facing slopes in the Virginia portion of the park can be fast developing, destructive, scarring, and difficult to control under certain circumstances. The commenter recommends that the FMP recognize the value of early extinguishment under elevated fire conditions in this area.	Thomas Walker Volunteer Fire Department	Comment to be incorporated into the FMP. Section 2.2.3 describes the range of fire management strategies that would be applied under the Proposed Action and incorporated into the FMP.
The commenter recommends that all ignitions be assessed as to the expected impact to resources rather than the origin dictating the action plan.	Thomas Walker Volunteer Fire Department	Comment to be incorporated into the FMP. Section 2.2.1 summarizes Minimum Impact Strategy and Tactics that would be applied to wildland fire occurrences within the park.
The plan should encourage the regular maintenance of all park roads and trails. A well-maintained trail system enhances safety to both emergency operations and the visiting public.	Thomas Walker Volunteer Fire Department	Comment noted. Although the park agrees that well-maintained access routes are important for safely managing wildland fire, neither this EA nor the FMP identifies specific routes to be improved as part of the Proposed Action. Instead the FMP would identify potential access routes within the park. The status and quality of access routes would be incorporated into event-specific prescribed burn plans and wildfire response plans.
The departure from an expectation of total suppression within the park would increase the potential for managed fires to accidently expand beyond their planned borders. Managed fires that turn into wildfires have the potential for negative impacts on private lands, and these fires would likely result in larger and more expensive fire suppression operations than would normally be the case.	Virginia Department of Forestry	Comment noted. Section 2.2.3 describes the range of fire management strategies that could be applied to wildland fire within the park, depending on the conditions in which a fire occurs. The use of wildland fire for multiple objectives is described in detail. It is important to note that wildfires managed for multiple objectives would not be allowed to cross the park boundary without agreement of the adjacent jurisdictional agency. Section 2.2.4 describes the range of fuel management strategies the park could apply to manage hazardous fuels to reduce the chance of a high-intensity wildfire from occurring.
The Virginia Department of Forestry requests that it be provided with 1) notification when the decision is made to manage an unplanned ignition for resource benefits on any fire that is burning or could threaten any lands in Virginia and 2) daily notification of fire status, projected movement, and evaluation of risk to private and state lands until the fire is controlled.	Virginia Department of Forestry	Comment to be incorporated into the FMP. Section 2.2.5 generally describes the level of communication and cooperation that would be included in the FMP.
The commenter provides information from the Division of Natural Heritage's Biotics Data System for occurrences of natural heritage resources in the project vicinity.	Virginia Department of Conservation and Recreation	Section 3.6 addresses impacts to vegetation, including rare and threatened and endangered plants identified as likely present within the park. Section 3.7 addresses impacts to wildlife, including threatened and endangered animals identified as likely present within the park.
Support for the re-introduction of fire within the park and the inclusion of an additional 4,000 acres in the revised FMP.	Middlesboro Coca-Cola Bottling Works, Inc.	No treatment necessary for letter of support for Proposed Action.

Refer to Section 4, Consultation and Coordination, for more information about the scoping period, including correspondence with U.S. Fish and Wildlife Service (USFWS) offices, State Historic Preservation Offices (SHPOs), and Native American tribes.

1.4 ISSUES

The purpose of this EA is to analyze anticipated impacts resulting from the Proposed Action and alternatives on resources, park visitors, and neighbors. Issue statements were developed to focus the impacts analysis contained in Section 3 on those issues of critical importance relating to the park and the Proposed Action. Issue statements were developed from the questions and comments brought forth during scoping, staff knowledge of park resources, and laws, regulations, policies, or orders applicable to the proposed project. Some issues were eliminated from detailed analysis because the issue is not relevant to the Proposed Action, a particular resource is not present within the proposed project area, or because the Proposed Action and alternatives would have no impact.

1.4.1 Issues Retained for Analysis

The issues identified during scoping that are evaluated in this EA are summarized in Table 1.2, including rationale for retaining the topic and relevant laws, regulations, and policies.

TABLE 1.2. ISSUES RETAINED FOR DETAILED ANALYSIS

Resource	Issue associated with resource	Relevant Laws, Regulations, and Policies
Air quality	Air quality would be impacted from both prescribed fire and wildfire occurrences within the park. The impact of smoke to local community members and park visitors would depend on weather conditions when fires are active and an individual's sensitivity to smoke. Prescribed burn plans would follow smoke management best management practices. Section 3.3 addresses impacts to air quality.	NPS Organic Act of 1916, as amended; Clean Air Act, as amended; NPS Reference Manual 18; Resource Management Guidelines (DO 77); Reference Manual 77; NPS Management Policies 2006; NEPA
Geology and soils	Cave and karst resources are located within the park and could be adversely impacted by fire management activities. In addition, sensitive soils and steep slopes could be adversely impacted, especially during wildfires. Section 3.4 addresses impacts to geology and soils.	NPS Management Policies 2006; NEPA; Federal Cave Resources Protection Act of 1988
Water resources, including floodplains and water quality	Fire management activities could adversely impact water resources, including floodplains and water quality. The headwaters of several streams are found in the park and Fern Lake is a water source for the City of Middlesboro, Kentucky. Davis Branch of Little Yellow Creek and Shillalah Creek are designated outstanding state resource waters by the State of Kentucky. Section 3.5 addresses impacts to water resources.	NPS Organic Act of 1916, as amended; Clean Water Act, as amended; Executive Order 11988; Resource Management Guidelines (DO 77); DO 77-2 Floodplain Management; NPS Management Policies 2006; NEPA; 401 Kentucky Administrative Record 10:031
Vegetation, including nonnative species and special status species	The Proposed Action could result in the temporary removal of vegetation, including state-identified rare plant species. Several vegetation types located in the proposed project area could be impacted by the implementation of the FMP. The project would also occur in some areas targeted for nonnative species eradication, where treatments considered under the Proposed Action are suitable for nonnative species management. Section 3.6 addresses impacts to vegetation.	NPS Organic Act of 1916, as amended; NPS Management Policies 2006; Resource Management Guidelines (DO 77); Federal Noxious Weed Control Act; Executive Order 13112 for Invasive Species; NEPA; Kentucky Rare Plant Recognition Act; Tennessee Rare Plant Protection and Conservation Act; Virginia Endangered Plant and Insect Species Act
Wildlife, including nonnative species and special status species	Fire management activities have the potential to impact wildlife species known to occur within the park, including both special status species and nonnative species. There are three federally listed species known to occur in the park: blackside dace (*Phoxinus cumberlandensis*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*M. septentrionalis*). Section 3.7 addresses impacts to wildlife species.	NPS Organic Act of 1916; NPS Management Policies 2006; Resource Management Guidelines (DO 77); Fish and Wildlife Coordination Act of 1934 (Public Law 85-624) as amended; Executive Order 12088; Migratory Bird Treaty Act; Endangered Species Act of 1973; NEPA

Resource	Issue associated with resource	Relevant Laws, Regulations, and Policies
Cultural resources, including archeological resources and cultural landscapes	The park is home to three historic districts and numerous other cultural resources, including but not limited to prehistoric archeological sites, Civil War fortifications, and historic settlements. There are several cultural landscapes associated with the historic use of the park. Fire management activities could adversely impact these cultural resources, especially during a wildfire. Section 3.8 addresses impacts to cultural resources.	National Historic Preservation Act; Executive Order 11593; Protection and Enhancement of the Cultural Environment; Archeological Resource Protection Act; Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Agreement Among the NPS; Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (2008); NPS Management Policies 2006; DO 28; NEPA
Utilities and transportation	The park provides a critical transportation corridor for Kentucky, Tennessee, and Virginia for both highway travelers and rail transport. In addition, several electric transmission lines, pipelines, and natural gas wells occur within the park. Fire management activities have the potential to adversely impact utilities and transportation infrastructure. Section 3.9 addresses impacts to utilities and transportation.	NPS Management Policies 2006; NEPA
Visitor use and experience	Fire management activities could disrupt visitor use and experience in the form of trail closures, smoke, or noise from site-specific treatment implementation. Section 3.10 addresses impacts to visitor use and experience.	NPS Management Policies 2006; NEPA
Recommended wilderness	The park contains 14,091 acres of recommended wilderness. Fire management activities have the potential to impact wilderness character. Section 3.11 addresses impacts to recommended wilderness.	NPS Management Policies 2006; NEPA; Wilderness Act of 1964; DO 41 and NPS Reference Manual 41

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1.4.2 Issues Considered and Dismissed from Further Consideration

The following issues were eliminated from consideration because either the resources are not present in the areas proposed for management implementation or because there are no anticipated impacts to the resource from the alternatives.

Wetlands

Wetlands occur within the park and may be located in areas where fire management activities would be implemented under the Proposed Action (NPS 2013). NPS policy (DO 77-1) states that activities with the potential to adversely impact wetlands are subject to the NPS procedures for implementation of Executive Order 11990 (NPS 2012). These are activities with the potential to degrade any of the natural and beneficial biotic, cultural, and other functions and values of wetlands. Examples of activities with the potential to adversely impact wetlands include water diversion, pumping, flooding, dredging, channelizing, filling, nutrient enrichment, impounding, placing of structures or other facilities, and other activities that degrade natural wetland processes, functions, or values. Neither alternative considered in this EA proposes any of these activities. In fact, one of the objectives of the FMP revision would be to manage for long-term beneficial impacts to wetlands within the park.

NPS Procedural Manual 77-1: Wetland Protection identifies actions that may be excepted from the statement of findings requirement and compensation requirements outlined in DO 77-1 (NPS 2012). The Proposed Action is intended to either avoid activities within wetlands or result in mostly beneficial impacts to wetlands. The Proposed Action, which includes the use of prescribed fire and management of wildland fire for multiple objectives, would allow for planned fire management activities in areas of the park where wetlands may occur. Direct disturbance within wetlands would be avoided to the extent possible. Fire management activities in areas where wetlands may occur would either be 1) emergency actions needed to manage a wildfire or 2) short-term disturbances within wetlands that would be necessary to implement fire management activities intended to restore the wetland. Best management practices (BMPs) and other conditions specifically identified in the procedural manual Appendix 2 will be followed as well as mitigation measures and BMPs identified in Section 2.3 of this EA.

The Proposed Action, revision of the FMP, would not result in new adverse impacts to wetlands regulated by Section 10 of the Rivers and Harbors Act, Section 404 of the Clean Water Act, Executive Order 11990 Protection of Wetlands, the Coastal Zone Management Act, NPS DO 77-1 Wetland Protection and its accompanying Procedural Manual DO 77-1: Wetland Protection, and the NPS no net loss of wetlands goal. Therefore, a DO 77-1 "Wetland Statement of Findings" is not required.

Soundscapes

A park's natural soundscape encompasses the natural sounds that occur in the park, including the physical capacity for transmitting those natural sounds and the interrelationship among park natural sounds of different frequencies and volumes (NPS 2006). The implementation of the FMP would include periodic noise from mechanical equipment, all-terrain vehicles, and possible use of helicopters. The noise contributed to the park's soundscape from the Proposed Action would be temporary, infrequent, and dispersed over different parts of the park at different times. Implementation of the FMP is not expected to change the character of the soundscape within the park; therefore, this topic was dismissed from further analysis.

Socioeconomics

Implementation of the FMP is not expected to impact the population, income, or employment base of neighboring communities. The Proposed Action would not have a measurable impact on the local or regional economy. Proposed fire management activities would require the need for additional personnel during

prescribed burns or suppression events. Also, short-term park closures may be necessary to protect public health and safety during planned and unplanned ignitions.

The park coordinates guided tours of the Gap Cave and Hensley Settlement. Closures due to fire management activities may temporarily impact the tour schedules. However, these types of closures for maintenance or weather-related purposes already occur, as needed. This temporary closure would not result in a socioeconomic impact; therefore, this impact topic was dismissed from further analysis.

Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs agencies to address environmental and human health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations. The population demographics were reviewed for the communities adjacent to the park, including Middlesboro in Bell County, Kentucky; Harlan in Harlan County, Kentucky; Cumberland Gap and Harrogate in Claiborne County, Tennessee; and Lee County, Virginia. Portions of Bell, Harlan, Claiborne, and Lee Counties are considered environmental justice communities based on low-income levels reported by the U.S. Census Bureau (2015) and the U.S. Environmental Protection Agency's (EPA's) EJSCREEN (EPA 2016a). Other areas around the park may also include low-income and minority populations, but these populations would not be disproportionately adversely affected by the activities associated with the implementation of an FMP. Therefore, this topic was dismissed from further analysis.

Public Health and Safety

In accordance with NPS Management Policies (2006), the NPS would seek to provide a safe and healthy environment for visitors and employees. Due to the emphasis placed on safety in all federal fire management policies and the current park practice of using available resources to notify the public of planned and unplanned ignitions, the revision of the FMP is not anticipated to impact public health and safety. Potential impacts of fire management on public health from the release of airborne constituents are discussed in Section 3.3, Air Quality, and potential impacts to visitor safety are addressed in Section 3.10, Visitor Use and Experience.

Operational guidance directs all fire management activities to be conducted to enhance and provide resource benefit and mitigate risk from unwanted wildfire while providing for firefighter and public safety. All actions would conform to safety policies defined in, but not limited to, the Interagency Standards for Fire and Fire Aviation Operations Guide (Red Book), DO 18, and the Standards for Operations and Safety chapter in NPS Reference Manual 18 (NPS 2014a).

Firefighter safety is of primary concern and its procedures are dictated by laws, regulations, policies, and guidelines. National fire policy states that firefighter safety is the first priority in fire management activities. DO 18 makes similar commitments. Firefighter safety is common to both alternatives and would not differ in either alternative. In addition, firefighter safety procedures are updated frequently and would be followed regardless of the alternative implemented. Therefore, this topic was dismissed from further analysis.

2 ALTERNATIVES CONSIDERED

NEPA requires federal agencies to explore a range of reasonable alternatives aimed at addressing the purpose, need, and objectives of the Proposed Action. The alternatives under consideration must include the "No Action" Alternative as prescribed by CEQ regulations for implementing NEPA (40 CFR 1502.14). This section describes two alternatives: the No Action Alternative and the Proposed Action (revision of the FMP).

2.1 ALTERNATIVE A: NO ACTION ALTERNATIVE

Based on definitions provided in NPS DO 12, the No Action Alternative considered in this EA would be no change in current management of the park as it relates to fire management activities. Under the No Action Alternative, the park's existing FMP would be outdated because it would not reference the current Federal Wildland Fire and NPS policies. The planned activities identified in the existing 2004 FMP could continue; however, new areas would not be treated using fire management activities. The existing FMP allows for prescribed burns to be used at the park. Mechanical treatments (e.g., mowing and using chainsaws to remove trees) to maintain existing defensible space around park buildings and sensitive resource sites would occur under the No Action Alternative. The management of wildland fire for multiple objectives, including resource benefit, would not occur under the No Action Alternative.

2.2 ALTERNATIVE B: PROPOSED ACTION (RECOMMENDED PREFERRED ALTERNATIVE)

The Proposed Action, the park's recommended preferred alternative, would implement a revised FMP for the park. The FMP would function at the programmatic level and accommodate changes in federal wildland fire policy, guidance, and practices from ongoing improvements in the science of wildland fire management. The FMP would provide a flexible range of options and activities that could be used to respond to changes in environmental conditions and the specific needs of fire management within the park. All actions described in the Proposed Action are consistent with the approved Cumberland Gap National Historical Park General Management Plan (NPS 2010), related park documents, and federal NPS policy. The Proposed Action would allow for implementation of a full range of fire management activities, including wildland fire suppression, the management of wildfire for multiple objectives, and fuels management (prescribed fire/mechanical treatments) within the entire park.

All fire management activities, including non-fire fuels treatments and prescribed burns, would be implemented using review and planning procedures in accordance with NPS DO 18 and Reference Manual 18. The FMP would include a multi-year fuels treatment plan, which would be reviewed and revised by the park on an annual basis. Proposals for fuels treatments would be identified in the multi-year fuels treatment plan. Individual non-fire treatment or prescribed burn plans would be completed for each project. All proposed fire management activities would be consistent with the objectives identified in the FMP. If compliance documentation for fuels management projects is not covered under the programmatic FMP/EA, those projects would undergo separate and independent review prior to approval in accordance with NPS Reference Manual 18.

The Proposed Action would be implemented to achieve the following objectives:

- Ensure firefighter and public safety during every fire management activity;
- Suppress all unwanted and undesirable wildfires;
- Use prescribed fire where and when appropriate as a tool to manage vegetation and wildland fuels;

- Modify fuel complexes around developed areas, along wildland urban interface boundary areas, and in proximity to cultural sites;
- Integrate fire as a natural process into the park's ecosystem to the fullest extent possible;
- Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements;
- Manage prescribed and wildfires in concert with federal, state, and local air quality regulations; and
- Promote public understanding of fire management programs and objectives.

The following resource management objectives apply to those parts of the landscape that are generally dry and fire prone. These areas are indicated by the presence of pine, dry-site oak species, or other indicators (certain herbs, grasses, etc.). The resource management objectives are as follows:

1. Reintroduce fire to approximate natural processes that have occurred on the park's landscape for thousands of years in order to maintain the native diversity within the park;
2. Reduce fuels to minimize the risk of severe wildfires and to facilitate restoration of fire-adapted species;
3. Reduce the stem density of fire-intolerant species to improve habitat for pine and oak regeneration; and
4. Maintain open pine and oak woodlands and forests that provide adequate habitat for native sun-loving herbs and grasses.

2.2.1 Minimum Impact Strategy and Tactics

Per NPS Reference Manual 18, "fire management requires the fire manager and firefighter to select management tactics commensurate with the fire's existing or potential behavior while causing the least possible impact on the resources being protected" (NPS 2014a:Chapter 2, pg. 1). Minimum Impact Strategy and Tactics (MIST) is the concept of using the minimum tool to safely and effectively accomplish a task (NPS 2014a). Adopting MIST also prioritizes firefighter safety above all other resources. MIST would be applied for all fire management activities within the park. NPS Reference Manual 18 provides a detailed list of MIST in Chapter 2, pg. 1 (NPS 2014a:Exhibit 2). The MIST list is not provided in this EA; however, a list of park-specific mitigation measures and BMPs is provided in Section 2.3 below.

2.2.2 Fire Management in Recommended Wilderness

All fire management activities affecting recommended wilderness within the park must utilize the minimum requirement analysis concept defined in NPS Management Policies and Director's Order 41. This planning tool and documentation process is used to determine whether administrative activities affecting wilderness resources or the visitor experience are necessary, and if so, what techniques and tools are needed to minimize impacts to the wilderness resource. The minimum requirement analysis is applied as a two-step process: (1) the NPS determines whether the proposed fire management action is necessary or appropriate for administration of the area as wilderness and does not cause a significant impact to wilderness resources and character; and (2) if the action is necessary/appropriate, the agency analyzes the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized.

Within the park, fire management is necessary in recommended wilderness to enhance wilderness character. More specifically, active management is necessary to restore a fire regime in wilderness that more closely approximates what would occur naturally but for the impact of past human activities, such as logging,

agriculture, and fire suppression. To do this, active manipulation is necessary in the short run to enhance the natural quality of wilderness in the long run. The primary resource objective of managed fires in wilderness would be to restore and maintain natural fire regimes and ecosystem stability by altering vegetative fuel conditions to within the range of natural variability. In that regard, Section 6.3.7 of Management Policies provides that active intervention in wilderness may be undertaken where necessary to correct past mistakes and the impacts of human use. Likewise, Section 6.3.9 of Management Policies and Director's Order 41, Section 6.7 authorize the use of wildland fire (including prescribed fire) in wilderness to reach desired future resource conditions, as established in park planning documents. Additional direction is provided by Section 4.4.1 of Management Policies, which directs park units to preserve and restore the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations, and the communities and ecosystems in which they occur.

Fire management procedures and tools related to wilderness would be described in the revised FMP and analyzed in a programmatic minimum requirement analysis document attached to the FMP (see draft minimum requirement analysis summary memorandum in Appendix A). Under the programmatic minimum requirement analysis, approved fire management tools could include, but not be limited to, hand tools such as ax, pulaski, cross-cut saw, pruners, and shovels; handheld motorized equipment such as trimmers, brush cutters, chainsaws, leaf blowers, or similar; and wheeled utility vehicles (UTV) and all-terrain vehicles (ATV). The application of MIST would be required. The park would continue to discourage the construction of firelines in wilderness, but would rely instead on roads, trails, and other natural features outside of wilderness to the extent possible. Flexible management would allow updating management techniques or using improved methods as they are developed and evolve over the years, so long as they are within the scope of the programmatic minimum requirement analysis in the FMP.

Project plans for fuel treatments in wilderness would address the minimum requirement. If the proposed treatment was confirmed to be within the framework of the programmatic minimum requirement analysis, the project plan would not have to revisit that decision. However, each project plan would be required to contain an analysis of the minimum methods and techniques necessary to accomplish the specific action with the least negative impact to wilderness character.

Under certain circumstances, especially those involving long-duration wildfires, an incident-specific minimum requirements analysis would be required. For large fires or long-duration incidents, fire suppression tactics in wilderness conceivably could include application of foam, water, and/or retardant by ground equipment or aircraft; limited off-road use of vehicles outfitted with pumps, hoses and suppression tools; cutting of vegetation in advance of the fire front by tracked or wheeled equipment; and potential use of heavy equipment, such as fireplows or bulldozers. However, in each instance only the minimum tool/technique would be authorized, as directed by the totality of circumstances and consistent with protecting human health and safety. Prior approval by the Park Superintendent would be required in the form of a signed minimum requirement analysis document.

After major wildfires, Burned Area Emergency Rehabilitation (BAER) would be considered in consultation with regional office and resource specialists. Any BAER plan would itself be accompanied by an minimum requirement analysis document.

2.2.3 Fire Management Strategies

Wildland Fire Suppression Strategies

A number of wildfire suppression strategies could be available to manage unplanned wildfire in the park. Suppression activities would strive to minimize potential damage to natural and cultural resources and would take into consideration the threat to public safety (including firefighting personnel), economic expenditures, firefighting resources, and other fire priorities (local, regional, and national preparedness).

Full Suppression

Suppression is the work of extinguishing or confining a wildfire beginning with its discovery (National Wildfire Coordinating Group [NWCG] 2012). The use of full suppression does not mean that all suppressed wildfires would be small or have no impacts. Some wildfires may consume larger acreage, ranging upwards to 1,000 acres as indicated by the park's fire history described in Section 1.2.1. Full suppression efforts would be used to extinguish or control the fire in order to protect human life and property, and/or critical cultural and natural resources that are threatened by the fire. Full suppression strategies may require actions such as mop-up, defined as extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned to make a fire safe or to reduce residual smoke (NWCG 2012). Patrol activities would also be needed to travel over a given route to prevent, detect, and suppress spot fires and extinguish overlooked hot spots (NWCG 2012).

Confine and Contain

This suppression strategy uses indirect attack to create a fuel break around a wildfire and either allows the fire to burn up to the fuel break or uses firing devices to burn out fuel between the fuel break and the flaming fire zone. Confine and contain actions often use natural barriers where possible or could use human-constructed hand lines. The use of natural barriers would potentially reduce impacts to natural and cultural resources from ground disturbance. Monitoring of fire behavior would be critical under a confine/contain strategy, and the response strategy could change in the event that objectives are no longer being met, potentially justifying a shift to a full suppression or point protection strategy. Mop-up and patrol activities are generally curtailed or limited to smaller portions of a burning/burned area than under full suppression. This is partially because these fires are larger and securing a perimeter can be accomplished without extinguishing all burning material.

Point Protection

This strategy may involve a variety of suppression tactical actions to prevent fire encroachment from threatening identified natural/cultural values at risk. Actions could include constructing fuel breaks or fire lines and burning them out, reducing fuel concentrations and modifying fuel continuity both vertically and horizontally, covering resources with material to shelter them from fire, and deploying water pumps and sprinkler systems. The park would work with resource advisors to determine the location of critical resources requiring protection and/or mitigated suppression actions.

Aerial resources may be used for all suppression strategies. This could involve aerial reconnaissance, detection, transportation of personnel and equipment, and fire control missions using retardant/bucket drops.

The park, fire managers, and incident commanders would monitor the conditions of a fire and determine if the response strategy selected needs to be revised.

Management of Wildland Fire for Multiple Objectives, Including Resource Benefits

As defined in Section 1, wildland fire includes both planned and unplanned ignitions. The use of planned ignitions, or prescribed fire, to achieve resource benefits and/or to reduce hazardous fuels is discussed below under Section 2.2.4. Per federal wildland fire management policy, unplanned ignitions could also be managed to accomplish specific resource management goals and objectives when appropriate conditions exist. The use of wildfire (unplanned ignitions) to meet multiple objectives, including resource benefits, would be based on priorities identified in the FMP, as well as prescriptions contained in operational plans. This approach would only be possible where allowing the wildfire to burn under managed conditions would not threaten life, property, and critical natural and cultural resources.

The decision to manage a wildfire, or part of a fire, for multiple objectives is dependent on assessing several factors, including location, fire behavior, fuels, human values at risk, risk to firefighters, cost, and resource benefits. The FMP would outline the criteria and decision factors that managers must contemplate. Upon deciding to manage an unplanned ignition, the fire management staff would develop a monitoring and future

containment plan for the wildfire, and ensure that the firefighting resources are in place for a successful outcome. National fire policy allows part of a fire to be suppressed (e.g., approaching a community), while allowing another flank to burn (e.g., approaching recommended wilderness).

Wildfire could be used to reduce hazardous fuels, restore fire in fire-adapted ecosystems, improve wildlife habitat, and restore native vegetation. Managing unplanned ignitions for resource objectives would require continuous monitoring, MIST, and use of resource advisors to ensure that critical natural and cultural resources are not threatened. Wildfires managed for multiple objectives would not be allowed to cross the park boundary without agreement of the adjacent jurisdictional agency.

2.2.4 Fuel Management Strategies

Fuel management strategies considered within this EA include the use of prescribed fire and mechanical fuel treatment, as described in detail below. Under the Proposed Action, prescribed fire and mechanical treatments would be used in areas identified by the park in the FMP's multi-year fuels treatment plan. Annual coordination with the interdisciplinary team, subject matter experts, and external stakeholders would provide valuable input for adapting the fire management program as needed. The multi-year fuels treatment plan would be reviewed and updated annually in response to factors such as changing federal regulations and guidelines, fire effects monitoring results, lessons learned in the field, budgets, staffing needs, and administrative changes within and outside the NPS. Per NPS Reference Manual 18, updates and modifications to the multi-year fuels treatment plan may or may not be made annually, but the plan should be reviewed during the annual update to ensure that project prioritization and proposed implementation schedules are current and consistent with environmental compliance requirements. Initial planning efforts by the FMP interdisciplinary team have identified a fuel treatment goal of 800 to 1,500 acres per year, using both mechanical treatments and prescribed fire. This goal may change from year to year depending on available funding and other resources.

Prescribed Fire

The park has identified that prescribed fire may be a useful tool for the following uses:

- Restoring natural ecological processes;
- Protecting natural and cultural resources; and
- Managing cultural landscapes.

Prescribed fire would be planned and prioritized annually by the park, before being used as a tool, and individual prescribed burn plans would be developed that adhere to the guidelines set forth in the FMP, and as appropriate, the programmatic minimum requirement analysis. Each prescribed burn plan would need to be approved by the park superintendent. Treatment boundaries identified within the site-specific prescribed burn plan could correspond with existing features on the landscape, such as roads and waterways, but may also include a hand line that is created along the park boundary or to connect existing features. Treatment unit boundaries could also be augmented by mechanical means to improve firefighter safety during fire operations by reducing fire intensity along the treatment edge, thereby creating areas where fire would be contained and controlled. Each prescribed fire would be managed and monitored by qualified personnel prior to and during all operations until the fire is declared to be extinguished. Each prescribed burn plan would specify ignition tools and patterns, which would be ground or aerially based and could include use of mixed gasoline and diesel fuel in drip torches, "fusees," flares fired from handheld pistols, gelled gasoline, and incendiary plastic spheres. This list does not preclude the use of new ignition tools developed during the life of the FMP. Prescribed burns that exceed the scope of the approved prescribed burn plan would be managed as wildfires.

Mechanical Fuel Treatment

Mechanical or non-fire fuel reduction methods would be used as needed and where appropriate to prepare for prescribed burns except in recommended wilderness, unless authorized by a minimum requirement analysis. Mechanical fuel treatments (for example, mowing) along burn area boundaries and around sensitive resource areas (for example cultural resources or sensitive wildlife habitat) and park facilities would be conducted to reduce hazardous fuels and provide a control line to facilitate firefighting efforts. Mechanical fuel treatment would also be used to enhance prescribed fire in attaining FMP objectives. Thinning of vegetation would be accomplished using hand-operated power tools and hand tools, such as chainsaws or other cutting tools, and wheeled or tracked mechanized equipment such as tractors, masticators, and similar equipment to construct control lines, create fuel breaks, thin fuels, and clear vegetation, including nonnative species. Heavy equipment that uses large tires or large tracks resulting in less ground disturbance would be the first choice for use. Projects that require equipment with possible ground-disturbing effects would be planned and implemented with mitigation measures when resource conditions allow for reduced impacts to soil, vegetation and potential archeological sites.

Vegetation thinning would reduce the fuel load available to support either a prescribed fire or wildfire. Fuel reduction could be used alone to reduce the intensity of a potential wildfire or it could be used prior to a prescribed burn to minimize the intensity and help maintain control of the fire. The need for using fuel reduction techniques would be determined in consultations among NPS resource management specialists, fire ecologists, and a fire management officer.

2.2.5 Cooperation and Collaboration

The NPS would establish a fire management interdisciplinary team consisting of subject matter experts from a variety of fields and divisions from within the park, the Cumberland Gap Wildland Fire Module, and the Mississippi River Fire Management Zone. The interdisciplinary team could consist of (but may not be limited to) the fire management officer, a fire ecologist, a prescribed fire specialist, the park chief of resource management, the chief ranger, the park natural resource program manager, the park ecologist, and park cultural resource specialists. The team would continue to coordinate during planning, implementation, and response operations. The interdisciplinary team would meet annually to review and update the FMP and multi-year fuels treatment plan, adding one additional out-year to the representative scope of work. The interdisciplinary team would determine whether impacts from the changes and actions proposed to the plan are within the scope of impacts analyzed in this EA or if supplemental compliance is required.

In addition to the interdisciplinary team, the NPS would continue to collaborate with the necessary federal and state agencies in Kentucky, Tennessee, and Virginia, and local government entities, including but not limited to the USFWS; the state forestry departments; state wildlife agencies; SHPOs; county governments; the municipalities of Middlesboro, Cumberland Gap, and Harrogate; local fire departments; the Cumberland Gap Tunnel Authority, and other park neighbors.

Prior to initiating prescribed burn activities, the park would consult with the appropriate USFWS office, as required by Section 7 of the Endangered Species Act. In the event of a wildfire, the park may need to enter into emergency consultation with the USFWS to comply with the Endangered Species Act while also responding immediately to the wildfire event. Similarly, the park would also consult with the appropriate SHPO for both prescribed burn activities and wildfires to comply with Section 106 of the National Historic Preservation Act. An archeologist would be engaged when necessary to survey for cultural resources.

In addition to government agencies and adjacent private landowners, the park would also coordinate with owners and operators of energy infrastructure, including pipelines, electrical transmission lines, and communication sites within the park, early and often, including during the annual prescribed burn planning

process. Communication with owners and operators of energy infrastructure would be a requirement placed in site-specific prescribed burn plans as applicable.

2.3 MITIGATION MEASURES/BEST MANAGEMENT PRACTICES

The NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources, protect the safety of firefighters and the public, and promote biodiversity and ecosystem health, the mitigation measures and BMPs discussed below would be implemented as part of the Proposed Action.

General

- Whenever consistent with safe, effective suppression techniques, the use of natural barriers and existing human-made features would be used as extensively as possible.
- Fire-retardant agents must be on an approved list for use by the U.S. Forest Service and the U.S. Department of Interior.
- Earthmoving equipment such as tractors, graders, bulldozers, or other tracked vehicles would not be used for fire suppression. The superintendent can authorize the use of heavy equipment in extreme circumstances in the face of potential loss of human life and/or property.
- MIST techniques would be used when constructing control lines. Leaf blowers, use of wet line, and other line-building techniques that would not disturb the soil would be used, especially in cultural sites. If possible, an archeologist or resource advisor would make the line in advance of the crews to avoid critical areas.
- All sites where improvements are made or obstructions removed would be rehabilitated to pre-fire conditions, to the extent possible.

Air Quality

- A prescribed fire plan (or burn plan) would be developed to meet specific vegetation management objectives would be developed for each prescribed burn unit. Variables considered in the prescription would include wind parameters and smoke-sensitive receptors, fuel moistures, temperature, firing methods, timing of burn seasonally, relative humidity, and smoke dispersion. Prescribed burn plans would outline prescription windows for appropriate weather, fuel, fire behavior, fire management staffing, and social considerations.
- Media releases would be used to inform the public and park visitors about wildland fire, informing them about potential smoke impacts, closures, or restrictions. Signs would be used throughout the park to inform visitors, and caution signs would be installed where smoke may impact transportation corridors inside and outside the park. If necessary, the superintendent would authorize temporary closure of some areas to the public and visitors.
- Other agencies would be notified by park staff for all prescribed burns. Each burn plan would contain a list of contacts, including park neighbors and adjoining landowners who may experience more immediate visual impacts from fire operations, or movement of personnel and equipment associated with prescribed burns. The list of contact would be notified by the park.
- Park staff would coordinate with the Cumberland Gap Tunnel Authority, adjacent agencies, landowners, and infrastructure owners/operators regarding prescribed burn planning to limit potential smoke impacts from affecting transportation routes, sensitive receptors, and infrastructure within or adjacent to the park.

- The park superintendent would be involved in initial planning to limit effects of prescribed fire smoke during holidays, special events, and busy visitation periods, when possible. However, prescribed burns could occur during these times, if approved by the park superintendent. Superintendent approval is required prior to ignition.
- Timing and methods of ignition on prescribed burns would be constantly assessed and reviewed by fire managers to minimize smoke impacts. Personnel would be trained in emission reduction techniques as outlined in the NWCG Smoke Management Guide (Hardy et al. 2001) and continuous monitoring would be required throughout the burn.
- Sensitive smoke receptors would be identified during planning. On the day of the burn, the burn boss would assess wind direction, transport winds, and dispersion prior to ignition. If plume trajectory maps reveal that sensitive smoke receptors would be impacted by the burn and the impacts cannot be mitigated, the burn may be rescheduled.

Natural Resources

- The park would consult with the USFWS for effects to federally listed species when developing individual prescribed burn plans.
- Prescribed fire and mechanical clearing, removing, or thinning trees, including snags, would occur in the winter (outside the roosting or maternity season) as determined through consultation with USFWS, minimizing the potential for eliminating a roost tree and injuring or killing federally listed bat species. Potential roost trees would not be cut during the period when the bats occupy their summer range. If prescribed fire is used or trees must be removed outside these dates, ESA Section 7 consultation would be reinitiated with USFWS.
    - If summer maternity roosts are identified, the surrounding forest and foraging areas within 2.5 miles of the documented maternity roost tree would be maintained in as natural a state as possible. These areas would be monitored to ensure human disturbance is minimized.
    - The forests above and around cave hibernacula (hibernation sites) would not be dramatically altered by human activities.
- The timing restrictions related to bat species listed above for prescribed burns and mechanical treatments would also provide protection for migratory bird species, during the bird nesting season.
- Specific to managing wildland fire for multiple objectives, the park would implement the following mitigation measures:
    - After providing for public and firefighter safety, attempt to prevent any wildfire from burning to within 0.25 miles of a known hibernaculum
    - After providing for public and firefighter safety, attempt to prevent any wildfire from burning to within 150 feet of a known maternity roost tree, if identified within the park
    - Contact the appropriate USFWS Ecological Services Office as soon as it is practical to do so in the event of any wildfire that burns within 0.25 miles of a known hibernaculum or 150 feet of a known maternity roost tree, or that occurs during the maternity season (approximately April 1 – August 15). *Note: This procedure follows the "Emergency Consultation Process" as defined by USFWS.*
- Stream crossings would be limited to set and existing locations.
- Log jams/debris would be left in streams to protect fish and aquatic insect habitat.
- Control line construction would be permitted in the floodplain or in wetlands during emergency response situations, as long as MIST are used. Control line construction within wetlands would be avoided for prescribed burns.

- Control lines would be located outside highly erosive areas, steep slopes, and other sensitive areas wherever possible. Following fire suppression activities, control lines would be recontoured, water barred, and material raked off would be replaced.
- Fire chemical use within the floodplain, wetlands, and other sensitive areas would adhere to the *Interagency Policy for Aerial and Ground Delivery of Wildland Fire Chemicals Near Waterways and Other Avoidance Areas* as described in Chapter 12 of the Interagency Standards for Fire and Fire Aviation Operations (U.S. Department of the Interior and U.S. Department of Agriculture 2016) or future revised version.
- Park resource specialists would be involved during and after wildfire and during prescribed burn planning to ensure that prescriptions and burn objectives do not conflict with objectives for the protection of sensitive vegetation and wildlife populations and habitat. The park would coordinate with the applicable USFWS field office, as needed.
- To reduce potential for the spread of invasive species, all equipment used for fire management activities would be washed and inspected prior to the burn.
- Wherever possible, natural features and existing human-made barriers would be used for containment lines to minimize additional disturbance to soils.
- The use of large mechanized equipment would require superintendent approval.
- Transport of fire personnel and equipment would use existing roads and trails wherever possible.
- In the event of a wildfire, resource specialists would examine maps and information resources to assess and discuss potential effects of the fire.
- Aviation use would be carefully considered and impacts to wildlife mitigated through timing of operations, exclusion of low-level aviation use, or avoidance of certain areas of the park.
- Fire effects monitoring on species and habitat would be used to inform multi-entry prescribed burning and ecosystem maintenance activities.
- Fire management personnel would be briefed on potential resources of concern and known locations within a burn unit in order to facilitate avoidance of habitat for special status species or other potentially sensitive resources.
- Mop-up methods would use MIST techniques to protect natural resources, including soils, water resources, vegetation, and wildlife.
- If a major wildfire occurs, the use of Burned Area Emergency Rehabilitation teams would be considered through consultation with the NPS Southeast Regional Office and park resource specialists.
- Park resource specialists would monitor wildfire locations for exotic plant invasions and manage as necessary.

Cultural Resources

- Prior to all fire management activities, cultural resources in treatment areas would be identified and avoided, if possible.
- Except in wildfire initial attack situations, an archaeologist or resource advisor would be assigned to a fire crew to locate the control line in advance of line construction activities.
- The park would continue coordination with the Southeast Archeological Center to ensure that the park has the most current data regarding archeological resources within its boundaries. The park's cultural resource specialist(s) would provide recommendations on how to mitigate adverse effects on these

resources during fire management activities and would coordinate compliance with Section 106 of the National Historic Preservation Act, as appropriate.

- The park will continue to work with the Southeast Archeological Center to use existing and develop better site prediction GIS models that can be used to guide placement of staging areas for equipment, cutting fire breaks, etc. to avoid areas of high site probability to the extent practical.
- Historic structures and sensitive cultural sites would be protected from wildland fire via maintenance (mowing and weed-eating during the growing season) of existing defensible space around them.
- During all suppression activities, MIST guidelines would be incorporated to the greatest extent feasible and appropriate for the given situation. Tactics directly or indirectly facilitating the protection of archeological/cultural/historic resources include:
    - Keeping engines or slip-on units on existing roads;
    - Not using heavy equipment (e.g., bulldozers, plows) for constructing control line;
    - Not using fireline explosives in areas of known cultural resource significance;
    - Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of fireline construction whenever possible;
    - Keeping fireline width as narrow as possible;
    - When necessary, mapping, marking, or flagging cultural resources during wildfire suppression, rehabilitation, and prescribed burn implementation (and removing flagging immediately after the fire event); and
    - Providing all workers with basic training about cultural resources.
- Ground disturbance would be avoided within known archeological/cultural/historic resource locations. When control line construction is necessary in proximity to these resource locations, it would involve as little ground disturbance as possible and be located as far outside known resource boundaries as possible. A resource advisor or archeologist would check this control line for possible site disturbance immediately following the wildland fire event.
- Soaker hoses, sprinklers, or foggers would be used in mop-up, avoiding boring and hydraulic action.
- The park's cultural resource specialist(s) would be contacted immediately if previously unrecorded cultural resources are discovered during any wildland fire operations. The cultural resources would be recorded, delineated, and protected.
- In instances of wildfire, a post-fire data recovery and/or restoration program would be developed that is sensitive to cultural resource concerns.

Visitor Use and Experience

- Prescribed fires would not be ignited in proximity to park structures when prevailing winds carry smoke towards the structures.
- Firefighter and public safety would be the highest priority in all fire management activities.
- The park would notify the public of upcoming prescribed burning operations and management of wildfires through press releases and social media. Prescribed fire notifications and fire information would be posted at public locations, such as trailheads, parking areas, and visitor centers.
- Educational outreach would be implemented prior to any closure or restrictions to explain the role of fire as a management tool.

- Fire management staff would work with protection staff and local agencies on posting smoke hazard signs if smoke could impact roadways.
- Fire staff would coordinate closely with rangers to determine the location of visitors and use road/trail closures and restrictions to ensure prescribed fire or wildfire operations do not put visitors at risk.
- Visitors would be excluded from the immediate vicinity of the wildfire or prescribed burn when fire management activities are underway.
- Weather conditions would be closely monitored during the prescribed fire or managed wildfire to ensure that any changing conditions do not suddenly put visitors at risk.
- Following a wildland fire and as burned areas are opened to visitors, signs would be used to inform visitors of the potential hazards (e.g., snags, stumps, and holes).

Recommended Wilderness

DO 41 and NPS Reference Manual 41 identify the following BMPs for a fire management program in wilderness areas, including categories of designated, recommended, potential, proposed and wilderness study areas:

- Wilderness character must be fully considered during all fire management actions beginning with the development of the FMP and continuing through the management of individual wildfires and implementation of fuel treatments and post-fire actions.
- Augmenting natural ignitions with prescribed fire or other fuel treatments within wilderness may be necessary to restore or maintain ecological function if that is a goal identified in the park's Backcountry Management Plan or FMP.
- Project plans should refer to the programmatic minimum requirement analysis developed for the FMP that establishes the necessity for such treatments. If the proposed treatment is confirmed to be within the framework of the programmatic minimum requirement analysis, the project plan is not required to revisit that decision. However, each project plan must contain an analysis of the minimum methods and techniques necessary to accomplish the specific action with the least negative impact to wilderness character.
- The application MIST is required for all fires in wilderness.
- Qualified wildland fire resource advisors should be used throughout wildfire incidents and post-fire activities, including emergency stabilization. Resource advisors must be knowledgeable about wilderness values, objectives, and policies.
- A delegation of authority from the park superintendent to an incident commander would include appropriate emphasis on the protection of recommended wilderness resources and values and the minimum requirements concept.
- Fire management resources must be adequately briefed on the concepts of wilderness stewardship and be held accountable for preservation of wilderness character. They must be made aware of specific protections and constraints contained in the park's Backcountry Management Plan and FMP.
- Prescribed fire plans in recommended wilderness would include the necessary prescriptions and procedures to protect wilderness resources and values.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section analyzes both beneficial and adverse impacts that would result from implementing either alternative described above in Section 2. It is organized by resource and provides a comparison between alternatives based on the issues identified for detailed analysis. This document addresses the direct and indirect potential environmental impacts from all aspects of the No Action Alternative and the Proposed Action, revision of the park's FMP. At the conclusion of each resource discussion, applicable cumulative impacts are described and a brief discussion of the importance of impacts is provided.

For all environmental consequences analyses provided below, it is assumed that the mitigation measures and best management practices described in Section 2: *Alternatives Considered* would be implemented under the Proposed Action, in accordance with the park's revised FMP. These mitigation measures are intended to minimize adverse impacts to resources, while achieving the objectives of the FMP.

3.1 CLIMATE CHANGE

Climate change refers to any significant changes in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality, storm frequency, etc.) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences, and the United Nations Intergovernmental Panel on Climate Change provide evidence that climate change is occurring and may accelerate in the coming decades. There is strong evidence that global climate change is being driven by human activities worldwide, primarily the burning of fossil fuels and tropical deforestation. These activities release carbon dioxide and other heat-trapping gases, commonly called "greenhouse gases," into the atmosphere (Intergovernmental Panel on Climate Change 2007).

The 2014 Climate Change Resource Brief for the park (NPS 2014b) recognizes that recent climatic conditions are already shifting beyond the historical range of variability. The brief states, "climate change will manifest itself not only as changes in average conditions …but also as changes in particular climate events (e.g., more intense storms, floods, or drought)." Increased storm events and potential drought conditions could lead to increased wildfire frequency and magnitude within and near the park. High-intensity wildfire events could threaten to alter the vegetation composition, negatively impact air quality by adding particulates to the air and reducing visibility, and potentially result in loss of cultural resources.

While directly combating climate change is beyond the resources of the park, evaluating impacts on the park's landscape, and using management actions to mitigate for those impacts are valid management issues/endeavors. For example, vegetation communities may experience altered ranges; this is of particular concern with regards to nonnative, invasive species, which may be able to take advantage as habitat becomes compromised.

During responses to wildfires or the management of prescribed fires, the Proposed Action could also result in a temporary increase in emissions of greenhouse gases from the operation of firefighting equipment, though these emissions would be far smaller than emissions from the associated fire. Emissions associated with wildland fire are potentially mitigated by carbon sequestered as a result of fire effects, such as additions to soil carbon stocks and increased plant growth above and below ground. These beneficial effects are more likely with the application of prescribed fire, and increased fuels management could create additional potential benefits by mitigating the effects of wildfires that may increase carbon emissions through the consumption of large woody vegetation and/or organic soils (Mitchell et al. 2014).

For context, a typical coal-fired power plant produces around 3.5 million tons of carbon dioxide equivalent per year (Union of Concerned Scientists 2015). The global impact of adding prescribed fire to park management would be de minimis, and multiple mitigating factors associated with prescribed fire and research into the effects of fire on park resources likely further reduce the overall effect of revising the park's FMP on climate change. The proposed revision to the FMP would create additional understanding of the potential role of fire in managing park resources to respond to the effects of climate change.

Impacts of climate change on the park are likely to be of a subtle, gradual nature. Changes in climate such as general warming, changes in water availability, and storm frequency, intensity, or duration could cause changes in vegetation communities and habitat for fish and wildlife, among other effects, within the park. The proposed revision to the park's FMP would give park managers a greater understanding of the role that fire plays in the context of park resources expected to be affected by climate change, which would provide opportunities for climate change response.

The potential effects of this dynamic climate on park resources are not analyzed in detail under the environmental consequences discussion for each impact topic because of the uncertainty and variability of outcomes resulting from climate change when compared to the shorter-term planning horizon for the FMP. Furthermore, the global scale of climate change is beyond the control of the park and impacts from climate change would not differ between the alternatives. Instead, alternatives that improve the park's ability to actively manage natural resource conditions, such as the use of active fire management and research opportunities under the Proposed Action, would be expected to provide greater beneficial impacts that counteract the effects of climate change compared to those alternatives that provide less flexibility in managing natural resource conditions.

3.2 SIMILAR AND CUMULATIVE ACTIONS

Per the NPS DO 12 NEPA Handbook, connected, similar, and cumulative actions are actions that result as a direct or indirect consequence of the Proposed Action and can be undertaken by federal, state, or local entities. There are no connected actions associated with the Proposed Action, revision of the FMP. Similar actions are those that have similar geography, timing, purpose, or other similar features to the Proposed Action. Cumulative actions are those actions that have additive, or cumulative, impacts on a particular resource. Cumulative actions may have occurred in the past, present, or are reasonably foreseeable to take place in the future. Table 3.1 summarizes similar and cumulative actions.

TABLE 3.1. SIMILAR AND CUMULATIVE ACTIONS TO BE ANALYZED IN THE EA

Project Description	Lead Agency	Project Timeframe (Past, Present, Future?)
Future land acquisitions by the park authorized by Congress	NPS	Future
Past land acquisitions by the park authorized by Congress	NPS	Past
Development in Cumberland Gap, Tiprell, Harrogate, and Middlesboro	Local governments and private entities	Past, present, and future
Prescribed burns by other entities	Private and state entities	Future
Recreational opportunities within the Fern Lake Watershed	NPS	Future
Noxious/exotic species control efforts – exotic plant and insect control	NPS	Past, present, and future
Completion of Great Eastern Trail (Pine Mountain Trail and Cumberland Trails) within park	NPS	Future
Assessment of threatened cave bats to determine status of bat populations in the park	NPS	Present and future
Maintain fire roads within park	NPS	Present and Future
Conduct archeological inventory survey of vulnerable archeological sites	NPS	Future
Rehabilitation of fire cache	NPS	Future
Protecting rare ginseng populations through habitat modeling, marking, and monitoring	NPS	Present and future
Remove hazardous trees and clean out culverts on 21+ miles of	NPS	Future

Project Description	Lead Agency	Project Timeframe (Past, Present, Future?)
trails		
Hazard tree survey and abatement	NPS	Present and future
Wilderness eligibility assessment of newly acquired lands in the Fern Lake watershed	NPS	Future
Cultural Landscape Report for Hensley Settlement	NPS	Future

3.3 AIR QUALITY

3.3.1 Affected Environment

The Clean Air Act (42 United States Code [USC] 7401 et seq.) gives federal land managers the responsibility for protecting air quality and related values, including visibility, plants, animals, soils, water quality, cultural resources, and public health, from adverse air pollution impacts (NPS 2014a). Specifically, Section 118 of the Clean Air Act requires a park to meet all federal, state, and local air pollution standards. The park is designated as a Class II air quality area under the Clean Air Act, which means moderate increases in new pollution may be permitted. The closest Class I airshed is Great Smoky Mountains National Park, approximately 65 miles south of the park. Class I airsheds, established by the Clean Air Act and administered by the EPA, apply to certain national parks over 6,000 acres and certain wilderness areas and memorial parks over 5,000 acres that require the highest level of aesthetic protection.

The Clean Air Act and its amendments require the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment (Public Laws 88-206, 90-148, 91-604, 95-95, and 101-549). These criteria pollutants include lead (Pb), nitrogen oxide (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter less than 10 microns in size (PM_{10}), particulate matter less than 2.5 microns in size ($PM_{2.5}$), and ozone (O_3). The Clean Air Act also allows states to adopt additional ambient air quality standards. Bell and Harlan Counties, Kentucky; Claiborne County, Tennessee; and Lee County, Virginia have been classified by the EPA as "attainment areas," which means that ambient air quality meets the standards of the levels set in the NAAQS (EPA 2016b). The park's Natural Resource Condition Assessment identifies O_3 as one of the main air quality considerations within the park. Previous monitoring efforts within the park and ongoing monitoring in the region demonstrates a continued risk of elevated O_3 concentration levels, although violations of the NAAQS have not been recorded (NPS 2013).

Air quality related values (AQRVs) are used by federal land managers to determine the impact of pollution to federal lands. An AQRV is a resource that may be adversely affected by a change in air quality. The NPS Cumberland Piedmont Network has identified visibility, vegetation, surface waters, soils, and fish and wildlife as AQRVs for the park (NPS 2008b). Visibility is a sensitive AQRV affected by air pollution because it can affect how far and how well vistas and landscape features can be seen. Air pollution can also affect the dark night sky resource, an integral component of visibility (NPS 2008b).

The park's existing prescribed burn program follows the latest national smoke management guidance, the NWCG Smoke Management Guide for Prescribed and Wildland Fire (Hardy et al. 2001). The guide provides fire use practitioners with a fundamental understanding of smoke management, including tools for managing smoke from wildland fires (Hardy et al. 2001). No state-level smoke management program has been identified for Kentucky, Tennessee, and Virginia.

3.3.2 Environmental Consequences

Wildfires generate smoke and ash, and produce a number of criteria pollutants including particulate matter (PM_{10} and $PM_{2.5}$), CO, NO_x, and SO_2 regulated under Title I of the Clean Air Act of 1970, as amended, the Kentucky Ambient Air Quality Standards (401 Kentucky Administrative Regulations 53:010), Tennessee Ambient Air Quality Standards (Tennessee Code Title 68, Chapter 201), and Virginia Ambient Air Quality Standards (9 Virginia Administrative Code 5-30). NO_x and volatile organic compounds (VOCs) produced by wildfires can contribute to the formation of another criteria pollutant, O_3. O_3 production from fires is a complex interaction, dependent on amounts of various chemical reactants and catalysts available, radiation loading and air temperature, the size and intensity of the fire, the weather-controlled dispersion of the plume, and the chemical composition of the burning vegetation (Nikolov n.d.). Field observations and modeling have found O_3 production within plumes of prescribed fires (Nikolov n.d.). O_3 production rates of about 25 parts per billion per hour have been observed in some cases (Nikolov n.d.), which is below the current NAAQS of 75 parts per billion over an 8-hour period (EPA 2016c).

Wildfires also produce a number of toxic air pollutants, including but not limited to the VOCs, acrolein, benzene, and formaldehyde, but in much lower concentrations than particulate matter and CO (Ammann n.d.; California Air Resources Board 2003). These toxic air pollutants are regulated under Title III of the Clean Air Act and state air quality regulations for Kentucky, Tennessee, and Virginia.

Alternative A: No Action

Under the No Action Alternative, fire management activities would include wildfire suppression, prescribed fire, and mechanical treatment activities. Based on the park's fire history (summarized in Section 1.2.1), unplanned ignitions occur within the park approximately three times per year, on average. Unplanned ignitions would likely result in short-term, localized contributions of smoke, particulate matter, and O_3 to the local airshed lasting the duration for which the unplanned ignition burns. Visibility would likely be compromised during the wildfire, thereby adversely impacting one of the park's AQRVs. The lack of control over atmospheric and drought conditions when unplanned wildland fires begin increases their potential to contribute emissions to the local airshed. If a wildfire does occur under drought conditions, the wildfire could expand beyond the park's boundaries, causing adverse air quality and visibility impacts for as long as the wildfire event occurs.

Contribution of smoke, particulate matter, and O_3 would be the primary impact to air quality from prescribed burns. The impact of smoke on local community members and park visitors would depend on weather conditions when fires are active and an individual's sensitivity to smoke. The park would take measures to manage smoke impacts resulting from prescribed fire. Prior to implementing a prescribed fire, a prescribed burn plan would be written that meets the requirements established in the Interagency Prescribed Fire Planning and Implementation Procedures Guide (Product Management System [PMS] 484; NWCG 2014) The prescribed burn plan would follow the PMS 484 prescribed fire plan template (PMS 484 - Appendix A) to include a go/no go checklist, complexity analysis, site description, map, personnel and equipment to be used, desirable weather conditions, desired fire behavior factors, and emergency protocol. Additionally, personnel responsible for managing prescribed burns would be trained in emission reduction techniques as outlined in the NWCG Smoke Management Guide (Hardy et al. 2001) and continuous monitoring would be required throughout the burn.

This pre-burn planning and agency coordination would help guarantee that appropriate conditions exist during implementation of a prescribed fire and the likelihood for lower air emissions, such as smoke, to migrate away from the site-specific burn area. Prescribed fires would be carefully evaluated to consider smoke dispersal into nearby communities, including Middlesboro, Cumberland Gap, Harrogate, and Tiprell. As a result, the effects to air quality from prescribed fire would be short term and localized near the prescribed fire area. The duration of the impact would coincide with the duration of prescribed burn activities.

These mitigation measures would reduce, if not eliminate, smoke impacts to sensitive receptors in the nearby communities. Fuels management and preparation of the treatment units for prescribed burning could also improve the effectiveness of a response to unplanned ignitions, thereby resulting in beneficial impacts to regional air quality.

Wildland fire management actions would require the use of mechanical equipment, such as mowers, engines, pumps, and all-terrain vehicles that would result in exhaust emissions that may include NO_x and SO_2, which are criteria pollutants. These emissions would be intermittent and temporary, lasting only for the duration of fire management events. Emissions from the use of mechanical equipment would be small relative to the emissions generated by unplanned or planned ignitions.

Cumulative Impacts

Cumulative impacts to air quality would occur if planned or unplanned ignitions occur on lands outside the park at the same time fire management activities occur on park lands. The duration of the cumulative impact would coincide with the duration of the concurrent fire events. Lack of control over atmospheric and drought conditions when unplanned wildland fires begin increase their potential to contribute emissions to the local airshed. These impacts would be local and regional, short and long term, and adverse. The cumulative effects of the No Action Alternative to air quality would be sporadic and temporary. The application of the NWCG Smoke Management Guide (Hardy et al. 2001) would reduce the intensity and duration of those contributions.

Alternative B: FMP Revision (Preferred Alternative)

The impacts to air quality from the Proposed Action would be similar to the impacts described under the No Action Alternative, with unplanned ignitions, prescribed fire, and mechanical treatments occurring under both alternatives. These fire management activities would result in short-term adverse impacts to air quality, lasting the duration of the wildland fire event and long-term beneficial impacts to the airshed through the reduced risk of a high-intensity wildfire.

The difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives, which would allow the park to manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Based on the park's fire history, approximately three unplanned fire events occur annually. Under the Proposed Action, it is likely that more than 800 to 1,500 acres of the park would experience the implementation of fire management activities because unplanned ignitions may be allowed to burn under managed conditions. Use of wildland fire for multiple objectives would contribute smoke, particulate matter, and O_3 to the airshed in a similar manner described for unplanned ignitions under the No Action Alternative: short-term, localized contributions of smoke to the local airshed lasting the duration for which the wildland fire burns. Visibility would likely be compromised during the use of wildland fire, thereby adversely impacting one of the park's AQRVs. The lack of control over atmospheric and drought conditions when wildland fires begin increases their potential to contribute emissions to the local airshed. The impact of air emissions on local community members and park visitors would depend on weather conditions when fires are active and an individual's sensitivity to compromised air quality.

The use of wildland fire would allow natural processes to perpetuate within the park and in the long term lessen the potential for adverse air quality impacts associated with high-intensity wildfire.

Cumulative Impacts

Cumulative impacts to air quality from the Proposed Action would be the same as those described for the No Action Alternative.

Conclusion

Under both the No Action Alternative and the Proposed Action, short-term adverse impacts to local air quality primarily in the form of smoke, particulate matter, O_3 and associated reduced visibility from prescribed burns and unplanned ignitions would occur. Impacts from unplanned ignitions would be short term, infrequent, and unpredictable. Unplanned ignitions have the potential to contribute more pollutants to the surrounding communities due to the lack of control over atmospheric conditions when unplanned wildland fires begin. Impacts from prescribed burns would be short term, lasting the duration of each prescribed fire. Under the Proposed Action, an estimated 800 to 1,500 acres or 3% to 6% of the entire park's acreage would undergo treatment by prescribed fire and mechanical treatments in any given year. Given that this acreage would likely be treated over a series of prescribed burn events and the park's commitment to implement smoke management BMPs, impacts to air quality would short-term, lasting the duration of the prescribed burn.

3.4 GEOLOGY AND SOILS

3.4.1 Affected Environment

The park is within the Appalachian Plateaus Province along Cumberland Mountain. The park is bordered by the Ridge and Valley Province and the Cumberland and Allegheny Plateaus. Exposures and outcrops of limestone and conglomerate sandstone are found throughout the park. Bedrock is Pennsylvanian age with rock outcrops of Mississippi and Devonian age on lower slopes (Hinkle 1975 as cited in NPS 2004). The Cumberland Gap was formed from stream erosion of fractured rock along the ridge. The Pinnacle, White Rocks, and Sand Cave are geologic formations that attract numerous visitors. In addition, there are over 30 known entries to limestone caves and numerous limestone sinks in the park (NPS 1979a as cited in NPS 2004).

Park soils contain alluvium, colluvium, and slump debris. Alluvium is found in valleys and contains gravel, sand, silt, and clay. Colluvium is found in the southeast and northwest drainage slopes and primarily is composed of limestone and sandstone blocks (NPS 1993 as cited in NPS 2004). Soils types within the park include Stendal gravelly sandy loam, Gilpin silt loam, Tate-Shelocta Complex, and Dekalb-Shelocta-Tate very stony complex (Hinkle 1975 as cited in NPS 2004).

3.4.2 Environmental Consequences

Alternative A: No Action

Mechanical treatment has potential to impact small, localized areas of soils due to increased erosion resulting from vegetation removal or compaction of soils from equipment. However, based on the equipment likely to be used and BMPs (Section 2.3) implemented to reduce erosion and compaction, it is anticipated any adverse impacts would be minimal and short term.

Under the No Action Alternative, the park would attempt to suppress wildfires before they gain size. Actions implemented to suppress wildfire would cause soil compaction from tracks and tread from mechanical equipment, and compaction from the use of water applications. Mitigation measures to avoid the most sensitive soils would alleviate impacts resulting from compaction, and therefore adverse impacts are expected to be localized and short term. Surface soil disturbance also may occur as a result of the construction of fire lines or fuel breaks to contain fire. Exposed mineral soils from suppression activities would be vulnerable to erosion. Suppression activities could directly impact soil resources as a result of potential contamination from spills from firefighting equipment, e.g., hydraulic fluids and fuel. The use of BMPs for equipment use and handling of chemicals would avoid and/or mitigate such impacts.

Wildfires, especially those that resist containment and are intense, could have long lasting impacts to soils as a result of extreme heat and increased residence times by causing soil sterilization and consumption of organic matter, which impact soil nutrient content, structure, and stability (DeBano et al. 1998; DeBano et al. 2005; Reardon et al. 2008). Removal of ground cover, consumption of roots and stumps, and removal of duff and litter layers result in indirect impacts to soils by increasing the potential for erosion and loss of topsoil, especially during periods of heavy precipitation or strong winds. Under some conditions, fire may cause the development of hydrophobic soil layers, which further increase erosion potential. Steep slopes and exposed areas would be especially prone to erosive forces. These impacts to soil resources would be adverse and would last for many years.

Prescribed fire would continue to be carefully managed under the No Action Alternative and implemented in a manner to minimize impacts to soils. Discrete areas would be prepared, including construction of fire lines and fuel breaks and removal of dense areas of vegetation, for burning as needed. Adverse impacts could include exposure of soil to increased heating and drying and resulting compaction or burning of the soil. Equipment and personnel activity prior to and during prescribed burns could cause localized compaction. Prescribed fires would impact soils by partially removing protective surface vegetation and litter, and organic matter in the soil, thereby temporarily exposing soils to a higher potential for both water and wind erosion. Prescribed fire could directly impact soil resources as a result of potential contamination from spills from firefighting equipment, e.g., hydraulic fluids and fuel. The use of BMPs for equipment use and handling of chemicals would avoid and/or mitigate such impacts. When executed properly, low-intensity prescribed fires can be beneficial to soil resources by providing a flush of nutrients from burned organic material, which stimulates productivity and helps perpetuate fire-adapted vegetation associations (Knapp et al. 2009). Prescribed burning can promote nutrient cycling, raise pH, and increase minerals and salt concentrations in soil (DeBano et al. 2005). Addition of ash, charcoal, and vegetation residue resulting from incomplete combustion aids in soil buildup and soil enrichment as new and partially burned organic matter are added to the soil profile. This added material works in combination with living, dead, and dying root systems to make the soil more porous, better able to retain water, and less compact, while increasing needed sites and surface area for essential microorganisms, mycorrhizae, and roots (Knapp et al. 2009). Such impacts have potential to be beneficial and long-term.

Cumulative Impacts

Cumulative impacts to soil could occur as a result of effects of the No Action Alternative and other actions (e.g., development or prescribed burns conducted by local government and private entities, trail development in the park, and trail and road maintenance in the park). Associated soil disturbance may contribute short-term adverse impacts to soils from construction, earthmoving, and repeated use (e.g., foot or equipment traffic) activities. Prescribed fire activities associated with other landowners and agencies could result in temporary adverse impacts to soils, but may provide long-term beneficial effects to soils through improved ecosystem functioning and improved resilience to wildfire. Cumulative impacts to soils under the No Action Alternative are expected to be adverse in the short term and beneficial in the long term.

Alternative B: FMP Revision (Preferred Alternative)

Impacts resulting from mechanical treatment, prescribed fire, and wildland fire suppression would be similar to those described under the No Action Alternative. Potential impacts to soil as a result of managed wildland fire would be similar to those described for prescribed fire—short term, adverse and long term, beneficial. The difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives, which would allow the park to manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Therefore, it is possible for more acres to be impacted by fire management activities under the Proposed Action when compared to the No Action Alternative. Impacts to soils would be the same as described under the No Action Alternative, with both adverse and beneficial impacts occurring on more acreage under the Proposed Action.

Cumulative Impacts

Cumulative impacts are the same as those described for the No Action Alternative.

Conclusion

Both the No Action Alternative and the Proposed Action generally would result in short-term adverse impacts and beneficial long-term impacts to soil resources. For example, under both alternatives, the mitigation of fire behavior affected through implementation of fuel treatments (e.g., mechanical treatment and prescribed burns) could reduce adverse impacts to soil such as erosion. However, the Proposed Action may increase short-term adverse and long-term beneficial impacts to soil, relative to the No Action Alternative, if additional soils in the park experience burning as a result of the management of unplanned ignitions.

Impacts to soils would occur in discrete, isolated patches. Through the use of BMPs, adverse impacts to soils as a result of either alternative are expected to be localized, minor, and short term. Both alternatives would generate long-term benefits to soils.

3.5 WATER RESOURCES, INCLUDING FLOODPLAINS AND WATER QUALITY

3.5.1 Affected Environment

The park straddles the ridge of the Cumberland Mountains. The southern portion of the park drains to the Powell River approximately 3 miles below the park, while north of the ridge the drainage reaches the Cumberland River in about 10 miles. The majority of streams in the park are intermittent first and second order streams characterized by steep hollows drained by relatively small streams that are seasonally flooded (NPS 2010). With the exception of Little Yellow Creek, all streams occurring in the park, such as Sugar Run and Station Creek, originate inside the park (NPS 2010).

In the western end of the park, Little Yellow Creek receives flow from Fern Lake and ultimately connects to Yellow Creek in Middlesboro. Sugar Run and Davis Branch flow into Yellow Creek and then into the Cumberland River. Shillalah Creek and Martins Fork are the primary streams in the eastern end of the park and drain into the Cumberland River. The southeastern side of Cumberland Mountain is drained by Station Creek near the Wilderness Road Campground. Several smaller intermittent streams also drain the southeastern face of Cumberland Mountain.

Fern Lake is a 150-acre public water supply for Middlesboro, Kentucky, located southwest of the park visitor center. The City of Middlesboro withdraws about 1.5 million gallons of water per day from Fern Lake or about 547.5 million gallons per year (1,668 acre-feet per year) (NPS 2010). A review of the Federal Emergency Management Agency's National Flood Hazard Geographic Information System Layer shows several federally designated 100-year floodplains in the park associated with Little Yellow Creek, Davis Branch, Station Creek, Sugar Run, Shillalah Creek, Martins Fork, Roaring Branch, and Gap Creek (Federal Emergency Management Agency 2016).

Several small human-made ponds also exist within the park boundary. The majority of these ponds occur in the Little Yellow Creek watershed at the southwestern end of the park (NPS 2010). These ponds have been created by either dikes or excavations.

Karst geology of the park creates large amounts of groundwater that originate on top of Cumberland Mountain from rain events. Rainwater percolating downward enters a vast karst system of caves and crevices. Water emerges at various locations along the base of the mountain where it enters surface streams. Some of the water

leaving Gap Cave is tapped, treated, bottled, and sold by the Cumberland Gap Spring Water and Middlesboro Coca-Cola Bottling Company, Inc. (NPS 2010).

Water Quality

The 2013 Natural Resource Condition Assessment for the park summarizes the water quality assessment completed by Meiman in 2009, which reported the water quality within the park as "quite good" (NPS 2013:42). None of the streams within the park are listed on the EPA's 303(d) list for impaired water bodies (NPS 2013). High levels of E. coli have been detected in Station Creek in 2003 and 2006–2008. These levels are attributed to the proximity of the water quality monitoring site to the septic field of the Wilderness Road Campground, which was repaired in 2012.

Davis Branch of Little Yellow Creek and Shillalah Creek are designated outstanding state resource waters by the State of Kentucky. Outstanding state resource waters are designated by the Kentucky Energy and Environment Cabinet and includes waters that support federally listed species and are part of a unique geological, natural, or historical area recognized by state or federal designation (401 Kentucky Administrative Regulation 10:031, Section 8).

No water quality concerns have been documented for Fern Lake.

3.5.2 Environmental Consequences

Alternative A: No Action

Water resources, including water quality, can be affected both by wildfires and fire management activities. Small fires and fires of low intensity would be expected to have little effect on water quality. Fires that become large could have adverse and short- to long-term effects on water quality due to increased ash and woody debris deposited into water bodies and their floodplains. This type of deposition could increase turbidity downstream from the fire. Loss of vegetation could lead to increased erosion and sediment loading in surface water resources in the park. However, these effects are considered normal and natural in fire-adapted ecosystems and would be within the normal range of variability. These adverse impacts would be expected to last one or two vegetation growing seasons to allow the vegetation to become re-established after the wildfire. It is when high-severity fires burn large portions of a watershed that impacts could exceed the natural range of variability and cause substantial adverse effects, which last longer than one to two growing seasons. A wildfire event that exceeds the natural range of variability could cause sediment loading that is higher than historic rates; thereby changing the transport capacity of the affected channels. These events could cause changes in hydrologic conditions, such as shifting channels that may require a substantial duration of time for recovery.

Higher intensity fires are expected to cause more sedimentation and ash flow into lakes and streams following heavy rain events because more vegetation has been removed and would take longer to re-establish and stabilize bare soils. Soils that are severely burned also may become hydrophobic, which in turn can increase runoff, suspended sediments, and ash into lakes and streams. Wildland fire within riparian and floodplain areas may remove vegetation that traps sediment in runoff from adjacent upland systems, increasing chances for water quality degradation. Removal of streamside vegetation could also cause increases in water temperatures resulting from losses of shade and a reduction in cover habitat for fish.

Through changes in soil and vegetation cover, fire influences the volume of water and the rate at which water flows in watersheds. Some slopes are steep or extremely unstable and some soils are highly erodible because of the underlying geology and parent material. If highly erodible soils are located on steep slopes or in geologically unstable areas, fire can have severe consequences on a watershed if vegetation cover is removed and heavy rains fall on bare slopes.

Effects on water quality from fire suppression strategies have the potential to be more severe than other fire management techniques depending on the intensity of the fire and the location of the fire in relation to perennial streams or riparian areas. These effects are related to maintenance of roads, construction of fire lines with hand tools or heavy equipment, installation of water tanks, installation of fire camps, trampling of soils by personnel and equipment at fire lines and camps, and use of aerial water drops or chemical suppressants or retardants. These effects on water quality are generally from runoff from erosion of soils disturbed by these activities.

Fire suppression strategies and prescribed fire generally require the use of fire line. Fire line construction may result in soil erosion, increased sedimentation, and alteration of spatial drainage patterns. The risk of this impact is greater along steep-sloped banks that are adjacent to streams. These potential impacts would be greatly reduced by using the mitigation measures identified in Section 2.3.

The use of chemical suppressants may be necessary to manage wildland fire. The park would adhere to Interagency Standards for Fire and Fire Aviation Operations (updated annually) for use of suppression chemicals such as foam and retardant (U.S. Department of the Interior and U.S. Department of Agriculture 2016). Use of chemical suppressants can have direct effects if the chemicals enter surface water. Aircraft delivering chemical drops would avoid hitting water. All structures (historic or otherwise) would be protected using standard methods including construction of fire lines, fuel reduction, and pretreatment with water and/or foam. If chemical suppressants and retardants enter surface water, they could have moderate to substantial adverse effects on water quality depending on the water body; the effects would likely be short term and would persist until high flows dilute any remaining chemicals.

Impacts from prescribed fire may include increases in water temperature if shading vegetation is burned, increases in sediment if fire removes vegetation immediately adjacent to water sources, and increased stream flow since there would be less vegetation and thus less transpiration on the burned areas. The use of mitigation measures described in Section 2.3, the use of natural boundaries rather than constructed fire lines, and post-fire rehabilitation of fire lines would reduce the potential for water quality impacts during use of prescribed fire.

Manual and mechanical reduction of fuel would not generally be conducted adjacent to water resources, including floodplains. If they were conducted near water sources, the potential direct adverse impacts of manual and mechanical fuel reductions would include trampling of stream banks or similar disturbances by felled and/or dragged trees and by foot or equipment traffic. These effects can be mitigated by avoidance, where possible, and immediate rehabilitation. The indirect adverse effects of manual and mechanical fuel reduction may slightly increase stream flow since there would be less vegetation and thus less transpiration on the treated area.

Cumulative Impacts

Other past, present, and reasonably foreseeable actions that may affect water quality include the park's past and future land acquisition efforts within the Fern Lake watershed and future recreation opportunities.

Land acquisitions within the Fern Lake watershed protect the area from development and adverse impacts that could occur under other management oversight, such as increased nutrient and microorganism levels from residential development and urban discharge that can lead to the eutrophication of park waters. The acquisition, protection, and conservation of the Fern Lake watershed has beneficial, long-term impacts to water quality within the park.

Water quality within the park can be impacted by the presence of recreation opportunities, such as trails, especially those located along stream channels. Well-maintained trails have fewer erosion and sedimentation problems, thereby reducing potential threats to water quality for adjacent streams. Future proposed trail maintenance activities by the park and volunteer groups would result in long-term, beneficial cumulative impacts to water quality of park water bodies.

Alternative B: FMP Revision (Preferred Alternative)

The impacts to water resources from the Proposed Action would be similar to the impacts described under the No Action Alternative, with unplanned ignitions, prescribed fire, and mechanical treatments occurring under both alternatives. The difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives, which would allow the park to manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Based on the park's fire history, approximately three unplanned fire events occur annually. Under the Proposed Action, it is likely that more than 800 to 1,500 acres of the park would experience the implementation of fire management activities because unplanned ignitions may be allowed to burn under managed conditions.

In employing use of wildland fire for multiple objectives, there would be less surface disturbance since managers may choose to use natural and human-made barriers rather than use of fire line for aggressive suppression of fires. However, fire lines may still be used, and there would be similar impacts as for suppression, as described under the No Action Alternative. Some of the acreage impacted by the use of wildland fire may be immediately adjacent to rivers and streams, so there could be potential runoff from burned areas to nearby water bodies and their floodplains. Adverse impacts may include increases in water temperature if shading vegetation is burned, increases in sediment if fire removes vegetation immediately adjacent to water sources, and increased stream flow since there would be less vegetation to intercept runoff. These adverse impacts would be expected to last one or two vegetation growing seasons to allow the vegetation to become re-established after the fire event. For high-intensity wildfires, adverse impacts to water quality may last longer. The use of mitigation measures described in Section 2.3 would reduce the potential for water quality impacts when using wildland fire for multiple objectives.

Cumulative Impacts

The cumulative impacts to water resources would be the same as described under the No Action Alternative.

Conclusion

Impacts to water resources under the No Action Alternative and Proposed Action are similar. Under both alternatives, the use of prescribed fire and mechanical treatments would be applied using MIST, thereby resulting in short-term adverse impacts to water resources lasting the duration of the treatment activities and one to two vegetation growing seasons. The difference between the two alternatives is the proposed use of wildland fire for multiple objectives under the Proposed Action. This alternative would provide the opportunity for the park to manage more acres with wildland fire when compared to the No Action Alternative, because unplanned ignitions would be allowed to burn under managed conditions where life, property, and critical natural and cultural resources are not threatened.

3.6 VEGETATION, INCLUDING NONNATIVE SPECIES AND SPECIAL STATUS SPECIES

3.6.1 Affected Environment

Historic Vegetation

Vegetation at the park has been altered by a number of variables including fire, logging operations, land clearing, highway construction, Civil War activities, agricultural practices, visitor use, human settlements, chestnut blight, and early park development (NPS 1993 as cited in NPS 2004). Civil War period (circa 1860s) photographs indicate that much of the area now part of the park was cleared in the 19th century. Trees were

harvested for use or were removed for agricultural purposes. As these land use practices changed, woody vegetation gradually reclaimed open fields and forests replaced fields and pastures (NPS 2004).

Current Vegetation

Presently, the park is largely forested. The park lies in the chestnut/chestnut oak (*Quercus prinus*)/yellow poplar (*Liriodendron tulipifera*) area of the southern hardwood forest and 33 distinct vegetation associations within 10 distinct ecological systems have been identified in the park (White 2006). Several vegetation communities are historically prone to fire and/or are traditionally managed or restored to historic conditions through the use of fire. These communities are generally dry, fire prone, and are indicated by the presence of pine, dry-site oak species, or other indicators (herbs, grasses, etc.). Major vegetation communities present in the park are described in detail in Appendix B and are listed below.

<u>Communities Historically Prone to or Managed by Fire</u>

- Blue Ridge Table Mountain Pine-Pitch Pine Woodland (Typic Type)
- Hi Lewis Pitch Pine Barrens
- Chestnut Oak Forest (Xeric Ridge Type)
- Ridge and Valley Dry-Mesic White Oak-Hickory Forest
- Appalachian Montane Oak-Hickory Forest (Chestnut Oak Type)
- Appalachian Montane Oak-Hickory Forest (Rich Type)
- Virginia Pine Successional Forest
- Appalachian Montane Oak-Hickory Forest (Red Oak Type)
- Chestnut Oak Forest (Mesic Slope Heath Type)
- Central Interior Beech-White Oak Forest
- Southern Appalachian Acidic Mixed Hardwood Forest
- Ridge and Valley Limestone Oak-Hickory Forest
- Cumberland Sandstone Glade Heath Shrubland
- Southern Appalachian Mountain Laurel Bald

<u>Non-fire Dependent Communities</u>

- Cumberland/Appalachian Hemlock-Hardwood Cove Forest
- Southern Appalachian Eastern Hemlock Forest (Typic Type)
- Northern Mixed Mesophytic Forest
- Interior Mid-to-Late-Successional Tuliptree-Hardwood Upland Forest (Acid Type)
- Successional Tuliptree Forest (Circumneutral Type)
- Dry Calcareous Forest/Woodland (White Ash-Shagbark Hickory Type)

Several invasive and invasive exotic invertebrates affect vegetation at the park. The invasive exotic hemlock woolly adelgid (*Adelges tsugae*) was discovered in the park in 2006 and is detrimental to eastern hemlock (*Tsuga canadensis*). Another invasive exotic, the emerald ash borer (*Agrilus planipennis*) was introduced into the US in the early 2000s and has since killed ash trees in the park. The southern pine beetle (*Dendroctonus frontalis*) is a native southeastern forest pest that has destroyed hundreds of acres of pines within the park. The

gypsy moth (*Lymantria dispar*) is an invasive exotic species that, though not yet present in the park, has potential to pose imminent threat to the natural resources there (NPS 2013).

Wetlands

Wetlands are rare in the park. Three constructed wetlands, serving as mitigation, provide habitat for various amphibians, including the four-toed salamander (*Hemidactylium scutatum*), wood frog (*Lithobates sylvaticus*), and spotted salamander (*Ambystoma maculatum*) (NPS 2013).

Special Status Species

The most comprehensive vegetation assessment at the park identified 882 plant species, including 127 new species not collected in previous surveys (White 2006). Of these, 90 vascular plants considered "Present in Park" or "Probably Present" meet at least one of the following criteria (Moore 2010; Appendix C):

- State-listed by the Kentucky State Nature Preserves Commission, Tennessee Natural Heritage Inventory Program, or Virginia Department of Game and Inland Fisheries as endangered, threatened, special concern, or other conservation status.
- Ranked as Critically Imperiled (G1) or Imperiled (G2) at the global level by NatureServe and its network of member programs.
- Ranked as Critically Imperiled (S1) or Imperiled (S2) at the state level by NatureServe and its network of member programs (Moore 2010).

No federally listed plant species occur in the park.

Invasive Species

More than 100 vascular plant species present or potentially present in the park are invasive, nonnative species (Moore 2010). While invasive species are present, their low proportion relative to native species indicates invasive species are not prolific throughout the forest community (Moore 2010). However, in some highly disturbed areas of the park, species such as autumn olive (*Elaeagnus umbellata*), Japanese stiltgrass (*Microstegium vimineum*), multiflora rose (*Rosa multiflora*), and privet (*Ligustrum* sp.) are outcompeting native species (NPS 2013).

Additional species that pose a particular ecological threat, which are abundant, or result in frequent management efforts at the park, include Chinese privet (*Ligustrum sinense*), Johnson grass (*Sorghum halepense*), princess tree (*Paulownia tomentosa*), tree of heaven (*Ailanthus altissima*), mimosa (*Albizia julibrissin*), garlic mustard (*Alliaria petiolata*), kudzu (*Pueraria* sp.), sericea (*Lespedeza cuneata*), crown vetch (*Securigera varia*), Oriental bittersweet (*Celastrus orbiculatus*), Chinese silvergrass (*Miscanthus sinensis*), teasel (*Dipsacus fullonum*), burning bush (*Euonymus alatus*), Japanese knotweed (*Polygonum cuspidatum*), pear (*Pyrus calleryana*), and coltsfoot (*Tussilago farfara*) (NPS 2013).

3.6.2 Environmental Consequences

Alternative A: No Action

Mechanical treatments, prescribed fire, and wildland fire suppression all have potential to affect vegetation. Mechanical treatment removes limited vegetation. Additionally, mechanical treatment impacts small, localized areas as a result of increased erosion following vegetation removal or compaction of soils from equipment. However, based on the equipment likely to be used and BMPs (Section 2.3) implemented to reduce erosion

and compaction, subsequent adverse impacts to vegetation, including invasive species encroachment, are expected to be minimal and short term.

Suppression activities used in the event of a wildfire would have adverse impacts on vegetation. Removal of vegetation along fire lines and fuel breaks would result in the direct loss of individual plants; however, impacts are not expected to rise to population-level effects. Some trampling of vegetation could occur during suppression activities from firefighters and equipment, and vehicles could crush or remove vegetation in localized areas. Adverse impacts of suppression actions on vegetation are expected to last only during the duration of the wildfire or for one to two growing seasons post-fire. Impacts to vegetation from high-intensity wildland fire has potential to be widespread and long lasting, due to removal of large swaths of vegetation and adverse impacts to seed banks, soils, and hydrology. Prescribed burning reduces fuel buildup. If a wildfire occurs under reduced fuel conditions, there would be fewer fuels to support a high-intensity fire, making wildfire suppression more easily attainable with fewer damaging suppression tactics required. The likelihood of direct consumption of organic matter is reduced in lower intensity fires. Under such circumstances, suppression activities would result in short-term adverse impacts, but post-treatment impacts as a result of avoiding large-scale, intense wildfire would be beneficial.

Areas of denser vegetation may be removed to reduce fuel loads prior to prescribed fire activities, resulting in a loss of individuals and potential impacts to species populations on a localized level. The use of prescribed fire would result in short-term adverse effects to vegetation, via removal of individuals or local populations, and in long-term beneficial impacts to vegetation communities through maintaining ecological function and supporting native species. Additionally, several vegetation communities in the park are historically fire prone and the use of prescribed fire would restore historic and more natural conditions in areas such as the Virginia Pine Successional Forest. Prescribed fire improves soil nutrient cycling and in turn promotes plant productivity (Neary et al. 1999). Prescribed fire helps thin encroaching scrub/shrub components, thereby reducing competition for limited resources and restoring native vegetation structure and composition. Prescribed fire does have potential to contribute to the spread of invasive nonnative species through transport on firefighting apparatuses. BMPs, such as washing and inspecting all apparatuses prior to a prescribed fire, would be implemented to avoid and mitigate this threat. Additionally, in some instances, small sections of a prescribed burn may burn too hot, leading to excessive mortality of older oaks and pines, development of brush thickets, and invasion of invasive species. At the park, previous fire monitoring work has resulted in the development of BMPs that emphasize “light burning” in the park’s woodlands. Such BMPs minimize the potential for these adverse impacts to occur.

Overall, prescribed fire could result in the loss of individual plants; however, broader impacts to the plant population and community composition would be long term and beneficial due to beneficial impacts on nutrient cycling, plant productivity, and improved resilience to unplanned ignitions. The use of prescribed fire, when used in conjunction with other management tools, could assist with controlling nonnative plant species.

Cumulative Impacts

Cumulative impacts to vegetation could occur as a result of the No Action Alternative and other actions (e.g., development or prescribed burns conducted by local government and private entities, trail development in the park, and trail and road maintenance in the park). The cumulative effects of removing individual plants is not expected to rise to population-level effects. While prescribed fire associated with other landowners and agencies could temporarily impact vegetation, such activities are expected to provide long-term benefits through improved ecosystem functioning, restoration to historic vegetative conditions, and improved resilience to wildfire across a broader area. The No Action Alternative would contribute to cumulative short-term adverse and long-term beneficial impacts to vegetation.

Alternative B: FMP Revision (Preferred Alternative)

Impacts resulting from mechanical treatment, prescribed fire, and wildland fire suppression would be similar to those described under the No Action Alternative—short term, adverse and long term, beneficial. The difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives, which would allow the park to manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Therefore, it is possible for more acres to be impacted by fire management activities under the Proposed Action when compared to the No Action Alternative. Impacts to vegetation would be the same as described under the No Action Alternative, with both adverse and beneficial impacts occurring on more acreage under the Proposed Action.

The use of wildland fire would promote a naturally functioning ecosystem. Direct impacts to vegetation would occur from the removal of vegetation, though much of the park's vegetation cover has adapted to fire-prone communities. For example, shortleaf pine (*Pinus echinata*), pitch pine (*P. rigida*), Virginia pine (*P. virginiana*), chestnut oak, white oak (*Q. alba*), and black oak (*Q. velutina*) represent the dominant forest cover species for at least 40% to 60% of the park (Klein 2016a). This group of species is widely known to have multiple adaptations to fire, such as thick bark, wound compartmentalization (especially oaks), shade intolerance, sprouting ability, and the need for exposed seed beds for germination and establishment (Klein 2016a). Removal of vegetation through the use of wildland fire for multiple objectives would have short-term, minor effects on vegetation. These adverse impacts would be expected to last one or two vegetation growing seasons to allow the vegetation to become re-established after the wildland fire event. Fire tolerant and resistant species would recover over time.

Use of wildland fire for multiple objectives can enhance the cycle of nutrients by releasing nutrients bound in dead plant material, making them available for new plant growth. While fire encourages new growth of many plant species, it can also alter plant community composition. Fire can be used to clear residual plants from a landscape and, when used in conjunction with other management tools, to negatively impact nonnative plants or other invasive species that dominate certain habitats to the extent that habitat quality is compromised. Perpetuating a natural fire regime would have long-term, direct, beneficial effects on vegetation.

Cumulative Impacts

Cumulative impacts of the Proposed Action would be the same as those for the No Action Alternative.

Conclusion

Effects to vegetation as a result of mechanical treatment, prescribed fire, and wildland fire suppression would be the same under both alternatives. Under the Proposed Action, the impact of managing unplanned ignitions on vegetation would be adverse in the short term and beneficial in the long term; however, the extent of these effects are somewhat unpredictable. Under each alternative, adverse impacts are unlikely to rise to population-level impacts except at a localized level. The use of prescribed fire and managed wildland fire would have substantial long-term beneficial effects to vegetation.

3.7 WILDLIFE, INCLUDING NONNATIVE SPECIES AND SPECIAL STATUS SPECIES

3.7.1 Affected Environment

The park has conducted numerous wildlife surveys, and has inventoried the animals of the park. For the proposed FMP revision, the park requested and received information related to special-status species with potential to occur in or near the park from the USFWS and Virginia Department of Conservation and Recreation (DCR) (Appendix D and Table 3.2). Additionally, the park followed up with each USFWS

Ecological Services Field Office and the Virginia DCR to help identify the species that may occur within the park boundaries. Of the species noted in agency response letters and listed in Table 3.2, the blackside dace (*Phoxinus cumberlandensis*), Cumberland arrow darter (*Etheostoma sagitta*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*) are present with the park. Gray bat (*Myotis grisescens*) is probably present within the park. Yellowfin madtom (*Noturus flavipinnis*), spider elimia (*Elimia arachnoidea*), spiny scale crayfish (*Cambarus jezerinaci*), and Tennessee pigtoe (*Pleuronaia barnesiana*) are not known to occur within the park, yet there is suitable habitat for these species within the park.

TABLE 3.2. SPECIAL STATUS SPECIES NOTED IN AGENCY CORRESPONDENCE (BOLDED TEXT INDICATES SPECIES THAT ARE "PRESENT," "PROBABLY PRESENT," OR NOT KNOWN TO OCCUR BUT SUITABLE HABITAT IS PRESENT WITHIN THE PARK)

Common Name	Scientific Name	Virginia DCR [1, 2, 3]	Kentucky USFWS [4, 5]	Tennessee USFWS [6, 7]	Virginia USFWS [8, 9]
Appalachian monkeyface (pearlymussel)	*Quadrula sparsa*	-	-	-	X
Birdwing pearlymussel	*Lemiox rimosus*	-	-	-	X
Blackside dace	***Phoxinus cumberlandensis***	**-**	**X**	**X**	**X**
Cracking pearlymussel	*Hemistena lata*	-	-	-	X
Cumberland arrow darter	***Etheostoma sagitta***		**X**	**-**	**-**
Cumberland elktoe	*Alasmidonta atropurpurea*		X	-	-
Cumberland monkeyface	*Quadrula intermedia*		-	-	X
Cumberlandian combshell	*Epioblasma brevidens*	-	-	X	X
Dromedary pearlymussel	*Dromus dromas*	-	-	X	X
Fanshell	*Cyprogenia stegaria*	-	X	-	X
Finerayed pigtoe	*Fusconaia cuneolus*	-	-	X	X
Fluted kidneyshell	*Ptychobranchus subtentum*	-	-	X	X
Kentucky arrow darter	*Etheostoma spilotum*	-	X	-	-
Littlewing pearlymussel	*Pegias fabula*	-	-	-	X
Madison Cave isopod	*Antrolana lira*	X	-	-	-
Northern riffleshell	*Epioblasma torulosa rangiana*	-	X	-	-
Orangefoot pimpleback	*Plethobasus cooperianus*	-	-	X	-
Oyster mussel	*Epioblasma capsaeformis*	-	-	X	X
Purple bean	*Villosa perpurpurea*	-	-	X	X
Rough rabbitsfoot	*Quadrula cylindrica strigillata*	-	-	X	X
Sheepnose mussel	*Plethobasus cyphyus*	-	X	X	X
Shiny pigtoe	*Fusconaia cor*	-	-	X	X
Slabside pearlymussel	*Pleuronaia dolabelloides*	-	-	X	X
Slender chub	*Erimystax cahni*	-	-	X	X
Snuffbox mussel	*Epioblasma triquetra*	-	-	X	X
Spider elimia	***Elimia arachnoidea***	**X**	**-**	**-**	**-**
Spiny riversnail	*Io fluvialis*	-	-	X	-
Spiny scale crayfish	***Cambarus jezerinaci***	**X**	**-**	**-**	**-**
Spotfin chub	*Erimonax monachus*	-	-	X	-
Tennessee pigtoe	***Pleuronaia barnesiana***	**X**	**-**	**-**	**-**
Yellowfin madtom	***Noturus flavipinnis***	**-**	**-**	**X**	**X**
Gray bat	***Myotis grisescens***	**-**	**X**	**X**	**X**
Indiana bat	***Myotis sodalis***	**X**	**X**	**X**	**X**
Northern long-eared bat	***Myotis septentrionalis***	**X**	**X**	**X**	**X**
Icebox cave beetle	*Pseudanophthalmus frigidus*	-	X	-	-

[1] Letter from Virginia DCR, dated 2/3/2016
[2] Rene' Hypes, Natural Heritage Project Review Coordinator with the Virginia DCR, personal communication with Jenny Beeler, Cumberland Gap National Historical Park, August 1, 2016
[3] Wil Orndorff, Karst Protection Coordinator with the Virginia DCR, personal communication with Jenny Beeler, Cumberland Gap National Historical Park, August 1, 2016
[4] Letter from the Kentucky Ecological Services Field Office, dated 2/8/2016 and follow up email on 2/19/2016
[5] Michael Floyd, Wildlife Biologist with the Kentucky Ecological Services Field Office, personal communication with Jenny Beeler, Cumberland Gap National Historical Park, July 28, 2016
[6] Letter from the Tennessee Ecological Services Field Office, dated 2/8/2016 and follow up letter on 2/10/2016
[7] Stephanie Chance, Fish and Wildlife Biologist with the Tennessee Ecological Services Field Office, personal communication with Jenny Beeler, Cumberland Gap National Historical Park, August 1, 2016
[8] Letter from the Virginia Ecological Services Field Office, dated 2/8/2016
[9] Brian Evans, Fish and Wildlife Biologist with the Virginia Ecological Services Field Office, personal communication with Jenny Beeler, Cumberland Gap National Historical Park, August 1, 2016

Mammals

The park's natural habitats and vegetation communities support a wide variety of wildlife. Forty mammal species, including nine bats, two federally listed species (Indiana bat, endangered, and northern long-eared bat, threatened), one federal species of concern (Allegheny woodrat, *Neotoma magister*), and several state-listed species have been documented in the park during inventories (NPS 2013; Moore 2010; Appendix C). A third federally listed species, the gray bat (*Myotis grisescens*; endangered) is considered "probably present" in the park (Moore 2010). Results indicate a diverse, native mammal community, including both specialists and generalists in all trophic levels (NPS 2013). Common mammal species include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), opossum (*Dedelphis virginiana*), gray squirrel (*Sciurus carolinensis*), American black bear (*Ursus americanus*), and coyote (*Canis latrans*). Twenty-one species of native shrews and rodents utilize habitat at the park (NPS 2004 and 2013).

Exotic and range-expanding mammal species are rare in the park. Feral hogs (*Sus scrofa*), house mouse (*Mus musculus*), Norway rats (*Rattus norvegicus*), and dogs (*Canis familiaris*) and abandoned pets have potential to occur in the park. Although most of these animals have not been observed during recent survey efforts, they may occur in the park and have potential to cause damage to native wildlife. Feral cats have depredated summer roosting bats in Gap Cave on more than one occasion (Jenny Beeler, personal communication as cited in NPS 2013).

Federally Listed Species

As described above, the federally endangered Indiana bat and federally threatened northern long-eared bat occur at the park, and the federally endangered gray bat is considered "probably present" in the park (Moore 2010). Indiana bats hibernate in cave and cave-like structures (mines, tunnels, etc.) with specific temperature and humidity requirements (USFWS 2006). Indiana bats hibernate in large clusters, sometimes of several thousand bats to a group (USFWS 2007). The winter bat populations are monitored by the NPS Inventory and Monitoring Program. Studies on summer populations in the park have been limited, and there are no known maternity roost trees for either species within the park. A study to determine the use of roost trees within the Park is currently funded and set to be conducted during the summer of 2017 (Klein 2016b).

Indiana bats tend to arrive at hibernacula from mid-August through October and emerge from hibernacula from mid-April through May, after approximately 190 days of hibernation (Menzel et al. 2001). After hibernation, Indiana bats migrate an average of 296 miles and as far as 357 miles between a hibernaculum and summer maternity grounds (Winhold and Kurta 2006). After leaving hibernacula, Indiana bats migrate to suitable summer habitat, which consists of:

> a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures. This includes forests and woodlots containing potential roosts…These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/woodland habitat (USFWS 2014a).

Reproductively mature females form maternity colonies with as many as 500 individuals as a life history strategy to improve reproductive success, while males and non-reproductive females typically roost singly or in small groups (USFWS 2007). Maternity colonies generally occupy distinct home ranges generally no more than 5 miles in diameter (USFWS 2014a). Indiana bat maternity colonies typically occupy one to a few primary roost trees and may use as many as 20 additional secondary roosts during the summer maternity season (Callahan et al. 1997; Kurta et al. 2002).

Indiana bats inhabit two limestone cave formations in the park and likely roost and forage in surrounding forested habitat during summer. Indiana bats are sensitive to flooding, pesticide poisoning, loss of summer

habitat, white-nose syndrome, and human-caused disturbance. The Commonwealth of Virginia Department of Conservation and Recreation recommends adherence to Indiana bat protection guidelines and coordination with the USFWS and Virginia Department of Game and Inland Fisheries to ensure compliance with protected species legislation (Appendix D).

Like the Indiana bat, northern long-eared bats hibernate in caves and mines, and distribute across the landscape during summer months. Northern long-eared bats tend to arrive at hibernacula, where they hibernate singularly versus in clusters, from mid-August through November and emerge from hibernacula from early April through May (USFWS 2014b). The species migrates from hibernacula to suitable summer habitat, which the USFWS considers generally similar to Indiana bats and includes a wide variety of forested/wooded habitats where northern long-eared bats roost, forage, and travel. Summer habitat also may include adjacent and interspersed non-forested habitats such as emergent wetlands, adjacent edges of agricultural fields, old fields, and pastures (USFWS 2014b). The northern long-eared bat is one of the species of bats most impacted by the disease white-nose syndrome.

Though not documented at the park, the gray bat occurs in areas near the park, and potentially suitable habitat for the bat is present in the park. The gray bat is considered "probably present" in the park (Moore 2010). Gray bats, with rare exceptions, live year-round in caves. During winter, the species hibernates in deep, vertical caves. In summer, gray bats roost in caves scattered along rivers. Gray bats forage along rivers and lakes where they prey on a variety of flying aquatic and terrestrial insects.

Birds

One hundred forty-two bird species are present in the park, including 24 species that are either state-listed or ranked as G1 or G2 at the global or state level by NatureServe (Moore 2010). Additionally, 14 species are considered "probably present", including 4 that are either state-listed or ranked as G1 or G2 at the global or state level by NatureServe; and 6 species are considered "unconfirmed," "encroaching," or "historic" (Moore 2010). These species are provided in the park's Natural Resource Condition Assessment (NPS 2013:Table 22). Additionally, some species do not have formal federal or state status, but are considered during management planning by park staff. Birds of management concern for the park include cerulean warbler (*Dendroica cerulea*), worm-eating warbler (*Helmitheros vermivorum*), and wood thrush (*Hylocichla mustelina*) for forest interior species; golden-winged warbler (*Vermivora chrysoptera*) and prairie warbler (*Setophaga discolor*) for early successional scrub species; and Louisiana waterthrush (*Parkesia motacilla*) for forest riparian species (Rosenberg 2003 as cited in NPS 2013). Additionally, Kentucky, Tennessee, and Virginia have Comprehensive Wildlife Conservation Strategies describing species of greatest conservation concern (NPS 2013). Thirty-nine bird species at the park are included on at least one of the state's Comprehensive Wildlife Conservation Strategies as a species of priority conservation concern (NPS 2013:Table 22).

Reptiles and Amphibians

Forty-seven reptile and amphibian species have been observed in the park during multiple survey efforts from 1979 to 2003 (NPS 2013). Several herpetofaunal long-term monitoring efforts have been undertaken at the park. For example, breeding effort of spotted salamanders and wood frogs in three mitigation ponds in the park has been monitored since 1993 to determine success and activity. These ponds provide habitat for at least 11 species (Petranka 2005 as cited in NPS 2013).

Fish and Other Aquatic Species

Twenty-five fish species from eight families and including one federally listed species (blackside dace, *Phoxinus cumberlandensis*, threatened) occur in the park (NPS 2013). The park contains warm, cool, and cold water stream habitat in the headwaters of two major drainages, and fish assemblages are considered healthy and diverse (NPS 2013). The Cumberland arrow darter (*Etheostoma sagitta)* is known to occur within the park. The species was previously listed as a federal candidate species; however this status has been removed.

Several exotic fish species also have been documented in the park. Rainbow trout (*Oncorhynchus mykiss*), common carp (*Cyprinus carpio*), and yellow perch (*Perca flavescens*) have been observed in lower Little Yellow Creek. Redbreast sunfish (*Lepomis auritus*) is an invasive species in the park's streams. Sunfish may predate blackside dace.

The Virginia DCR has identified one state listed species (spider elimia, *Elimia arachnoidea*, endangered) that has suitable habitat within the park's headwater streams, although the species' occurrence within the park is unknown at this time (Virginia DCR 2016). The spider elimia is a freshwater snail species that occurs in small streams in Tennessee and southwestern Virginia (Virginia DCR 2016). It is found in small, rich, hardwater creeks and springfed streams.

The Virginia DCR has also noted two species identified as "very rare and imperiled" with potential habitat within the park. These species are the spiny scale crayfish (*Cambarus jezerinaci)* and Tennessee pigtoe (*Pleuronaia barnesiana*). The spiny scale crayfish is found in first and second order spring-fed streams draining into the Powell River (Virginia DCR 2016). The Tennessee pigtoe, a freshwater mussel, occurs in the Cumberland regions of the Tennessee River, and in Virginia, there are records from the Clinch, Powell, and Holston drainages (Virginia DCR 2016).

Federally Listed Species

Blackside dace occur in the park in both Davis Branch and Little Yellow Creek above Fern Lake (Remley 2005 as cited in NPS 2010). Studies have observed a decrease in the blackside dace population in the upper reaches of Davis Branch. Habitat alterations by beaver (*Castor* sp.) have elevated water temperature, increased siltation in the substrate, and reduced canopy cover. Blackside dace prefer cool streams with rocky substrates and good canopy cover. A population of blackside dace persists in Little Yellow Creek above Fern Lake. The continued survival of a healthy blackside dace population there can be attributed to the presence of silt-free areas downstream of riffles, which provides suitable spawning habitat, and to an undisturbed zone of riparian vegetation, the shading of which attenuates stream temperature increase during summer months (NPS 2010).

The park contains suitable habitat for the federally listed yellowfin madtom (*Noturus flavipinnis*, threatened), although the species' presence within the park is unknown at this time (Stephanie Chance, Fish and Wildlife Biologist with the Tennessee Ecological Services Field Office, personal communication with Jenny Beeler, Cumberland Gap National Historical Park, August 1, 2016; Brian Evans, Fish and Wildlife Biologist with the Virginia Ecological Services Field Office, personal communication with Jenny Beeler, Cumberland Gap National Historical Park, August 1, 2016). The species is known to occur outside of the park in Lee County, Virginia and Claiborne County, Tennessee. Habitat requirements for yellowfin madtom include medium-sized and large creeks that are unsilted and warm or warm to cool (NatureServe 2009). The species usually occurs in slow pools and occasionally small backwaters or runs and riffles.

3.7.2 Environmental Consequences

Alternative A: No Action

Mammals

Most mammals occurring in the park are considered common and widespread throughout the region, and many are adapted to developed areas and human disturbance. Use of mechanical treatments (e.g., mowing and use of chainsaws) under the No Action Alternative may cause noise or disturbance temporarily displacing mammals. However, displacement is expected to be minimal and short lived. Vegetation management through mechanical treatment is discrete and targeted. In most cases, mammals displaced from habitat could utilize adjacent habitats or undisturbed habitats elsewhere in the park.

Under the No Action Alternative, all wildfires would be suppressed. During fire suppression activities, mammals may be disturbed by firefighters, use of mechanical equipment, and water applications. The duration of this disturbance would be limited to the duration of fire management activities. Adverse effects to individuals are expected to be short term and not rise to population-level impacts.

Mammals, when mobile, can escape the heat and smoke of wildfire. Juveniles or litters may be killed by fire, but breeding adults likely would survive and reproduce in the same year or in subsequent years depending on the species and season. Individuals of smaller species may not always be able to escape fire. However, many would escape. Volant mammals (bats) are often capable of escaping fire through flight (hibernating bats may be able but to a lesser extent) (Perry 2011). Impacts may include effects to habitat, including loss of cover and potential foraging habitat, and temporary displacement of individuals (Perry 2011). However, mammals could utilize neighboring unburned areas during fire and likely would repopulate burned areas once fire ceased. New growth in burned areas can provide increased forage quality and availability for species such as white-tailed deer. Overall, effects to mammals as a result of wildfire are expected to be short term, as fire suppression activities would be implemented to contain and extinguish the fire.

The temporary effects to mammals as a result of prescribed fire would be similar to those from wildfire (e.g., displacement). However, prescribed fire provides varied habitat structure suiting a diverse wildlife assemblage and providing benefits to many species over the long term. Some species may utilize the encroaching shrub habitat for cover; therefore, prescribed fire could have adverse impacts for species utilizing shrub habitat. It is expected that such species would be able to utilize other shrub habitat in adjacent areas. Mitigation actions to minimize the severity of prescribed fire (e.g., development of site-specific prescribed burn plans and involvement of park wildlife specialists in fire management activities) would limit adverse impacts to mammals to the short term.

Federally Listed Species

Mechanical treatments, wildland fire and suppression, and prescribed fire have potential to result in removal of suitable bat roost trees. If suitable roost trees for Indiana or northern long-eared bats are removed, adverse effects to the species have potential to occur. It is not known which, if any, trees in the park are used by these bat species. Thus, trees would be removed during winter (November 15–March 31) when bats are not present. If trees must be removed outside these dates, ESA Section 7 consultation would be reinitiated with USFWS Additionally, if summer maternity roosts are identified, the surrounding forest and foraging areas within 2.5 miles of the documented maternity roost tree would be maintained in as natural a state as possible. These areas would be monitored to ensure human disturbance is minimized. The forests above and around listed bat cave hibernacula would not be dramatically altered by human activity. These measures would avoid adverse impacts to bats and their habitat as a result of fire management activities.

Numerous potential effects to Indiana, northern long-eared, and gray bats could occur as a result of wildfire. Effects depend largely on the season in which fire occurs and what the species are doing during that time. Wildfires, because they are unplanned, can affect any area with burnable vegetation at any time. This has potential to include potential roosting habitat for listed bat species, and individuals of the species if they are present. Fire has potential to directly affect bats via heat, smoke, and CO. In addition, bats can be indirectly affected via habitat and prey base modifications (Dickinson et al. 2009 as cited in Perry 2011). Because bats require time to arouse from torpor, hibernating bats may not have adequate opportunity to arouse and escape the effects of fire (such as smoke drifting into a cave) (Perry 2011). Under the No Action Alternative, all wildland fire would be suppressed, minimizing the potential for such adverse effects to occur. However, in cases where intense wildfires burn or wildfires resist immediate suppression, short-term adverse effects to bats have potential to occur.

Prescribed fire has potential to affect listed bats via many of the same modes described above for wildland fire (e.g., heat, smoke, and CO). The park's fire program has a history of consulting with USFWS regarding potential impacts of prescribed burning to Indiana bats since the onset of the prescribed burning program in 2005. The park has consulted with USFWS regarding impacts to northern long-eared bats since they were

listed as federally threatened in April 2015. These consultations have occurred annually and they have addressed the site-specific concerns for each individual burn completed in a given year. In general, USFWS has concurred with the park that burns conducted prior to April 1, and greater than 0.25 miles from known hibernacula, were not likely to adversely affect either species. Under both alternatives, this site specific consultation and the agreed-upon mitigation measures would continue for all prescribed burns. Prescribed burns can improve habitat quality for Indiana and northern long-eared bats via creation of snags, reduction in understory and midstory clutter and creation of open flyways, and potentially an increase in prey base (Perry 2011).

Because bat habitat could be improved through the use of fire, and BMPs would be implemented to avoid adverse impacts resulting from fire management activities, the No Action Alternative may affect, but is not likely to adversely affect Indiana, northern long-eared, and gray bats.

Birds

Use of mechanical treatments (e.g., mowing and use of chainsaws) under the No Action Alternative may cause noise or disturbance temporarily displacing birds. However, displacement is expected to be minimal and short lived. Vegetation management through mechanical treatment is discrete and targeted. In most cases, birds displaced from habitat could utilize adjacent habitats or undisturbed habitats elsewhere in the park. If young are present (e.g., in nests), they may be lost directly during mechanical treatment.

Under the No Action Alternative, all wildfires would be suppressed. During fire suppression activities, birds may be temporarily displaced by disturbance resulting from firefighters, use of mechanical equipment, and water applications. Nestling or fledgling birds may be lost through direct mortality during wildfire and suppression activities. Adult birds easily can escape disturbance and fire through flight. The duration of impacts would be limited to the duration of fire management activities. Permanent adverse effects to populations would not be expected to occur as a result of wildland fire suppression.

Effects to birds as a result of prescribed fire are similar to those from wildfire. Some bird species would benefit in the long term from improved habitat created through the use of prescribed fire, e.g., the stimulation of growth and seed production of food plants for birds and other wildlife (Knapp et al. 2009). Some bird species may utilize the encroaching shrub habitat for cover; therefore, prescribed fire could have adverse impacts for species utilizing shrub habitat. However, these species would be able to utilize other shrub habitat in adjacent areas. The varied habitat structure created through multiple-entry prescribed fire would suit a diverse wildlife assemblage and provide benefits to many bird species. Seasonal restrictions on prescribed fires intended to avoid effects to protect federally listed bat species during the summer roosting season would also avoid effects to birds nesting or rearing young during that time.

Due to BMPs to minimize the severity of prescribed fire, including the development of site-specific prescribed burn plans and the involvement of park specialists in fire management activities, adverse impacts to bird species would be short term.

Reptiles and Amphibians

Use of mechanical treatments (e.g., mowing and use of chainsaws) under the No Action Alternative may cause noise or disturbance temporarily displacing reptile and amphibian species. However, any displacement is expected to be minimal and short lived. Vegetation management through mechanical treatment is discrete and targeted. In most cases, animals displaced from habitat could utilize adjacent habitats depending upon mobility.

Under the No Action Alternative, all wildland fires would continue to be suppressed. During fire suppression activities, reptile and amphibian species may be temporarily displaced by disturbance resulting from firefighters, use of mechanical equipment, and water applications. Suppression activities may result in trampling and crushing of individuals. The duration of these effects would be limited to the duration of fire

management activities. Permanent adverse effects to populations would not be expected to occur as a result of these management activities.

Reptiles and amphibians have species-specific adaptations that allow them to avoid impacts from fire, including burrowing and selection of wetter habitats less prone to wildfire. Many reptiles and amphibians (e.g., some salamander species) depend on coarse woody debris in bottomland hardwood forests and understory herbaceous vegetation to provide cover (Lower Mississippi Valley Joint Venture Forest Resource Conservation Working Group 2007). Some species may depend on herbaceous cover to attract prey. Intense, unplanned ignitions, if they resist immediate suppression, may result in consumption of this important habitat component for a number of growing seasons, causing adverse impacts to these habitat specialists (Rochester et al. 2010). Low-intensity fire may reduce soil moisture content through elimination of leaf litter and increase in light penetrating the soil surface (Barnes and Van Lear 1998 as cited in Floyd et al. 2002). Reductions in litter mass, depth, and moisture may result in a decrease in some herpetofaunal species (e.g., terrestrial salamanders) as they depend on these habitat features for respiration and foraging (Ash 1995 as cited in Floyd et al. 2002). Fire would result in an increase in areas of early seral vegetation, benefitting species that select for more open and disturbed habitat (Rochester et al. 2010). Overall, effects to reptiles and amphibians as a result of wildfire are expected to be minimal and short term/temporary, adverse, and beneficial, as fire suppression activities would be implemented to contain and extinguish the fire, thereby minimizing effects.

Effects to reptiles and amphibians as a result of prescribed fire would be similar to those described above for wildland fires resisting suppression. However, prescribed fire would be managed to create a mosaic of habitat benefiting many reptile and amphibian species over the long term. Due to BMPs to minimize the severity of prescribed fire (e.g., development of site-specific prescribed burn plans and involvement of park wildlife specialists in fire management activities), adverse impacts to amphibians and reptiles would be short term, and beneficial effects would be short and long term.

Fish and Other Aquatic Species

Mechanical treatments and fire suppression activities are not expected to result in effects to fish and other aquatic species. Removal of vegetative cover may cause a decrease in habitat quality due to increased water temperatures, increased suspended sediment, and decreased dissolved oxygen, which could cause displacement of individuals to unburned areas. However, displacement of individuals is expected to be temporary (Rinne and Jacoby 2005). Fire can result in fish mortality, though few studies have documented such direct effects (Rinne and Jacoby 2005). Severe fire and heavy fuel and slash buildup in riparian areas are predisposing factors for direct fish kills resulting from fire (Rinne and Jacoby 2005). Key factors in immediate mortality to fish and other aquatic species include size of the riparian area, fuel load present in the riparian area, severity of fire, and size of aquatic habitat (e.g., stream) (Rinne and Jacoby 2005). For example, a small stream with neighboring high fuel loads and high-severity fire is most likely to experience immediate aquatic species mortality following fire. Where such conditions exist in the park, if fire could not be effectively contained, such impacts have potential to occur.

Prescribed burning is not expected to be a threat to fish bearing streams. Consideration of fish-bearing streams would be taken when planning prescribed burns and during implementation of prescribed fires care would be taken to avoid streams and rivers. Fish and aquatic habitats could be adversely affected due to small amounts of short-term sedimentation from ash from prescribed burning. Due to measures to minimize the severity of prescribed fire and minimize the resulting effects to aquatic resources, adverse impacts to fish and other aquatic species, including the Cumberland arrow darter, spider elimia, spiny scale crayfish, and Tennessee pigtoe, are expected to be negligible and short term if impacts occur.

Federally Listed Species

Potential effects to blackside dace and yellowfin madtom are the same as those described above for fish. The park's fire program has a history of consulting with USFWS regarding potential impacts of prescribed burning to blackside dace since the onset of the prescribed burning program in 2005. These consultations have occurred

annually and they have addressed the site-specific concerns for each individual burn completed in a given year. In general, USFWS has concurred with the park that burns conducted in a manner to not disturb habitat within the riparian zone where the species occurs and to managing ignitions in a manner to burn away from riparian areas, would result in a may affect but not likely to adversely affect determination to the species. Under both alternatives, this site-specific consultation and the agreed-upon mitigation measures would continue for all prescribed burns. Because BMPs would be implemented to ensure adverse effects to blackside dace and yellowfin madtom habitats are avoided and wildland fires would be immediately suppressed, the No Action Alternative may affect but is not likely to adversely affect the species.

Cumulative Impacts

Birds, bats (in certain life history stages), and adult mammals are capable of escaping impact sources and can occupy adjacent habitat during disturbance and until habitat is restored. However, cumulative impacts to wildlife could occur under the No Action Alternative. This could occur if mechanical treatments, wildfire, or prescribed burns occur simultaneous to development or planned/unplanned ignitions by landowners or agencies in adjacent areas, trail development in the park, and trail and road maintenance in the park. Such circumstances could compound the effects of temporary displacement on wildlife species by rendering habitats to which disturbed wildlife otherwise could escape also temporarily unsuitable. This could result in additional expenditure of energy and increased breeding and foraging competition. However, surviving individuals would be expected to repopulate disturbed areas over time. Species in less mobile life stages (juvenile or nestling), and less mobile species (small mammals, amphibians, and reptiles) could be cumulatively impacted by mechanical treatment and/or fire management through direct injury or mortality if they are experiencing similar effects from simultaneous activities (i.e., those noted above). Prescribed fires carried out by the park would avoid sensitive resources, including listed bat species, through the use of BMPs, thereby not contributing to adverse cumulative effects to such resources. Prescribed fire may contribute beneficially to habitat quality of all wildlife, including listed bat species, within and surrounding the park.

Alternative B: FMP Revision (Preferred Alternative)

Mammals

Impacts resulting from mechanical treatment, prescribed fire, and wildland fire suppression would be similar to those described under the No Action Alternative—short-term, adverse and long-term, beneficial. Potential impacts to mammals as a result of managed wildland fire would be similar to those described for prescribed fire under the No Action Alternative. The difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives, which would allow the park to manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Based on the park's fire history, approximately three unplanned fire events occur annually. Under the Proposed Action, it is likely that more than 800 to 1,500 acres could experience fire management activities because unplanned ignitions may be allowed to burn under managed conditions.

Individuals in less mobile life stages (juvenile or roosting) and less mobile, small mammal species could be adversely affected by the use of wildland fire for multiple objectives. However, most species evolved in the presence of fire and have behavioral and other adaptations making populations resilient to fire. Based on the park's fire history, it is most likely that suitable and available habitat for many wildlife species would persist in other areas of the park during prescribed burn or wildland fire management events. Foraging opportunities may decrease for some species during the disturbance event, but may increase following fire. The use of prescribed fire, and of managed wildland fire under the Proposed Action, would provide long-term beneficial impacts to wildlife that may result from increased plant productivity, and reduced incidence of intense wildfire. Further, over the long term, improvements to vegetation are expected to result in improved ecosystem functioning and increased habitat diversity. The use of prescribed burns, and of wildfire only under specific conditions under the Proposed Action, would allow park staff to control fire location, season, and intensity. In this way, impacts to sensitive mammals would be avoided or minimized.

Federally Listed Species

Impacts resulting from mechanical treatment, prescribed fire, and wildland fire suppression would be similar to those described under the No Action Alternative—short-term, adverse and long-term, beneficial. Under the Proposed Action, an estimated 800 to 1,500 acres or 3% to 6% of the entire park's acreage would undergo treatment by prescribed fire and mechanical treatments in any given year.

The primary difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives. Wildland fires would be allowed to burn, and managed, only under specific conditions that would not result in adverse impacts to Indiana, northern long-eared, and gray bats or their habitats. Under this alternative, the park would have the option to manage naturally-occurring wildfires for resource benefits. The park would also have greater flexibility to manage human-caused wildfires using indirect control lines to ensure human safety and avoid resource damage, in accordance with NPS policies. Because the annual occurrence of wildfire within the park is low, this change has only limited potential to cause additional impacts to federally listed bat species when compared to the No Action Alternative. However, because these management practices would result in fire burning in unplanned locations and seasons, they may impact these species. To avoid adverse impacts to the greatest extent possible, the park would implement the following mitigation measures:

- After providing for public and firefighter safety, attempt to prevent any wildfire from burning to within 0.25 miles of a known hibernaculum
- After providing for public and firefighter safety, attempt to prevent any wildfire from burning to within 150 feet of a known maternity roost tree, if one is found in the park
- Contact the appropriate USFWS Ecological Services Office as soon as it is practical to do so in the event of any wildfire that burns within 0.25 miles of a known hibernaculum or 150 feet of a known maternity roost tree, or that occurs during the maternity season (approximately April 1 – August 15). Note: This procedure follows the "Emergency Consultation Process" as defined by USFWS.

Because the park currently has no records of maternity roost trees, it is essential to use an adaptive management approach to implement these mitigation measures. The future roost tree study could provide information on roost tree locations for federally listed bat species; this information would then be used to determine necessary mitigation during a managed wildfire event. The Proposed Action may affect, but is not likely to adversely affect Indiana, northern long-eared, and gray bats because bat habitat could be improved through the use of fire, and BMPs would be implemented to avoid adverse impacts resulting from fire management activities.

Birds

Impacts resulting from mechanical treatment, prescribed fire, and wildland fire suppression would be similar to those described under the No Action Alternative. Wildland fires managed for multiple objectives would be allowed to burn, and managed, only under specific conditions. Potential impacts to birds as a result of managed wildland fire would be similar to those described for the No Action Alternative—short-term adverse and long-term, beneficial. During wildland fire management activities, birds may be temporarily displaced by disturbance resulting from firefighters, use of mechanical equipment, and the presence of wildfire. Nestling or fledgling birds may be lost through direct mortality during these managed events, especially during the migratory bird nesting season. Adult birds easily can escape disturbance and fire through flight. Seasonal restrictions on prescribed fires intended to avoid effects to federally listed bat species during the summer roosting season would also avoid effects to birds nesting or rearing young during that time. The duration of impacts would be limited to the duration of fire management activities. Permanent adverse effects to populations would not be expected to occur when using wildland fire for multiple objectives.

Reptiles and Amphibians

Impacts to reptiles and amphibians resulting from the Proposed Action would be similar to those described under the No Action Alternative. Reptiles and amphibians have species-specific adaptations that allow them to avoid impacts from fire, including burrowing and selection of wetter habitats less prone to wildfire; therefore, adverse impacts are expected to be minimal. Under the Proposed Action, the park could manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Therefore, it is possible for more acres to be impacted by fire management activities under the Proposed Action when compared to the No Action Alternative. In the long term, beneficial impacts to reptiles and amphibians are expected in the form of habitat enhancement.

Fish and Other Aquatic Species

Impacts to fish and other aquatic species resulting from mechanical treatment, prescribed fire, and wildland fire suppression would be similar to those described under the No Action Alternative. Use of wildland fire for multiple objectives would have minor, adverse effects on fish and aquatic species and their habitat. Fires can result in immediate mortalities to fish. Increased suspended sediment loads from rain events over areas covered in ash could degrade the water quality of fish and aquatic species habitat, including the habitat of the Cumberland arrow darter, spider elimia, spiny scale crayfish, and Tennessee pigtoe. A majority of the fires would burn themselves out in moist streamside areas, providing a natural buffer strip that would filter out products of erosion before they entered the stream. Long-term benefits to fish and other aquatic species would occur due to the prevention of large scale, severe wildfires.

Federally Listed Species

Potential effects to blackside dace and yellowfin madtom are the same as those described above for fish. The park's fire program has a history of consulting with USFWS regarding potential impacts of prescribed burning to blackside dace since the onset of the prescribed burning program in 2005. These consultations have occurred annually and they have addressed the site-specific concerns for each individual burn completed in a given year. In general, USFWS has concurred with the park that burns conducted in a manner to not disturb habitat within the riparian zone where the species occurs and to managing ignitions in a manner to burn away from riparian areas, would result in a may affect, not likely to adversely affect determination for the species. Under both alternatives, this site-specific consultation and the agreed-upon mitigation measures would continue for all prescribed burns. Because BMPs would be implemented to ensure adverse effects to blackside dace and yellowfin madtom habitat are avoided and wildland fires would be managed for multiple objectives, including the benefits to federally listed species, the Proposed Action may affect, but is not likely to adversely affect both blackside dace and yellowfin madtom.

Cumulative Impacts

Cumulative impacts of the Proposed Action would be the same as those for the No Action Alternative.

Conclusion

Under both alternatives, there would be adverse impacts to some species during mechanical treatments as a result of temporary human disturbance, direct mortality from crushing and trampling, and loss of forage and cover. However, such impacts would be short term, limited to the duration of treatment activity and are not likely to be substantial or rise to population-level effects.

Both alternatives could result in short-term adverse impacts to wildlife during fire suppression activities. Suppression activities related to unplanned ignitions would last the duration of the wildfire event but most wildlife species would be able to escape the area and utilize adjacent habitat.

Impacts to wildlife from prescribed fires would include wildlife mortality and displacement due to habitat loss. Less severe prescribed fires would result in mortality and displacement of a few localized individuals or groups of animals and would not jeopardize population trends. Thus adverse effects would be short term.

Use of wildland fire for multiple objectives could result in the temporary displacement of wildlife or individual mortality of wildlife species. Wildland fires would have an immediate effect on wildlife and wildlife habitats by removing plant material, exposing soils, stimulating growth of some plants, and killing or reducing the vigor of some plants. The amount of habitat removed may depend on the following fire characteristics: size, severity, patchiness, and time of year. The loss of habitat would have an indirect, short-term minor effect by displacing wildlife.

Overall, fire management activities are expected to have a long-term beneficial effect on wildlife as open, fire-maintained pine and oak woodlands are restored and maintained within the park.

3.8 CULTURAL RESOURCES, INCLUDING ARCHEOLOGICAL RESOURCES AND CULTURAL LANDSCAPES

3.8.1 Affected Environment

Archeological Resources

As of 2016, the NPS Archeological Sites Management Information System database contained entries for more than 200 archeological sites in the park, with more being discovered each year. Only a small portion of the park has ever been examined beyond the cursory pedestrian level so the depth of cultural resource information is limited (NPS 2010). The majority of the surveyed sites are historic with visible surface features and/or artifacts. Less information is available for prehistoric sites within the park because few surveys have been conducted using methods that detect prehistoric sites (NPS 2010). Known archeological resources within the park include domestic sites such as houses and farmsteads, generally occupied during the early twentieth century. There are also several manufacturing sites such as a brewery and coal processing facility. At least three coal mines have been identified within the park. Transportation-related resources include three railroads and six roads. The park also contains several sites associated with the Civil War, including camps, earthworks, rifle pits, batteries, and several other related sites (NPS 2010). Prehistoric sites include rock shelters, caves, and other sites (NPS 2010).

Cultural Landscapes

The park includes three historic districts either designated or eligible for listing in the National Register of Historic Places: the Cumberland Gap Historic District, the Hensley Settlement, and the Chadwell Gap Coal Company mining district. Despite the fact that none of the landscapes at the park have been formally inventoried or designated as cultural landscapes, the 2010 General Management Plan identifies two historic areas of the park—the Hensley Settlement and the Cumberland Gap Historic District—to include many characteristics of a cultural landscape (NPS 2010). The Chadwell Gap Historic District is also discussed under cultural landscapes, since it has been formally determined to be eligible for the National Register.

The landscape at Cumberland Gap, as represented by the Cumberland Gap Historic District, was shaped by the geology of the area, native vegetation, and the associated land forms and spectacular viewsheds. Centuries of human use of the Cumberland Gap added transportation corridors, Civil War facilities, a variety of structures and landscape, and vegetation features resulting in major changes to the original historic scene viewed by Native Americans and, later, Daniel Boone and other long-rifle hunters (NPS 2010). Removal of the old U.S. Highway 25E and restoration of the Cumberland Gap in 2002 returned the overall area to the approximate

historic setting/cultural landscape viewshed representing the period from 1780 to 1810 and helped preserve historic resources at Civil War sites (Cumberland Gap Tunnel Authority 2016).

As described in the park's General Management Plan (NPS 2010), primary among the character-defining landscape features at Cumberland Gap are the historic roadways, including the restored Wilderness Road, the Upper and Lower Virginia Roads, Kentucky State Road, Harlan Road, Fort McCook-Fort Lyon Road, Battery #7 Road, and Fort Farragut Trail Road. Civil War features and structures also contribute to the cultural landscape by providing insight into the military strategies used in the area and the relationship of topography on the war effort (NPS 2010). The Iron Furnace Ruin is representative of the period of industrial expansion in the area. Other contributing elements to the cultural landscape include Indian Rock and trail markers for Daniel Boone's Trail established by Daughters of the American Revolution (NPS 2010).

The Hensley Settlement is another area of the park that is considered to have its own cultural landscape, consisting of a community of 12 scattered farmsteads situated on an isolated plateau on Brush Mountain (NPS 2010). The Hensley Settlement Historic District "preserves a disappearing culture in American history and reflects the operation of a complete and nearly self-sufficient isolated Southern Appalachian community as it existing in the decades before and after 1900" (NPS 1979b:10). The potential cultural landscape at Hensley includes the remaining community buildings, as well as other landscape elements such as trails, meadows, native vegetation, spatial organization, transportation routes, and scenic mountain viewsheds (NPS 2010). Several trails ran from Virginia and Kentucky to the Hensley Settlement. Location of these trails was based on topography, stream courses, homesteads, and connections to roadways outside the mountain community (NPS 2010). Using readily available timber, the cleared meadows were often fenced with split rail "worm" fences of oak or chestnut. The balance of cleared, farmed, and grazed areas reflects the amount of land and type of farming products families could cooperate to produce, as well as area topography, soils, and historic uses (NPS 2010). The strategic and isolated location of the Hensley Settlement contributes to the landscape. The use of indigenous native materials contributes heavily to the feeling and historic ambiance of the area (NPS 2010).

The Chadwell Gap Coal Company district has been determined to be eligible for listing in the National Register of Historic Places as a historic district at the local level in the areas of industry and historical archeology. The complex, featuring a coal mine, coke ovens, and possible commissary sites, possesses local significance as a rare surviving example of a small coal extraction and processing operation in private ownership during a period of regional economic hardship, when most local mining enterprises were undergoing consolidation into large operations that housed workers in company towns and camps. The likely period of significance for the mine spans 1922 through 1943.

3.8.2 Environmental Consequences

Alternative A: No Action

Archeological Resources

Under the No Action Alternative, fire management activities would include wildfire suppression, prescribed fire, and mechanical treatment activities. Archeological sites would continue to be at risk to unplanned ignitions that could result in loss or damage to sites, either directly by wildfire and related effects or firefighting activities. Suppression of wildfires would attempt to contain ignitions before they are able to gain size, which would provide protection to archeological resources located outside the wildfire burn area. In the event that an unplanned ignition grows beyond containment there is potential for adverse impacts to archeological resources known to occur within the park boundaries. Specific impacts to archeological resources from unplanned ignitions would vary depending on the fuels and locations of artifacts (Hanes 2001; Ryan et al. 2012). Fires burning in grassland areas are easier to suppress and burn with shorter residence times, meaning that prolonged heating would be minimal and damage to artifacts unlikely. Fires burning in the denser

shrub and forested areas are more difficult to suppress, however, resulting in longer residence times and increased surface and subsurface heating that would damage metal, ceramic, bone, and stone artifacts and stone and brick foundations (NPS 2005). The historic cabins and other structures and sites with flammable wooden elements are especially vulnerable to wildfires and fire suppression activities. Recent fire history suggests unplanned ignitions occur approximately three times per year, on average. If an unplanned ignition does occur in an area with sensitive archeological resources, it has the potential to cause long-term and permanent damage or loss of cultural resources. Wildfire suppression techniques, such as the construction of fire lines and burnout operations, may cause direct impacts to buried artifacts due to soil disturbance and compaction. Under the existing FMP, fire suppression is performed using MIST guidelines. By using these mitigation measures and cultural resource advisors in fire management decisions, wildfire suppression activities would avoid impacts to cultural resources.

In the event of a wildland fire, measures would be taken to limit damages to cultural resources. Unplanned events would be conducted in coordination with the park's cultural resource specialist or advisor. If cultural resources are threatened by an unplanned event, a cultural resource specialist or advisor would be consulted to help mitigate the impacts of fire management activities.

Prior to initiating a prescribed fire, the NPS would develop a prescribed burn plan, which would include advanced coordination with cultural resource staff to identify sensitive cultural locations and protocols for burning near archeological sites. Cultural resources would be identified and located as part of the prescribed burn plan process. Section 106 compliance would be completed for prescribed burn plans with the appropriate SHPO and identified cultural resources would be either avoided in the burn unit or prepped prior to the burn in order to mitigate impacts. Preparations might include manually removing fuels on or around the cultural resource; removing heavy logs and fuels from vulnerable areas; removing or covering stumps with dirt, foam, or retardant where burnout could affect subsurface cultural resources; or modifying the burn prescription to reduce fire intensity. All prescribed fire would be carefully managed and implemented using prescribed burn planning, MIST techniques and oversight by cultural resource advisors. Close monitoring of the prescribed burn would be conducted to avoid adverse impacts to recorded archeological sites. Through adherence to these and other mitigation measures (described in Section 2.3), impacts to cultural resources from prescribed fire would be short term and minimal.

The use of prescribed burns and mechanical treatments would reduce current hazardous fuel loads, thereby lowering the potential severity of an unplanned ignition. Lower severity wildfire would require less intense and potentially damaging suppression actions, which would result in fewer adverse impacts to cultural resources than if no fire management activities were allowed to occur. Mitigation of fuel loading would provide significant protections to surface and subsurface cultural artifacts that would otherwise be subject to long flame residence times and significant surface and subsurface heating that is typical of fire in this fuel type. Woody materials immediately adjacent to historic buildings would be carefully removed with hazard fuel reduction projects, using hand tools and, as appropriate, chainsaws or brushcutters. Damage to adjacent buildings during vegetation removal and disposal would be minimized by taking care to avoid disturbance of foundations or walkways, felling trees away from buildings, and sawing the limbs and logs into transportable small pieces. Hazard fuel reduction around historic structures and sites would reduce the potential for loss of or damage to the structure during a wildland fire.

Mechanical and manual fuel treatments could impact undiscovered cultural artifacts due to disturbance of surface vegetation and soils, potential exposure of buried artifacts, or impacts of compaction due to tracks from heavy machinery. Mechanical methods would be carefully selected and would be avoided in areas that may be vulnerable to disturbance. Mechanical methods would be beneficial in some areas where overstocked woodland and dense vegetation threatens the long-term persistence of cultural resources due to the potential for wildfire or the degrading nature of vegetation on the integrity of the artifact as a result of root growth and surface vegetation growth and decay.

Cultural Landscapes

Wildland fire would, depending on its severity, diminish the visual integrity of cultural landscapes. Short-term adverse impacts would include unsightly burned and scorched vegetation and unvegetated areas. Intense unplanned wildfires could also result in the removal of important cultural landscape features, resulting in long-term adverse impacts if buildings and structures are consumed by fire.

The use of proactive fire management activities would increase the park's ability to reduce understory brush density, increasing the reduction of hazardous fuels and success rate of ecological restoration efforts to fire-adapted and other unique habitats. This would increase the potential for lower intensity ground fires, which are easier to manage, thus reducing the potential risk of damage to cultural landscapes. These lower intensity ground fires would help maintain more open forest structures within the cultural landscapes. Impacts to cultural landscapes under the No Action Alternative would be long term and beneficial due to minimizing the potential for future severe wildland fires as the amount of acres restored increases and undergrowth brush density decreases. Short-term adverse impacts would include unsightly burned and scorched vegetation and unvegetated areas from both prescribed burns and more intense unplanned wildland fires. The adverse impacts to vegetation would be expected to last one or two growing seasons, depending on the intensity of the fire event.

Prescribed burning combined with mechanical methods would be used to reduce the risk of brush encroachment and enhance cultural resources important to the cultural landscapes (for example, maintaining open pastures/grasslands, improving and creating defensible space around structures at the Hensley Settlement) and visual aesthetics, thus decreasing the probability of severe wildland fires and enhancing their protection. Based on current information, the impacts of the No Action Alternative on cultural landscapes would be beneficial by helping to restore and maintain cultural landscapes.

Mechanical fuels management under this alternative would beneficially impact cultural landscapes since trimming and removing vegetation would protect defensible space around structures and restore historic viewsheds.

Cumulative Impacts

Past, present, or reasonably foreseeable future projects at the park would undergo evaluation under Section 106 of the National Historic Preservation Act. Through this process, impacts to cultural resources would either be avoided or mitigated. Unanticipated discoveries during proposed activities typically results in work ceasing in the area and a qualified NPS staff member visiting the site to assess conditions and recommending a course of action in consultation with the Kentucky, Tennessee, or Virginia SHPO. Therefore, there would be no cumulative adverse impacts to prehistoric or historic sites or cultural landscapes at the park under the No Action Alternative from planned actions by the NPS and other entities. Beneficial long-term impacts would occur to cultural resources resulting from the future archeological inventory survey of vulnerable archeological sites within the park and the cultural landscape reports for Hensley Settlement and the Cumberland Gap historic district (in progress).

Alternative B: FMP Revision (Preferred Alternative)

The impacts to archeological resources from the Proposed Action would be similar to the impacts described under the No Action Alternative, with unplanned ignitions, prescribed fire, and mechanical treatments occurring under both alternatives. The use of wildland fire for multiple objectives, including resource benefits, would be allowed under the Proposed Action. With the use of wildland fire, it is likely that more than 800 to 1,500 acres of the park would experience disturbance from the implementation of fire management activities because unplanned ignitions may be allowed to burn under managed conditions beyond those areas where prescribed burns are planned in any given year. Some resources that have not been documented may be present in areas where wildfires burn vegetation (e.g., archeological sites that have become overgrown by vegetation or in areas that have never been surveyed). Potential adverse impacts to archeological resources could result

from using wildland fire for multiple objectives, as described for unplanned ignitions under the No Action Alternative, particularly if unknown sites are located where fires are allowed to burn. However, park managers would have the option of suppressing fires near known archeological sites to protect them. The use of wildland fire could also result in long-term beneficial impacts to archeological resources by reducing hazardous fuels around historic structures and sites, which would reduce the potential for loss of or damage to sites from a future wildfire.

Cultural Landscapes

The impacts to cultural landscapes from the Proposed Action would be the same as described under the No Action Alternative, with a potential for more acres to be managed with wildland fire under this alternative.

Cumulative Impacts

The cumulative impacts to cultural resources would be the same as described under the No Action Alternative.

Conclusion

Impacts to cultural resources would be adverse or beneficial depending on the nature and intensity of any wildfire and subsequent fire management response and rehabilitation activities. Adverse effects on cultural resources from planned fire management actions would be avoided or minimized through identifying the resources prior to disturbance and protecting the resources. However, because during wildfire management activities unidentified archeological sites sometimes cannot be protected, and because professional expertise and many of the mitigation measures listed may be unavailable for some areas, archeological resources could suffer direct, long-term, adverse impacts.

Direct damage to or loss of historic structures and sites from wildfire and wildfire suppression activities would result in long-term adverse impacts to these resources. The effects on historic structures from fuel reduction projects would be localized, adverse, short-term impacts and beneficial long-term impacts as the projects would reduce the risk of fire around structures. The use of prescribed fire could restore the adjacent landscape to a setting more like the historic period and have beneficial long-term impacts as the proposed fire management projects could reduce the risk of extreme and catastrophic fire around historic structures and sites.

Fire or suppression activities could have short- and long-term, minor to moderate adverse impacts on cultural landscapes as viewshed changes could result in loss of trees and structures, burned vegetation and stumps, and exposed soils in fire lines altering the character of the landscape. Some impacts would be short-term because vegetation may regenerate. Alternatively, fire can also have long-term beneficial impacts on cultural landscapes as vegetation composition can be altered beneficially on a large scale with fire resulting in maintaining and even partially restoring the historic extent of native plant communities.

3.9 UTILITIES AND TRANSPORTATION

3.9.1 Affected Environment

Several electric transmission lines, pipelines, communication lines, and regional transportation routes are located within or in proximity to the park. Most notably is the Cumberland Gap Highway Tunnel on U.S. Highway 25E, which connects Middlesboro, Kentucky, and Harrogate, Tennessee. The twin tunnels carry more than 11 million vehicles annually or approximately 32,000 vehicles per day (NPS 2011). The tunnel is owned by the NPS and is operated by the Cumberland Gap Tunnel Authority. In addition, CSX Railroad maintains the tracks and tunnel for the railroad located to the east of U.S. Highway 25E. This infrastructure is important to both the local communities and the region to deliver and provide necessary utilities and

community services. Facility owners and operators may be concerned with wildland fire activities in proximity to this infrastructure, although no specific comments were received during public scoping.

3.9.2 Environmental Consequences

Alternative A: No Action

Under the No Action Alternative, unplanned ignitions could potentially adversely impact aboveground power lines and communication lines, and to a lesser extent buried transmission lines, within the park through either direct contact with fire or the presence of smoke. Dense particulate matter in smoke can arc electricity between electric power lines, potentially causing temporary power outages (Iowa State University 2012). Depending on the location of the unplanned ignition, smoke could enter roadways, causing reduced visibility and potentially resulting in a temporary road closure. It is difficult to know where unplanned ignitions could occur and defense of the infrastructure may pose too large of a threat to firefighter safety, depending on fire conditions. There are no documented cases of unplanned ignitions causing damage to transportation networks and energy and communication infrastructure within the park. Fuels management and preparation of the park for prescribed burning could also improve the effectiveness of a response to unplanned ignitions.

Prior to initiating a prescribed burn, the NPS would develop a prescribed burn plan, which would include advanced notification of planned ignitions to all power line, pipeline, communication companies, and nearby facility owners and operators, including the Kentucky, Tennessee, or Virginia Departments of Transportation, as well as the Cumberland Gap Tunnel Authority. The prescribed burn plan would include locations and protocols for burning near infrastructure, and transmission line outage requests would be filed as necessary and directed by the appropriate company. Close monitoring of the prescribed burn would be conducted by the park, other NPS staff, and the affected owner or operator, as necessary. If smoke from a prescribed burn is expected to impact a roadway, the appropriate state department of transportation would be notified to determine if driver notification on the roadways would be necessary. Smoke impacts to the roadways would be short term, lasting the duration of the prescribed burn.

Mitigation is expected to result in the avoidance of adverse impacts to energy infrastructure, communication lines, and nearby facilities from planned fire management activities. Furthermore, the establishment of control lines, reduced shrub cover, and other fuels management could improve access to established rights-of-way. Nearby facility owners and operators would benefit from implementation of the fire management activities because the threat of wildland fire igniting within the park and spreading outside the park's boundaries would be reduced.

Cumulative Impacts

Cumulative impacts to energy infrastructure, communication lines, or nearby facilities would occur under the No Action Alternative in the form of temporary, localized degradation of air quality if a wildland fire occurs at the park at the same time other landowners or agencies experience fire events (either planned or unplanned), such as within other public or private lands near the park. The No Action Alternative would add smoke and particulate matter emissions when prescribed burns occur. Implementation of the No Action Alternative would result in short-term, adverse impacts to transportation routes, depending on smoke conditions. Cumulative impacts to utilities and transportation could occur from the removal of hazardous trees and culvert cleaning on park trails and the hazard tree abatement activities conducted by the park. If utilities are located near trails, the removal of hazardous trees would result in reduced risk of maintenance problems to the utilities, resulting in a long-term beneficial impact to utilities. The cumulative impact would be similar for the hazard tree survey and abatement activities. If hazardous trees are removed near utilities and transportation routes, this would result in a long-term beneficial impact to existing infrastructure. The cumulative effects of the No Action Alternative to the utilities and transportation would be adverse, short term and beneficial, long term.

Alternative B: FMP Revision (Preferred Alternative)

Impacts to utilities and transportation resulting from prescribed burns and mechanical treatments would be the same under the Proposed Action as presented under the No Action Alternative. Fire management activities would result in short-term disturbance to utilities and transportation and long-term beneficial impacts as a result of protected infrastructure. The difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives, which would allow the park to manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Based on the park's fire history, approximately three unplanned fire events occur annually. Under the Proposed Action, it is likely that more than 800 to 1,500 acres of the park would experience the implementation of fire management activities because unplanned ignitions may be allowed to burn under managed conditions. Use of wildland fire for multiple objectives would allow natural processes to perpetuate, and in the long term lessen the potential for adverse impacts to utilities and transportation routes from damaging wildfires. Short-term impacts associated with use of wildland fire for multiple objectives could include increased smoke and particulate matter in the air, which could enter the roadways and disrupt electric power lines. Adverse impacts would be unlikely to occur under the Proposed Action, because use of wildland fire for multiple objectives would only be allowed if conditions would not threaten life, property, and critical natural and cultural resources.

Cumulative Impacts

The cumulative impacts to utilities and transportation would be the same as described under the No Action Alternative.

Conclusion

Impacts to utilities and transportation under the No Action Alternative and Proposed Action are similar. Under both alternatives, the use of planned and unplanned ignitions would result in potential short-term adverse impacts to transportation in the form of smoke on the roadways lasting the duration of the treatment activities and long-term beneficial impacts from the reduced wildland fire threat. The difference between the two alternatives is the proposed use of wildland fire for multiple objectives under the Proposed Action. This alternative would provide the opportunity for the park to manage more acres with wildland fire when compared to the No Action Alternative, because unplanned ignitions would be allowed to burn under managed conditions where life, property, and critical natural and cultural resources are not threatened.

3.10 VISITOR USE AND EXPERIENCE

3.10.1 Affected Environment

On average, annual visitation at the park is approximately 887,500 people, and this number is increasing. Peak visitor months are May through October. There are numerous buildings associated with the headquarters, one park visitor center, and other park administration buildings. The Wilderness Road Campground provides 160 wooded campsites and comfort stations with toilets, water, and electricity (NPS 2004).

Visitors use the park for activities such as picnicking, hiking, sightseeing, and camping. The most popular activity is sightseeing at Pinnacle Overlook, the most visited feature in the park from which Kentucky, Tennessee, and Virginia are visible (NPS 2016).

There are more than 80 miles of hiking trails in the park (NPS 2016). Among the more popular trails is a 2-mile fitness trail located near the visitor center. More than 100 people use the fitness trail daily (NPS 2016). Backcountry trails take visitors to remote wilderness areas. Backcountry camping is permitted in designated sites with a permit. In total, there are five backcountry campsites with a combined capacity of 81 campers located at Gibson Gap, Hensley Camp, Chadwell Gap, Martins Fork, and White Rocks. Martins Fork Cabin,

located in the backcountry, also can be rented. Backcountry trips can range from day hikes to multiple-day adventures. In addition, the 21-mile Ridge Trail runs the length of the park and provides visitors with wildlife-viewing and scenic opportunities.

Tours of Hensley Settlement and Gap Cave also are popular among visitors. Hensley Settlement is a restored mountain community located on Brush Mountain where visitors explore cabins and learn about the Hensley and Gibbons families, who lived a pioneer life until the last resident moved in 1951. Gap Cave is located just north of Cumberland Gap, Tennessee. The cave contains enormous rooms, large stalagmites and stalactites, and a stream. In the past, the cave contained electricity and had been vandalized. The park has removed the lighting and has restored the near-original conditions of the cave. Tours of Gap Cave are conducted nearly year-round (NPS 2016). Additional attractions include White Rocks and Sand Cave. These unique geological formations attract numerous visitors each year.

3.10.2 Environmental Consequences

Alternative A: No Action

Under the No Action Alternative, fire management would include suppression of wildfire, prescribed fire, and mechanical treatments. If wildfire behavior has the potential to endanger visitor or employee safety, a temporary restriction or closure of a portion of the park may be issued by the superintendent. Other areas in the park would remain open to visitor use, however, and would have similar resources available, so impacts to visitor use and experience would be adverse in the short term and would last only for the duration of the fire or until it is safe for visitor use to resume.

Prescribed fire management activities at the park would result in potential temporary closures of, or restricted access to, portions of the park during prescribed fire events. Short-term adverse impacts to visitor experience would result from localized public closures and presence of smoke during prescribed fire management activities. The duration of impacts would correlate to the duration of prescribed burn activities and would be minimized through the use of BMPs described in Section 2.3 (e.g., prescribed fires would not be ignited in proximity to park structures when prevailing winds carry smoke towards the structures). The use of prescribed fire and its effects on vegetation may present an opportunity for education and interpretation of natural resource values and processes, which may result in a beneficial impact. Because fire management actions would be employed in a way to be sensitive to the cultural landscape of the park, visitor experience is expected to improve in the long term as many visitors are attracted by the park's cultural setting.

Because much of the vegetation on the park is fire adapted, prescribed fire would benefit native species and in turn improve ecosystem functioning over the long term. This would provide benefits for wildlife, improving wildlife viewing opportunities. Additionally, thinning dense woodland stands improves wildlife viewing and enhances the viewshed by increasing visibility of surrounding scenery. In the long term (years to decades), fire management actions that reduce hazardous fuels would reduce the potential for more damaging wildfires that could potentially create more restrictions and adverse impacts on visitor use and experience.

Mechanical treatments likely would result in localized short-term adverse impacts to visitor experience as a result of localized trail or area closures or noise from mechanized equipment and chainsaws. Most treatments would be carried out on a scale that would allow for visitor use to occur at other locations of the park, thereby allowing visitor experiences to continue while fire management activities take place. Impacts are expected to be minimal and last only the duration of the treatment.

Cumulative Impacts

Cumulative impacts to visitor use and experience would occur under the No Action Alternative in the form of temporary, localized degradation of air quality if a fire occurs at the park as other landowners or agencies

experience fire events (either planned or unplanned), or as other development or improvement activities (e.g., trail maintenance) occur within the park. This may adversely impact visitor use and experience in the area for the duration of the fire management event via restricted access, degraded air quality, and noise. Such adverse cumulative effects are expected to be short term, lasting only the duration of the fire management activity or the park improvement activity (whichever is shorter). Long-term cumulative impacts of the No Action Alternative and other park management activities, such as trail improvements and new trail connections, are expected to be beneficial to visitor use and experience as a result of improved accessibility, improved ecosystem functioning, and the resulting increased recreational opportunities (e.g., wildlife viewing).

Alternative B: FMP Revision (Preferred Alternative)

Impacts resulting from mechanical treatment, prescribed fire, and wildland fire suppression would be similar to those described under the No Action Alternative for these activities. These fire management activities would result in short-term adverse and long-term beneficial impacts to visitor use and experience.

The difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives, which would allow the park to manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Based on the park's fire history, approximately three unplanned fire events occur annually. Under the Proposed Action, it is likely that more than 800 to 1,500 acres could experience fire management activities because unplanned ignitions may be allowed to burn under managed conditions. Direct adverse impacts using wildland fire for multiple objectives may include minor displacement of some visitor activities, but it would likely be limited to a few hours or days over the course of a year in total. There would be an incremental increase in smoke in scenic views and temporary restrictions in access to some areas, and temporarily blackened vegetation. Smoke production would be of limited duration, usually lasting a few hours to a few days. Exceptions may occur when meteorological conditions, such as an inversion, exist and smoke may linger for a longer period of time.

Some visitors would be disappointed to see blackened areas following a wildfire. This would be a short-term, adverse, localized effect that would persist until vegetation regrows. Blackened areas usually green up within a few days to a few months. The visitor experience would improve when green vegetation grows back and wildflowers emerge in the spring. The use of wildland fire for multiple objectives and its effects on vegetation may present an opportunity for education and interpretation of natural resource values and processes, which may result in a beneficial impact.

Cumulative Impacts

Cumulative impacts of the Proposed Action would be the same as those for the No Action Alternative.

Conclusion

Both the No Action Alternative and the Proposed Action generally would result in short-term adverse impacts and beneficial long-term impacts to visitor use and experience. Temporary adverse impacts such as restricted access and smoke could occur under either alternative but are expected to be short lived. The duration of short-term adverse impacts would coincide with the duration of fire. The Proposed Action has potential to result in an increased occurrence of short-term adverse impacts, relative to the No Action Alternative, if additional areas in the park experience burning as a result of allowing wildland fires to burn. Likewise, the Proposed Action has potential to result in an increased long-term beneficial impact to visitor use and experience as a result of improved ecosystem functioning and increased habitat diversity, improved visual resources within the viewshed, and a return to a more natural and accurate depiction of the cultural landscape within more areas of the park.

3.11 RECOMMENDED WILDERNESS

3.11.1 Affected Environment

The establishment of the 1964 Wilderness Act (16 USC 1131 et seq.) provided for the protection of wilderness areas for future generations. The park includes 14,091 acres of recommended wilderness, for a total of 58% of the park. A Wilderness Recommendation Study was completed for the park, and in 1972, the President recommended to Congress that areas within the park be designated as wilderness and potential wilderness. A final determination of the wilderness proposal has yet to be completed by Congress. Although a final determination has not been made, these acres of recommended wilderness are managed as wilderness pursuant to Section 6 of NPS 2006 Management Policies (NPS 2010).

Management of natural resources in wilderness focuses on protection and restoration of resources and natural processes. The role of fire as a natural process in wilderness has been well documented. The 1963 Leopold Report in particular pointed to the need to allow natural fire in areas managed as natural parks and wilderness. This landmark document provided impetus for the transition of wilderness management away from object preservation to the inclusion of the natural processes that create and influence ecosystem structure.

NPS DO 41, Wilderness Preservation and Management, and accompanying Reference Manual 41 (NPS 2013), as well as NPS 2006 Management Policies (Section 6.3.9), state that "fire management activities conducted in wilderness areas will conform to the basic purposes of wilderness" (NPS 2006:84). Project plans for fuels treatments in wilderness must address the minimum requirement concept. This concept is a documented process used to determine if a proposed project affecting wilderness character, resources, or the visitor experience is necessary, and if so, how to minimize impacts (NPS 2006:81). Minimum requirement analysis includes two components: 1) whether the Proposed Action is appropriate or necessary in wilderness and does not result in a significant impact to wilderness resources and character and 2) the techniques and types of equipment needed to ensure that impacts to wilderness resources and character are minimized (NPS 2006). Per DO 41, "To ensure adequate consideration of wilderness resources, a programmatic minimum requirement analysis must be completed as part of the development of the park's FMP and companion environmental compliance document" (NPS 2013:10). The memorandum developed by the park to summarize the programmatic minimum requirement analysis is provided in Appendix A.

DO 41 and Reference Manual 41 identify several BMPs and guidelines for fire management in wilderness areas, including categories of designated, recommended, potential, proposed, and wilderness study areas. These measures have been incorporated into Section 2.3.

Five qualities of wilderness character are considered in this EA:

1. **Untrammeled** – Wilderness is essentially unhindered and free from modern human control or manipulation. This quality is degraded by modern human activities or actions that control or manipulate the components or processes of ecological systems inside the wilderness.
2. **Natural** – Wilderness ecological systems are substantially free from the effects of modern civilization. This quality is degraded by intended or unintended effects of modern people on the ecological systems inside the wilderness since the area was designated.
3. **Undeveloped** – Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation. This quality is degraded by the presence of structures, installations, habitations, and by the use of motor vehicles, motorized equipment, or mechanical transport that increases people's ability to occupy or modify the environment.
4. **Solitude or Primitive and Unconfined Recreation** – Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation. This quality is degraded by settings that reduce

these opportunities, such as visitor encounters, signs of modern civilization, recreation facilities, and management restrictions on visitor behavior.

5. **Other Features of Value** – The NPS has defined a fifth quality to capture elements that aren't included in the other four qualities – other ecological, geological, or other features of scientific, educational, scenic, or historical value. This quality, if present, is unique to an individual wilderness based on the features that are inside that wilderness. These features typically occur only in specific locations within a wilderness.

3.11.2 Environmental Consequences

Alternative A: No Action

Direct and indirect impacts caused by fire management activities would affect recommended wilderness characteristics (untrammeled, natural, undeveloped, solitude or primitive and unconfined recreation, other features of value). These impacts would be caused by such activities as construction of control lines, ignition operations, water or retardant drops, and approved use of equipment such as aircraft, chainsaws, and portable pumps that may be used for fire suppression strategies and manual and mechanical fuel treatments. Suppression of fires also affects recommended wilderness characteristics by purposely removing a natural process from the landscape, which has created and maintains these wilderness characteristics. The impacts of any fire management actions on wilderness character would be mitigated using MIST and the minimum requirement analysis process to determine the most appropriate tools to be used for non-emergency actions.

Mechanical fuel treatments would occur after the park completed the minimum requirement analysis process, which would likely result in the use of hand tools and hand-operated power tools within recommended wilderness. These fuels management activities would focus on the reduction of fuel loads immediately surrounding fire-sensitive features, such as structures and cultural resources.

Prescribed fire may be necessary in wilderness for purposes of unplanned wildfire protection and resource benefits. Prescribed fire activities that would contribute to recommended wilderness impacts include control line construction with motorized tools and ignition operations to consume unburned fuels along the fire line.

Below, is a summary of effects of fire management activities on recommended wilderness character, organized by the five qualities of wilderness character:

1. **Untrammeled** –Fire management activities, including mechanical fuel reduction and the use of prescribed fire are a manipulation of the wilderness environment, and a trammeling, even though the treatment may be necessary to decrease fire intensity and thereby reduce high severity fire and the necessity for damaging suppression activities to protect adjacent non-wilderness lands and development. On the other hand, fire suppression is also a trammeling action, and generally has greater long-term adverse effects on wilderness character than prescribed fire and mechanical fuel reduction. The short-term trammeling of wilderness resulting from the implementation of prescribed fire and mechanical treatments would be outweighed by enhancing the untrammeled quality of the park over the long term by allowing natural processes such as fire to perpetuate.

2. **Natural -** Undertaking fire management activities that are consistent with natural processes and reduce the amount of interference by wildfire suppression within the park's recommended wilderness would help restore and enhance the natural quality of the recommended wilderness. Historic suppression of fire within the park has led to a shift in the forest from fire-adapted vegetation communities to fire-intolerant communities. This can be seen as a less natural quality of the wilderness compared to vegetation that dominated the landscape historically. A wilderness area is to be "protected and managed so as to preserve its natural conditions" meaning that wilderness ecological systems are substantially free from the effects of modern civilization. To preserve this quality, and

address the scenic and conservation public purposes of wilderness, it may be necessary to take action to correct unnatural conditions through active fuels management even if they were present at the time of designation. Fire is a natural event and any effects to the wilderness are part of the natural processes that occur in wilderness. Recent fire research indicates frequent occurrence of fire during historic times, with an average fire return interval of 5 to 15 years within oak and pine forests.

3. **Undeveloped** –Implementation of prescribed fire would leave little imprint as a human-caused effect because fire is a natural process within the park. Manual fuel treatment activities in strategic locations, prescribed fire operations, and suppression of unplanned ignitions would impact the undeveloped quality of recommended wilderness. The potential presence and associated noise of mechanized and hand-operated equipment deemed necessary for fire management activities (e.g., chainsaws, portable pumps, helicopters) would temporarily affect the undeveloped quality of recommended wilderness. However, these impacts would be short lived and last only as long as the equipment is present in recommended wilderness.

4. **Solitude or Primitive and Unconfined Recreation** – Opportunities for solitude or primitive and unconfined types of recreation should be relatively unaffected, except on a temporary basis. During unplanned wildfires and prescribed burns, visitors may be excluded from certain areas for safety reasons. Fire management activities may require the use of motorized equipment that may disturb this recommended wilderness quality temporarily, but would last only as long as the equipment is present in wilderness. While some wilderness visitors may see the effects of the fire as less scenic, both the fire and its effects are a natural event in wilderness and no action is necessary to preserve the opportunities for visitors to experience wilderness.

5. **Other Features of Value** – Historic structures are located within the recommended wilderness, primarily around the Chadwell Gap Historic District and Hensley Settlement. These structures may be part of the fabric of wilderness character in the area. Protecting historic structures within the recommended wilderness may protect the historic or cultural value of the wilderness. Wooden structures can be directly consumed by fire while stone structures can be affected by high intensity fire through heating and spalling of the rock surface. Low intensity wildfire, prescribed fire or mechanical fuels treatments would reduce fire intensity and thereby decrease the threat to these cultural values.

Cumulative Impacts

Beneficial long-term cumulative impacts are expected to occur within recommended wilderness. The fire management activities described under the No Action Alternative would result in the long-term enhancement of wilderness characteristics and the proposed wilderness eligibility assessment of the newly acquired lands in Fern Lake Watershed would potentially result in the enlargement of the recommended wilderness area, where wilderness characteristics would be protected.

Alternative B: FMP Revision (Preferred Alternative)

The impacts to recommended wilderness from the Proposed Action would be similar to the impacts described under the No Action Alternative, with possible suppression of unplanned ignitions, prescribed fire, and mechanical treatments occurring under both alternatives. Fire management activities would result in short-term disturbance within wilderness and long-term wilderness character enhancement (National Wilderness Steering Committee 2004). The difference between the No Action Alternative and the Proposed Action is the use of wildland fire for multiple objectives, which would allow the park to manage unplanned ignitions when conditions allow for the fire to burn without immediate suppression. Based on the park's fire history, approximately three unplanned fire events occur annually. Under the Proposed Action, it is likely that more than 800 to 1,500 acres of the park would experience the implementation of fire management activities because unplanned ignitions may be allowed to burn under managed conditions.

Below, is a summary of effects related to the use of wildland fire for multiple objectives on recommended wilderness character, organized by the five qualities of wilderness character:

1. **Untrammeled** – Reintroducing the natural role of fire in recommended wilderness via managing fire for multiple objectives would help to restore the untrammeled quality of wilderness character, which has been degraded by prior fire suppression activities. These beneficial impacts to the untrammeled quality would be partially offset by the trammeling inherent in the use of prescribed fire. Taken together, the combination of management of unplanned ignitions and prescribed fire will have a beneficial impact on the natural quality of wilderness character.
2. **Natural –** Reintroducing the natural role of fire in recommended wilderness using both prescribed fire and managing fires for multiple objectives would help to enhance the natural quality of the wilderness character that has been degraded by prior fire suppression activities.
3. **Undeveloped** – Impacts to this quality are similar to those described under the No Action Alternative. Wildland fire for multiple objectives would leave little imprint as a human-caused effect because fire is a natural process within the park. Management of wildland fire would impact the undeveloped quality of recommended wilderness. The potential presence and associated noise of mechanized and hand-operated equipment deemed necessary for fire management activities (e.g., chainsaws, portable pumps, helicopters) would temporarily affect the undeveloped quality of recommended wilderness. However, these impacts would be short lived and last only as long as the equipment is present in recommended wilderness.
4. **Solitude or Primitive and Unconfined Recreation** – Impacts to this quality are the same as those described under the No Action Alternative.
5. **Other Features of Value** – Impacts to this quality are the same as those described under the No Action Alternative.

Cumulative Impacts

The cumulative impacts to recommended wilderness would be the same as described under the No Action Alternative.

Conclusion

Impacts to recommended wilderness under the No Action Alternative and Proposed Action are similar. Under both alternatives, the use of prescribed fire and mechanical treatments would be required to undergo minimum requirements analysis prior to implementation, thereby resulting in short-term adverse impacts to recommended wilderness lasting the duration of the treatment activities and long-term beneficial impacts from wilderness character enhancement. The difference between the two alternatives is the proposed use of wildland fire for multiple objectives under the Proposed Action. This alternative would provide the opportunity for the park to manage more acres with wildland fire when compared to the No Action Alternative, because unplanned ignitions would be allowed to burn under managed conditions where life, property, and critical natural and cultural resources are not threatened.

4 CONSULTATION AND COORDINATION

Letters were sent to Native American tribes on January 7, 2016, to inform them of the revised FMP/EA and to inquire whether affiliated tribes wanted to be involved in the environmental compliance process. The United Keetowah Band expressed interest in being a consulting party in February 2016. The tribes and governments that received letters are listed in Table 4.1.

TABLE 4.1. LIST OF CONSULTED NATIVE AMERICAN TRIBES FOR THE PROPOSED FIRE MANAGEMENT PLAN

Absentee Shawnee Tribe of Oklahoma	United Keetowah Band
Chickasaw Nation	Cherokee Nation
Eastern Band of Cherokee Indians	Shawnee Tribe
Eastern Shawnee Tribe	

The park has also notified various state and federal agencies of the proposed FMP revision and EA. Table 4.2 and Table 4.3 list the agencies notified of the proposed project during the scoping period.

TABLE 4.2. LIST OF CONSULTED FEDERAL AGENCIES FOR THE PROPOSED FIRE MANAGEMENT PLAN

Agency	Consultation Requirement
USFWS, Kentucky Ecological Services Field Office	Endangered Species Act, Section 7
USFWS, Tennessee Ecological Services Field Office	Endangered Species Act, Section 7
USFWS, Virginia Ecological Services Field Office	Endangered Species Act, Section 7
Advisory Council on Historic Preservation	National Historic Preservation Act, Section 106, 36 CFR 800, Section 800.08(c)

TABLE 4.3. LIST OF CONSULTED STATE AGENCIES FOR THE PROPOSED FIRE MANAGEMENT PLAN

Agency	Consultation Requirement
Kentucky SHPO	National Historic Preservation Act, Section 106
Tennessee Historical Commission	National Historic Preservation Act, Section 106
Virginia Department of Historic Resources	National Historic Preservation Act, Section 106

The National Historic Preservation Act requires the consideration of impacts on cultural resources, either listed or eligible to be listed in the National Register of Historic Places. Park staff sent a letter to the SHPOs for Kentucky, Tennessee, and Virginia on January 7, 2016, to solicit input on issues of concern. A response was received from the Virginia Department of Historic Resources on January 19, 2016, expressing concern related to the potential effect to historic properties from the Proposed Action and discussing the use of the Streamlined Review Process under the Service-wide Programmatic Agreement resulting from an approved FMP (see Appendix D).

The park also sent letters to the Kentucky, Tennessee, and Virginia USFWS Ecological Services Field Offices to initiate consultation under Section 7 of the Endangered Species Act. The following responses, provided in Appendix D, were received:

- Letter from Commonwealth of Virginia, Department of Conservation and Recreation, dated February 3, 2016
- Letter from Kentucky Ecological Services Field Office, dated February 8, 2016
- Letter from Tennessee Ecological Services Field Office, dated February 8, 2016
- Letter from Virginia Ecological Services Field Office, dated February 8, 2016
- Letter from Tennessee Ecological Services Field Office, dated February 10, 2016

- Email from Kentucky Ecological Services Field Office, dated February 19, 2016

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APPENDIX A. SUMMARY MEMORANDUM FOR PROGRAMMATIC MINIMUM REQUIREMENT ANALYSIS

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United States Department of the Interior

NATIONAL PARK SERVICE
Cumberland Gap National Historical Park Road
91 Bartlett Park Road
Middlesboro, KY 40965

IN REPLY REFER TO:

L7617 (5230)

Memorandum

To: File

From: Wilderness Team

Subject: Minimum Requirements Analysis of Cumberland Gap National Historical Park Fire Management Plan

Project Description:
National Park Service (NPS) Director's Order (DO) 18 ("Wildland Fire Management") provides that all parks having "burnable vegetation" must have an approved fire management plan (FMP) (NPS 2008). Cumberland Gap National Historical Park (CUGA) is updating its current plan to achieve three objectives: a) comply with DO 18 and related wildland fire policy directives; b) provide fire management direction for approximately 4,000 acres of land acquired by the park since the previous FMP was approved in 2004; and c) expand fire management activities in wilderness by authorizing the use of unplanned ignitions for multiple objectives, including resource benefits.

The existing FMP allows for mechanical fuels reduction and prescribed burn projects to reduce the threat of destructive wildfires and to achieve resource objectives. However, the existing FMP also requires that all unplanned ignitions at CUGA be suppressed. The latter requirement is inconsistent with current federal fire policy. Current policy allows wildland fires, which consist of either prescribed fire or wildfire, to be managed concurrently for multiple objectives, including resource benefits. This policy extends to the use of wildland fire in wilderness. CUGA is revising its FMP to bring wilderness management at the park in line with current policy.

NPS DO 41 ("Wilderness Stewardship") requires that all FMPs and associated environmental compliance documents for wilderness parks include a programmatic Minimum Requirements Analysis (MRA) to ensure adequate consideration of the wilderness resource. The MRA must establish whether potential fire management actions are needed in wilderness, and if they are, specify the minimum activities (strategies. methods, and tools) that are generally permitted for managing wildfires, implementing fuels treatments, and conducting post-fire activities.

Step One – Are Fire Management Activities Necessary in the Cumberland Gap Wilderness?

YES

Authorization of fire management activities (to include such activities as mechanical fuel reduction, prescribed burning, and management of unplanned ignitions for multiple objectives) is needed to administer the Cumberland Gap recommended wilderness as wilderness. In particular, giving managers the authority to manage unplanned ignitions for multiple objectives would serve to reduce hazardous fuel buildup and help re-establish the historic role that fire once played in the forest ecosystem.

From prehistoric times onward, fire occurred frequently in the area that is now the park, with an average fire return interval on the order of five to fifteen years. This interval was associated with the development of pine, oak, and chestnut forests in the wilderness. Full fire suppression over the last 60 to 80 years has led to the buildup of hazardous fuels, thereby increasing the potential for destructive wildfires. It has also led to a shift in the forest from fire-adapted vegetation communities to fire-intolerant communities. Increased numbers of fire intolerant species like red maple (*Acer rubrum*) and black gum (*Nyssa sylvatica*) has led to heavy shading in the park's forests, which has diminished the ability of pines and oaks to regenerate. Today, as the oldest pine and oak trees die from old age, windthrow, insects, etc., they are replaced by these fire intolerant "invader" species, resulting in the conversion of open, sunny pine and oak woodlands to closed forests of maple and other hardwoods. This in turn limits the abundance of herbaceous plants and grasses that require the open sunny conditions of the pine and oak woodlands. Given that approximately 58 percent of the park (14,091 acres) is recommended wilderness, failure to actively manage fire in wilderness would not only increase the threat of destructive wildfires, it would perpetuate the unnatural shift of the park's forests toward fire intolerant species.

Fire management activities are also needed to enhance the wilderness character of the Cumberland Gap recommended wilderness. Three qualities of wilderness character would be enhanced by fire management, namely, the untrammeled quality, the natural quality, and other features of value, as outlined below.

For many years now the untrammeled quality of wilderness character has been degraded at Cumberland Gap by active suppression of wildfire. The untrammeled quality is defined as an absence of manipulation or control of natural processes by humans. The suppression of wildfires from natural ignitions is considered a trammeling, or manipulation of the wilderness environment. Reintroducing the natural role of fire in recommended wilderness via managing unplanned ignitions for multiple objectives would help to restore the untrammeled quality of wilderness character.

Fire management activities would also serve to enhance the natural quality of wilderness character by helping to restore historic ecosystem functioning. As noted above, vegetation in the wilderness is shifting to a less natural state as compared to the vegetation that dominated the landscape historically. Conducting fire management activities solely outside the wilderness would not actively address the negative trends of vegetation community changes within the wilderness. Undertaking fire management activities that are consistent with natural processes will restore and enhance the natural quality of the recommended wilderness at Cumberland Gap. While some fire management activities constitute trammeling, e.g., mechanical fuel reduction and the use of prescribed fire, they also serve to return the ecosystem to a more natural state, and, if properly implemented, would become less needed over time as more natural conditions predominate.

Other features of value in CUGA wilderness include the historic structures associated with the Chadwell Gap Historic District. These structures are part of the fabric of wilderness character in the area and would benefit from implementation of fire activities in wilderness. Low intensity wildfire, prescribed fire, and mechanical fuel reduction treatments would reduce fire intensity and thereby decrease the threat to these cultural values. Protecting the historic structures within the recommended wilderness would protect the historic and cultural value of wilderness.

Step Two – Determine the Minimum Activity – and Comparison

Two alternatives and their impacts to wilderness character are summarized below.

1. Alternative A: No Action Alternative – Continue Fire Management According to Existing FMP

   Description: Under this alternative fire management activity would continue according to the existing FMP. Prescribed fire and mechanical fuel reduction treatments could occur in recommended wilderness if the proposed treatment is confirmed to be within the framework of the programmatic MRA. Under this alternative all unplanned ignitions (wildfires) would be suppressed.

   Wildfire Suppression
   Initial response to wildfires that threaten the park boundary, structures or sensitive cultural or natural resources may allow consideration of more aggressive methods and tools. Fire management tools that may be used in these situations include hand tools such as ax, Pulaski, cross-cut saw, pruners, and shovels; and handheld motorized equipment such as trimmers, brush cutters, chainsaws, leaf blowers, or similar; mechanical transport such as ATVs and UTVs; and fire suppression tools such as pumps and helicopters. In contrast, an initial response deep in the wilderness having minimal risk to human life and safety would specify more limited and less impacting initial response methods and tools.

   In the event the park is managing a long-duration wildfire (one that will last for more than a few operational periods beyond the initial response) long-term incident planning should consider methods and tools that would be less intrusive than those used during the initial response. Subsequent planning cycles should reevaluate methods and tools as conditions and location of the fire activity change.

   Prescribed Fire and Mechanical Fuel Reduction
   Prescribed fire and mechanical fuel reduction activities would be allowed in wilderness. These activities would generally be accomplished with non-motorized tools, such as cross-cut saws, pruners or similar devices. Use of chainsaws would be permitted to remove hazardous trees (after consideration for threatened and endangered species and current guidance provided by the U.S. Fish and Wildlife Service). In situations deemed inappropriate for traditional tools (due to safety, resource management, or other considerations), tools that could be considered for limited use would be handheld motorized equipment such as chainsaws, mowers, leaf blowers, and similar devices.

Effects on Wilderness Character

Untrammeled quality – Negative – The use of prescribed fire and mechanical fuel reduction is an intentional manipulation of the wilderness environment; however these temporary trammeling effects would result in a positive long-term impact on the natural quality of wilderness. Suppression of unplanned ignitions is also a trammeling action. Generally, suppression of unplanned ignitions has longer term adverse effects on wilderness character than prescribed fire and mechanical fuel reduction because it perpetuates unnaturally high fuel loading conditions and decreases the natural quality of vegetation communities.

Undeveloped quality – Negative - The use of chainsaws to remove hazardous trees and potential use of other mechanized vehicles or tools would temporarily degrade the undeveloped quality of wilderness character.

Justification – Use of chainsaws to remove hazardous trees is determined to be the minimum tool necessary in order to mitigate risk to firefighters. Using a cross-cut saw to remove hazardous trees increases the number of firefighters and the amount of time that they are exposed to this risk. After a hazardous tree is removed and a safe path is established, all remaining cutting will be accomplished with hand saws. Impact to the undeveloped character of wilderness would be limited to the duration of the activity.

Natural quality – Positive – Reintroducing the natural role of fire via prescribed fire would help to enhance the natural quality of wilderness character that has been degraded by prior fire suppression activities.

This alternative is not preferred because the existing FMP is out of date and does not reflect current federal wildland fire and NPS policies. Additionally, the suppression of unplanned ignitions generally has substantial and long term adverse effects on the untrammeled and natural qualities of wilderness character.

2. Alternative B: - Expand Existing Range of Fire Management Activities in Wilderness to Include Management of Unplanned Ignitions for Multiple Objectives (Proposed Action)

Description: This alternative would implement a revised FMP that accommodates changes in federal wildland fire policy, guidance and practices from ongoing improvements in the science of wildland fire management. This alternative would allow for implementation of a full range of fire management activities within the entire park, including wildland fire suppression, fuels management (prescribed fire/ mechanical fuel reduction treatments), and management of unplanned ignitions for multiple objectives. The latter would be allowed to occur within wilderness when appropriate conditions are met, including considerations for firefighter and public safety and when the fire would not threaten critical natural and cultural resources.

Under this alternative, personnel and equipment would be transported within the recommended wilderness using non-mechanized methods, such as by foot or using pack animals. If conditions arise, the Park Superintendent may approve on a case-by-case basis the use of mechanized vehicles, such as UTVs/ATVs, keeping to official park trails, and possibly other

heavy equipment. Fire management and fuel reduction activities would be accomplished with non-motorized tools, such as cross-cut saws, hand tools, or similar devices. Use of chainsaws would be permitted to remove hazardous trees (after consideration for T&E species and current guidance provided by the U.S. Fish and Wildlife Service). If conditions arise, the Park Superintendent may approve on a case-by-case basis the use of motorized tools in other situations. Tools would be limited to handheld motorized equipment such as chainsaws, mowers, leaf blowers, and similar devices.

Effects on Wilderness Character

Untrammeled quality – Positive/Negative – Reintroducing the natural role of fire in recommended wilderness via management of unplanned ignitions would help restore the untrammeled quality of wilderness character, which has been degraded by decades of prior fire suppression activities. These beneficial impacts to the untrammeled quality would be partially offset by the trammeling inherent in the use of prescribed fire and mechanical fuel reductions. Taken together, the combination of unplanned ignitions and prescribed fire will have a beneficial impact on the natural quality of wilderness

Undeveloped quality – Negative – The use of chainsaws to remove hazardous trees and potential use of other mechanized vehicles or tools would temporarily degrade the undeveloped quality of wilderness character.

Justification – Use of chainsaws to remove hazardous trees is determined to be the minimum tool necessary in order to mitigate risk to firefighters. Using a cross-cut saw to remove hazardous trees increases the number of firefighters and the amount of time that they are exposed to this risk. After a hazardous tree is removed and a safe path is established, all remaining cutting will be accomplished with hand saws. Impact to the undeveloped character of wilderness would be limited to the duration of the activity.

Natural quality – Positive - Reintroducing the natural role of fire via prescribed fire and management of unplanned ignitions for multiple objectives would help to enhance the natural quality of wilderness character that has been degraded by prior fire suppression activities.

Alternative B is the preferred alternative because it reflects current federal wildland fire and NPS policies and because it would enhance the untrammeled and natural qualities of wilderness character.

Elements common to both alternatives: Project plans for fuel treatments in wilderness would address the minimum requirement. If the proposed treatment was confirmed to be within the framework of the programmatic MRA, the project plan would not have to revisit that decision. However, each project plan would be required to contain an analysis of the minimum methods and techniques necessary to accomplish the specific action with the least negative impact to wilderness character. Note that under certain circumstances, especially those involving long-duration wildfires, an incident-specific minimum requirements analysis would be required.

A common denominator for both alternatives is that in an emergency situation, where fire threatens life or property or the health or safety of persons actually within the area, the use of mechanized vehicles and/or tools may be approved by the Park Superintendent. In addition, per NPS Reference Manual 18, "fire management requires the fire manager and firefighter to select management tactics commensurate with the fire's existing or potential behavior while causing the least possible impact on the resources being protected" (NPS 2014a:Chapter 2, pg. 1). Minimum Impact Strategy and Tactics (MIST) is the concept of using the minimum tool to safely and effectively accomplish a task (NPS 2014a). Adopting MIST also prioritizes firefighter safety above all other resources. MIST would be applied for all fire management activities within the park.

Step 3: Determination

This document is being released as an appendix to the environmental assessment for the revised CUGA FMP. A final determination will be made after review of all public and agency comments on the environmental assessment.

APPENDIX B. MAJOR VEGETATION COMMUNITIES IDENTIFIED WITHIN CUMBERLAND GAP NATIONAL HISTORICAL PARK

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TABLE.B.1. MAJOR VEGETATION COMMUNITIES HISTORICALLY PRONE TO OR MANAGED BY FIRE

Vegetation Communities[1,2]	Canopy	Shrub	Herb	Comments
Blue Ridge Table Mountain Pine-Pitch Pine Woodland (Typic Type)*	Dominated by pitch pine and Virginia pine. Varies widely due to effects of the pine bark beetle and fire suppression. The beetle has killed off much of the canopy of pine species, and fire suppression has limited reproduction of pine. Therefore, most of the remaining stands have either a very limited pine canopy or a recently killed pine canopy with dense understory of oaks and red maple that is quickly overtopping all other vegetation. Chestnut oak is often a component of the canopy and understory as well.	In understory layer sourwood and blackgum are sparse to dense. In shrub layer, early lowbush blueberry (*Vaccinium pallidum*) is very common. Other shrubs include other blueberry species and mountain laurel.	Very sparse. Common species are spotted wintergreen, beetleweed, bracken fern (*Pteridium aquilinum*), teaberry, and trailing arbutus, although herbaceous species composition vary. Glaucous leaved greenbrier is a common vine.	Occurs throughout the park on heavily exposed south-facing slopes with shallow soils. It is most common on the southern end of the park.
Hi Lewis Pitch Pine Barrens*	The lone example documented contained large diameter dead pitch or Virginia pine with live canopy chestnut oak trees. Sourwood dominates the subcanopy along with chestnut oak and blackjack oak (*Quercus marilandica*).	Common species are early lowbush blueberry and black huckleberry.	Species include poverty oatgrass (*Danthonia spicata)*, little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), goat's rue (*Tephrosia virginiana*), silkgrass (*Pityopsis graminifolia*), and wood tickseed (*Coreposis major*).	Occurs in very isolated patches on south-facing slopes with very shallow soils and exposed sandstone bedrock. Community is extremely rare and declining due to heavy pine beetle damage.
Chestnut Oak Forest (Xeric Ridge Type)*	Dominated by either chestnut oak or scarlet oak, sometimes intergrading into more mesic protected slope communities that have a higher component of white oak or more xeric exposed types with pitch pine (*Pinus rigida*) or Virginia pine. Red maple is a large component of the understory.	Dominated by ericaceous species, typically mountain laurel and/or early lowbush blueberry (*Vaccinium pallidum*).	Sparse. Includes subshrubs such as trailing arbutus (*Epigaea repens*) and teaberry (*Gaultheria procumbens*). Other common species include devil's-bit (*Chamaelirium luteum*), spotted wintergreen (*Chimaphila maculata*), beetleweed (*Galax urceolata*), mountain magnolia (*Magnolia fraseri*), sassafras, horse-sugar (*Symplocos tinctoria*), common greenbrier (*Smilax rotundifolia*), and glaucous-leaved greenbrier (*S. glauca*).	Occurs throughout the park on exposed ridges and south-facing slopes with acidic soils. Distinguished by its overall floristic composition, with a high abundance of acid-loving ericaceous species indicative of this community's extremely infertile, acid soils.

[1] Seventeen communities are considered "natural" as opposed to "semi-natural," "human modified/successional," or "exotic species dominated." Those considered natural communities are noted with an asterisk (White 2006).
[2] Source: White 2006.

Vegetation Communities[1,2]	Canopy	Shrub	Herb	Comments
Ridge and Valley Dry-Mesic White Oak-Hickory Forest*	Generally has >50% cover of white oak, though shag-bark hickory (*Carya ovata*), northern red oak (*Quercus rubra*), scarlet oak (*Q. coccinea*), and chestnut oak (*Q. prinus*) may co-dominate in some situations. A mixture of calciphilic and acidophilic trees exists in this type.	Redbud (*Cercis canadensis*) and spicebush (*Lindera benzoin*) exist alongside blackgum, dogwood, and sourwood as understory or tall shrub layer trees.	–	Occurs on the lower slopes of the park.
Appalachian Montane Oak-Hickory Forest (Chestnut Oak Type)*	Dominated by chestnut oak or scarlet oak (90% of occurrences). In some cases white oak or black oak co-dominate. In areas with high maple invasion rates, red maple may begin to dominate the canopy as it matures.	Understory and shrub layers are sparse. Blackgum, sassafras, red maple, and sourwood commonly found in the understory. Early lowbush blueberry (*Vaccinium pallidum*) is the most common shrub component, often with 10% or more as a cover value.	Generally sparse. The most common and consistent species is bare-stemmed tick-trefoil (*Desmodium nudiflorum*). Other common species include spotted wintergreen and violet (*Viola* sp.), etc.	Occurs scattered throughout the park at various aspects in exposed or semi-exposed positions at moderate elevations.
Appalachian Montane Oak-Hickory Forest (Rich Type)*	Generally dominated by northern red oak, black oak (*Quercus velutina*), or hickory may also be co-dominated by white oak, southern red oak (*Quercus falcata*), tuliptree, white ash (*Fraxinus americana*), and blackgum.	Generally sparse to moderate includes both acidic and basic loving species.	Very diverse and usually contains 50%–100% cover. High cover species include mayapple (*Podophyllum peltatum*), jack-in-the-pulpit (*Arisaema triphyllum*), American hog-peanut (*Amphicarpaea bracteata*), northern maiden-hair fern (*Adiantum pedatum*), Canada horse-balm (*Collinsonia canadensis*), black bugbane *(Cimicifuga racemosa*), blue cohosh (*Caulophyllum thalictroides*), bloodroot (*Sanguinaria canadensis*), zigzag spiderwort (*Tradescantia subaspera*), broad beech fern (*Phegopteris hexagonoptera*), Christmas fern, Bosc's witchgrass (*Dichanthelium boscii*), and bearded short-husk (*Brachyeletrum erectum*).	Occurs on exposed to slightly protected upper to mid to lower slopes and appears to often grade into cove forests.

Vegetation Communities[1,2]	Canopy	Shrub	Herb	Comments
Virginia Pine Successional Forest	Dominated by Virginia pine (*Pinus virginiana*). In the oldest examples of this community type, sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), and tuliptree (*Liriodendron tulipifera*) may overtop the pine canopy.	Typically sparse to moderate.	Of very low diversity.	Heavily impacted by pine beetle. Many areas are transitioning 100% Virginia pine canopy to a younger canopy with successional species such as sweetgum and red maple as key dominants. Occurs in small patches throughout the park where canopy removal has created open conditions and where erosion has created little to no mineral soil (e.g., areas heavily disturbed by logging, agriculture, or very severe fire). These conditions often exist in heavily impacted and exposed landscapes, but can sometimes occur in valley bottoms and other areas where severe human disturbance related to heavy logging and/or heavy agriculture has created the right conditions.
Appalachian Montane Oak-Hickory Forest (Red Oak Type)*	Dominated by northern red oak or white oak or a combination of the two. Species also include cucumber magnolia (*Magnolia acuminata*), tuliptree, and chestnut oak.	Generally sparse to moderate.	Usually moderate to dense, with a high cover value of ferns such as New York fern (*Thelypteris noveboracensis*), southern lady fern (*Athyrium asplenoides*), hay-scented fern (*Dennstaedtia punctiloba*), and/or cinnamon fern (*Osmunda cinnamonea*).	Occurs mostly on upper to mid to lower slopes, where it intergrades with lower elevation types and coves.
Chestnut Oak Forest (Mesic Slope Heath Type)*	Generally a mixture of chestnut oak, red maple, and northern red oak. May have high components of sweet birch and tuliptree, especially where disturbed recently or in ecotones with mixed mesophytic forests.	–	Moderate to high cover of great rhododendron.	Occurs on lower to upper slopes in very sheltered positions, usually north-facing slopes.
Central Interior Beech - White Oak Forest*	Dominated by beech (*Fagus grandifolia*) with white oak (*Quercus alba*) as co-dominant. Subcanopy species include tuliptree (*Liriodendron tulipifera*), dogwood (*Cornus florida*), blackgum (*Nyssa sylvatica*), sassafras, and eastern hophornbeam (*Ostrya virginiana*).	–	Common species include Christmas fern (*Polystichum acrostichoides*), wild licorice (*Galium circaezans*), bare-stemmed tick-trefoil (*Desmodium nudiflorum*), yellow trout-lily (*Erythronium americanum*), sharp-lobed hepatica (*Hepatica nobilis var. obtusa*), beechdrops (*Epifagus virginiana*), heart-leaved foamflower (*Tiarella cordifolia* var. *collina*), American alumroot (*Heuchera americana*), and common starwort (*Stellaria pubera*).	Restricted to lower slopes in Kentucky side of park (with some small patches possible in Tennessee). Occurs on protected steep, acidic, north-facing slopes near creeks. Often intergrades further downslope with mesic hemlock community types and often surrounded upslope and on the sides by dry-mesic oak communities.

Vegetation Communities[1,2]	Canopy	Shrub	Herb	Comments
Southern Appalachian Acidic Mixed Hardwood Forest*	Dominants include red maple, sweet pignut hickory (*Carya glabra*), and sometimes sweet birch (*Betula lenta*). Sourwood (*Oxydendrum arboreum*) and sassafras (*Sassafras albidum*) are understory dominants.	Can be sparse to dense with high concentration of mountain laurel (*Kalmia latifolia*), great rhododendron (*Rhododendron maximum*), or American holly (*Ilex opaca*). Blueberry (*Vaccinium* sp.) and black huckleberry (*Gayllusacia baccata*) may also occur.	Can vary widely, but is generally sparse.	Occurs intermingled with oak-hickory communities on lower and mid slopes throughout Kentucky side of the park. Most likely, this community developed in mid-elevation areas historically dominated by American chestnut (*Castanea dentata*). Many areas were likely historically fire-prone sites with fairly deep soils.
Ridge and Valley Limestone Oak-Hickory Forest*	Dominated by chinquapin oak (*Quercus muehlenbergii*) and white oak with northern red oak and black oak in smaller amounts. White ash, tuliptree, and black walnut may also be present. The relatively open subcanopy contains redbud, slippery elm (*Ulmus rubra*); pawpaw (*Asimina triloba*) is present as tall shrubs or small trees.	Low shrubs include poison ivy (*Toxicodendron radicans*) and smooth black-haw (*Viburnum prunifolium*).	Species include round-leaf groundsel (*Packera obovata*), hairy wood brome grass (*Bromus pubescens*), bearded short-husk, white snakeroot (*Ageratina altissima*), little brown jug (*Hexastylis arifolia*), Canada horse-balm, wild crane's bill (*Geranium maculatum*), bloodroot, wild lily-of-the-valley (*Maianthemum racemosum*), hairy-jointed meadow parsnip (*Thaspium barbinode*), rattlesnake root (*Prenanthes* sp.), and Christmas fern.	Occurs on limestone substrate on steep to moderate southeast facing slopes.
Cumberland Sandstone Glade Heath Shrubland*	–	Lack of catawba rhododendron and presence of stunted pine and oak trees throughout.	–	This sandstone shrubland community occurs on shallow soiled sandstone rock outcrops along the ridge line of Cumberland Gap National Historical Park. It exists as a shrubland with scrubby trees, especially pines and oaks interspersed throughout. This community occurs throughout the sandstone rock outcroppings along the spine of the ridgeline that helps separate Kentucky from Virginia.
Southern Appalachian Mountain Laurel Bald*	Dominant species are sourwood, red maple, and black gum.	Common species are Catawba rhododendron (*Rhododendron catawbiense*) and mountain laurel.	Sparse (cover < 5%). Catawba rhododendron is present and there is a relative lack of stunted pine trees.	Occurs only on the highest elevations above White Rocks. Occurs over shallow soils on ridgetops that are prone to windfall, fire, and drought.

TABLE.B.2. MAJOR NON-FIRE DEPENDENT VEGETATION COMMUNITIES

Vegetation Communities[3,4]	Canopy	Shrub	Herb	Comments
Cumberland/Appalachian Hemlock-Hardwood Cove Forest*	Dominated by eastern hemlock (*Tsuga canadensis*) with associates such as white oak, red maple, beech, and sweet birch.	Sparse.	Sparse: common species include fourleaf yam (*Dioscorea quaternata*), New York fern, Christmas fern, little brown jug, bare-stemmed tick-trefoil, partridge berry (*Mitchella repens*), and Indian cucumber root (*Medeola virginiana*).	Occurs over acidic soils on more protected slopes, most often as a transitional community between a hemlock-dominated lower slope and a hardwood-dominated mid slope.
Southern Appalachian Eastern Hemlock Forest (Typic Type)*	Contains at least 50% cover of hemlock along with many co-dominants (red maple, chestnut oak, mountain magnolia, blackgum, black oak).	Understory species include Fraser magnolia, red maple, and umbrella magnolia (*Magnolia tripetala*), all at fairly low cover. Shrub layer heavily dominated by great rhododendron with mountain pepper-bush (*Clethra acuminata*).	Where shrubs do not exist, some acid-loving herbs such as Indian cucumber root and spotted wintergreen are found at very low cover.	Occurs in various areas on protected lower slopes and terraces near creeks on the Kentucky side of the park.
Northern Mixed Mesophytic Forest*	Species include tuliptree, sugar maple (*Acer saccharum*), red maple, yellow buckeye (*Aesculus flava*), white ash, black cherry (*Prunus serotina*), basswood (*Tilia americana*), and northern red oak.	Moderately to heavily dominated by spicebush and/or pawpaw.	Tends to be very diverse and rich. Most consistently high cover summer forb species is wood nettle (*Laportea canadensis*) although other species such as green violet (*Hybanthus concolor*), white baneberry (*Actaea pachypoda*), hoary skullcap (*Scutelleria incana*), poison ivy, and Canadian black-snakeroot (*Sanicula canadensis*) can be heavy in areas. Spring ephemerals may also have very high cover in early spring.	Occurs on protected slopes and ravines with nutrient rich neutral to basic soils. Community may range high up on the slopes, but is best developed in the most protected ravines in the park.
Interior Mid-to-Late-Successional Tuliptree-Hardwood Upland Forest (Acid Type)	Dominated by tuliptree but can have high cover of bigleaf magnolia (*Magnolia macrophylla*), sweet birch, and northern red oak.	–	Species tolerant of acidic conditions can be common or at least consistently present. These include mountain laurel, common greenbrier, Christmas fern, blackgum, sassafras, Indian cucumber-root, chestnut oak, pink lady's slipper (*Cypripedium acaule*), downy rattlesnake-plantain (*Goodyera pubescens*), and partridge-berry.	Uncommon. Found in areas of very acidic soils that were once clearcuts or old fields and occasionally along heavily disturbed mesic stream terraces.
Successional Tuliptree Forest (Circumneutral Type)	Dominated by tuliptree, with minor canopy coverage of species such as sweetgum and oak.	Often dominated by species that like high pH such as spicebush and redbud.	American hog-peanut is the most consistently common species, though poison ivy is also common.	Found on calcareous or other base-rich soils on protected slopes recovering from human caused disturbance such as agriculture, heavy grazing, or

[3] Seventeen communities are considered "natural" as opposed to "semi-natural," "human modified/successional," or "exotic species dominated." Those considered natural communities are noted with an asterisk (White 2006).
[4] Source: White 2006.

Vegetation Communities[3,4]	Canopy	Shrub	Herb	Comments
				clear-cutting between 40 and 80 years ago.
Dry Calcareous Forest/Woodland (White Ash-Shagbark Hickory Type)*	White ash, shag-bark hickory, and northern red oak are the most constant and abundant canopy trees. Red hickory (*Carya ovalis*) is a frequent canopy associate.	In understory, eastern hophornbeam (*Ostrya virginiana*) is most common, along with slippery elm and eastern red-cedar. Redbud and eastern hophornbeam dominate the shrub layer, with Carolina buckthorn (*Frangula caroliniana*), dogwood, and common hackberry (*Celtis occidentalis*) as common components. Poison ivy and Virginia creeper (*Parthenocissus quinquefolia*) frequently reach into the shrub stratum, and fragrant sumac (*Rhus aromatica*) can be common.	Mean cover 50%. Variable. White-flower leafcup (*Polymnia canadensis*), stiff-hair and small wood sunflower (*Helianthus hirsutus* and *microcephalus*), and nettle-leaf sage (*Salvia urticifolia*) are dominant species.	Occurrence follows narrow mid slope band of limestone along the Virginia side slope and into Tennessee.

APPENDIX C. LIST OF FEDERAL AND STATE-LISTED SPECIES FOR THE PARK

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The following table is an excerpt from *An Evaluation of Biological Inventory Data Collected at Cumberland Gap National Historical Park: Vertebrate and Vascular Plant Inventories* (Moore 2010).

Table 6. Organisms on CUGA's Local List with a park status of Present in Park or Probably Present, which are state listed, federally listed, and/or possess a state rank of S1 or S2.

Category	Scientific Name	Common Name	State Status[1], State Rank[2] and Federal Status[3]	Global Rank[4]	Park Status[5]
Amphibian	*Desmognathus welteri*	Black Mountain salamander	TN=D	G4	Present in Park
Amphibian	*Gyrinophilus porphyriticus duryi*	Kentucky spring salamander	VA=S2	T4	Present in Park
Amphibian	*Hemidactylium scutatum*	four-toed salamander	TN=D	G5	Present in Park
Amphibian	*Plethodon kentucki*	Cumberland Plateau salamander	TN=S2	G4	Present in Park
Amphibian	*Plethodon richmondi*	southern ravine salamander	TN=S2	G5	Present in Park
Bird	*Accipiter striatus*	Sharp-shinned Hawk	KY=S, S3B,S4N; TN=D, S3B	G5	Present in Park
Bird	*Aegolius acadicus*	Northern Saw-whet Owl	TN=T, S1; VA=SC, S1B,S1N	G5	Probably Present
Bird	*Aquila chrysaetos*	Golden Eagle	TN=T, S1	G5	Probably Present
Bird	*Carpodacus purpureus*	Purple Finch	VA=SC, S1B,S5N	G5	Present in Park
Bird	*Catharus guttatus*	Hermit Thrush	VA=SC, S1B,S5N	G5	Present in Park
Bird	*Certhia americana*	Brown Creeper	KY=E, S1B,S4N; VA=SC, S3B,S5N	G5	Present in Park
Bird	*Circus cyaneus*	Northern Harrier	KY=T, S1B,S4N; TN=D, S4N; VA=SC, S1B,S3N	G5	Present in Park
Bird	*Contopus cooperi*	Olive-sided Flycatcher	TN=D, S1	G4	Present in Park
Bird	*Corvus corax*	Common Raven	KY=T, S1; TN=T, S2	G5	Present in Park
Bird	*Dendroica cerulea*	Cerulean Warbler	TN=D, S3B	G4	Present in Park
Bird	*Dendroica fusca*	Blackburnian Warbler	KY=T, S1B	G5	Present in Park
Bird	*Dendroica magnolia*	Magnolia Warbler	VA=SC, S2B	G5	Present in Park
Bird	*Empidonax flaviventris*	Yellow-bellied Flycatcher	VA=SC, S1B	G5	Probably Present
Bird	*Empidonax minimus*	Least Flycatcher	KY=E, S1B	G5	Present in Park
Bird	*Falco peregrinus*	Peregrine Falcon	KY=E, S1B; TN=E, S1N; VA=ST, S1B,S2N	G4	Present in Park
Bird	*Haliaeetus leucocephalus*	Bald Eagle	KY=T, S2B,S2N; TN=D; VA=ST, S2B,S3N	G5	Present in Park
Bird	*Junco hyemalis*	Dark-eyed Junco	KY=S, S2B,S5N	G5	Present in Park

Table 6. Organisms on CUGA's Local List with a park status of Present in Park or Probably Present, which are state listed, federally listed, and/or possess a state rank of S1 or S2 (continued).

Category	Scientific Name	Common Name	State Status[1], State Rank[2] and Federal Status[3]	Global Rank[4]	Park Status[5]
Bird	*Limnothlypis swainsonii*	Swainson's Warbler	TN=D; VA=SC, S2B	G4	Present in Park
Bird	*Oporornis philadelphia*	Mourning Warbler	VA=SC, S1B	G5	Probably Present
Bird	*Pandion haliaetus*	Osprey	KY=T, S2B	G5	Present in Park
Bird	*Pheucticus ludovicianus*	Rose-breasted Grosbeak	KY=S, S3B	G5	Present in Park
Bird	*Regulus satrapa*	Golden-crowned Kinglet	VA=SC, S2B,S5N	G5	Present in Park
Bird	*Sitta canadensis*	Red-breasted Nuthatch	KY=E, S1B; VA=SC, S2B,S4N	G5	Present in Park
Bird	*Sphyrapicus varius*	Yellow-bellied Sapsucker	TN=D, S1B,S4N	G5	Present in Park
Bird	*Troglodytes troglodytes*	Winter Wren	VA=SC, S2B,S4N	G5	Present in Park
Bird	*Vermivora chrysoptera*	Golden-winged Warbler	KY=T, S2B; TN=D, S3B; VA=SC, S3B	G4	Present in Park
Bird	*Vireo olivaceus*	Red-eyed Vireo	VA=SC, S5	G5	Present in Park
Bird	*Wilsonia canadensis*	Canada Warbler	KY=S, S3B	G5	Present in Park
Fish	*Ammocrypta clara*	western sand darter	KY=E, S1; TN=T, S1; VA=ST, S1	G3	Probably Present
Fish	*Etheostoma caeruleum*	rainbow darter	VA=S2	G5	Present in Park
Fish	*Etheostoma sagitta*	arrow darter	TN=D, S2	G3	Present in Park
Fish	*Notropis buccatus*	silverjaw minnow	TN=T, S1	G5	Present in Park
Fish	*Notropis rubellus*	rosyface shiner	TN=D, S2	G5	Present in Park
Fish	*Percina aurantiaca*	tangerine darter	TN=D; VA=S2	G4	Probably Present
Fish	*Phoxinus cumberlandensis*	blackside dace	KY=T, S2; TN=T, S2S1; USFWS=T	G2	Present in Park
Mammal	*Corynorhinus rafinesquii*	Rafinesque's big-eared bat	KY=S; TN=D; VA=LE, S2	G3	Probably Present
Mammal	*Myotis grisescens*	gray bat	KY=T, S2; TN=E, S2; VA=LE, S1; USFWS=E	G3	Probably Present
Mammal	*Myotis leibii*	eastern small-footed bat	KY=T, S2; TN=D, S2S1	G3	Present in Park
Mammal	*Myotis sodalis*	Indiana bat	KY=E, S1; TN=E, S1; VA=LE, S1; USFWS=E	G2	Present in Park
Mammal	*Napaeozapus insignis*	woodland jumping mouse	TN=D, S4	G5	Present in Park

Table 6. Organisms on CUGA's Local List with a park status of Present in Park or Probably Present, which are state listed, federally listed, and/or possess a state rank of S1 or S2 (continued).

Category	Scientific Name	Common Name	State Status[1], State Rank[2] and Federal Status[3]	Global Rank[4]	Park Status[5]
Mammal	*Neotoma magister*	Allegheny woodrat	TN=D	G3	Present in Park
Mammal	*Parascalops breweri*	hairy-tailed mole	TN=D	G5	Present in Park
Mammal	*Sorex cinereus*	masked shrew	KY=S; TN=D	G5	Present in Park
Mammal	*Sorex dispar*	long-tailed shrew	KY=N (*S. d. blitchi*=E) , S1; TN=D, S2	G4	Probably Present
Mammal	*Sorex fumeus*	smoky shrew	TN=D	G5	Present in Park
Mammal	*Sorex hoyi*	pygmy shrew	TN=S2	G5	Present in Park
Mammal	*Spilogale putorius*	eastern spotted skunk	KY=S, S2	G5	Present in Park
Mammal	*Synaptomys cooperi*	southern bog lemming	TN=D, S4	G5	Present in Park
Mammal	*Ursus americanus*	black bear	KY=S, S2	G5	Present in Park
Vascular Plant	*Adlumia fungosa*	climbing fumitory	KY=E, S1; TN=T, S2	G4	Present in Park
Vascular Plant	*Agrimonia gryposepala*	tall hairy groovebur	KY=T, S1	G5	Present in Park
Vascular Plant	*Allium tricoccum*	wild leek	TN=S-CE, S1	G5	Present in Park
Vascular Plant	*Amianthium muscitoxicum*	fly-poison	KY=T, S1	G4	Present in Park
Vascular Plant	*Aralia nudicaulis*	wild sarsaparilla	KY=E	G5	Present in Park
Vascular Plant	*Boykinia aconitifolia*	brook saxifrage	KY=T, S2	G4	Present in Park
Vascular Plant	*Calamagrostis porteri*	Porter's reedgrass	KY=N, S2; TN=E, S1	G4	Present in Park
Vascular Plant	*Calamagrostis porteri ssp. porteri*	Porter's reedgrass	KY=T, S2	T4	Present in Park
Vascular Plant	*Cardamine rotundifolia*	round-leaf water cress	TN=S, S2	G4	Present in Park
Vascular Plant	*Carex appalachica*	Appalachian sedge	KY=T, S2; TN=S1	G4	Present in Park
Vascular Plant	*Carex austrocaroliniana*	tarheel sedge	KY=S; TN=S2	G4	Present in Park
Vascular Plant	*Carex interior*	inland sedge	VA=S1	G5	Present in Park
Vascular Plant	*Carex purpurifera*	purple sedge	VA=S2	G4	Present in Park
Vascular Plant	*Carex radiata*	stellate sedge	KY=N, S2	G4	Present in Park

Table 6. Organisms on CUGA's Local List with a park status of Present in Park or Probably Present, which are state listed, federally listed, and/or possess a state rank of S1 or S2 (continued).

Category	Scientific Name	Common Name	State Status[1], State Rank[2] and Federal Status[3]	Global Rank[4]	Park Status[5]
Vascular Plant	*Castanea dentata*	American chestnut	KY=E, S1; TN=S, S2	G4	Present in Park
Vascular Plant	*Castanea pumila*	Allegheny chinkapin	KY=T, S2	G5	Present in Park
Vascular Plant	*Castanea pumila var. pumila*	Allegheny chinkapin	KY=S1	T5	Present in Park
Vascular Plant	*Cheilanthes alabamensis*	Alabama lipfern	KY=H, SHS1	G4	Present in Park
Vascular Plant	*Clematis catesbyana*	satincurls	KY=H, SHS1	G4	Present in Park
Vascular Plant	*Cocculus carolinus*	Carolina coralbead	VA=S1	G5	Present in Park
Vascular Plant	*Convallaria majuscula*	convallaria	KY=E, S1	G4	Present in Park
Vascular Plant	*Corydalis sempervirens*	pale corydalis	KY=S; TN=E, S1	G4	Present in Park
Vascular Plant	*Crataegus calpodendron*	pear hawthorn	VA=S1	G5	Present in Park
Vascular Plant	*Cypripedium acaule*	pink lady's-slipper	TN=S-CE, S4	G5	Present in Park
Vascular Plant	*Cypripedium parviflorum*	small yellow lady's-slipper	KY=T, S2	G5	Present in Park
Vascular Plant	*Deschampsia flexuosa*	wavy hairgrass	KY=T, S2	G5	Present in Park
Vascular Plant	*Desmodium cuspidatum*	largebract ticktrefoil	VA=S2	G5	Present in Park
Vascular Plant	*Desmodium strictum*	pinebarren ticktrefoil	VA=S2	G4	Present in Park
Vascular Plant	*Elymus canadensis*	nodding wild-rye	VA=S2	G5	Present in Park
Vascular Plant	*Eriophorum virginicum*	tawny cottongrass	KY=E, S1; TN=E, S1	G5	Present in Park
Vascular Plant	*Eryngium yuccifolium*	rattlesnake-master	VA=S2	G5	Present in Park
Vascular Plant	*Eupatorium incarnatum*		VA=S2	G5	Present in Park
Vascular Plant	*Eupatorium steelei*	Steele's eupatorium	KY=T, S2	G4	Present in Park
Vascular Plant	*Euphorbia mercurialina*	mercury spurge	KY=T, S1	G4	Present in Park
Vascular Plant	*Eurybia surculosa*		VA=S1	G4	Present in Park
Vascular Plant	*Gentiana decora*	showy gentian	KY=S	G4	Present in Park
Vascular Plant	*Hexastylis contracta*	mountain heartleaf	KY=E, S1	G3	Present in Park

Table 6. Organisms on CUGA's Local List with a park status of Present in Park or Probably Present, which are state listed, federally listed, and/or possess a state rank of S1 or S2 (continued).

Category	Scientific Name	Common Name	State Status[1], State Rank[2] and Federal Status[3]	Global Rank[4]	Park Status[5]
Vascular Plant	*Hieracium scabrum*	rough hawkweed	TN=T, S2	G5	Present in Park
Vascular Plant	*Houstonia canadensis*	Canadian summer bluet	VA=S2	G4	Present in Park
Vascular Plant	*Huperzia porophila*	rock clubmoss	VA=S1	G4	Present in Park
Vascular Plant	*Hydrastis canadensis*	golden-seal	TN=S-CE	G4	Present in Park
Vascular Plant	*Hydrophyllum virginianum*	Shawnee salad	KY=T, S2; TN=T	G5	Present in Park
Vascular Plant	*Juglans cinerea*	butternut	KY=S, S3; TN=T	G4	Present in Park
Vascular Plant	*Juncus subcaudatus*	woods-rush	KY=N, S1	G5	Present in Park
Vascular Plant	*Lathyrus venosus*	smooth veiny peavine	KY=S, S2	G5	Present in Park
Vascular Plant	*Lilium canadense*	Canada lily	TN=T, S3	G5	Present in Park
Vascular Plant	*Listera smallii*	kidney-leaf twayblade	KY=T, S2	G4	Probably Present
Vascular Plant	*Lonicera dioica*	limber honeysuckle	TN=S, S2	G5	Present in Park
Vascular Plant	*Lycopodium clavatum*	running clubmoss	KY=E, S1	G5	Present in Park
Vascular Plant	*Lysimachia tonsa*	southern loosestrife	TN=S2	G4	Present in Park
Vascular Plant	*Magnolia macrophylla*	bigleaf magnolia	VA=S1	G5	Present in Park
Vascular Plant	*Maianthemum canadense*	false lily-of-the-valley	KY=T, S2	G5	Present in Park
Vascular Plant	*Melampyrum lineare*	American cow-wheat	KY=N, S2	G5	Present in Park
Vascular Plant	*Melampyrum lineare var. latifolium*	American cowwheat	KY=T, S2	T5	Present in Park
Vascular Plant	*Melanthium parviflorum*	small-flowered false helleborne	KY=E, S1	G4	Present in Park
Vascular Plant	*Minuartia glabra*	Appalachian sandwort	KY=T, S1	G4	Present in Park
Vascular Plant	*Minuartia groenlandica*	Appalachian sandwort	TN=E, S1S1	G5	Present in Park
Vascular Plant	*Oclemena acuminata*	whorled wood aster	KY=T, S2	G5	Present in Park
Vascular Plant	*Oligoneuron rigidum var. rigidum*		VA=S2	T5	Present in Park

Table 6. Organisms on CUGA's Local List with a park status of Present in Park or Probably Present, which are state listed, federally listed, and/or possess a state rank of S1 or S2 (continued).

Category	Scientific Name	Common Name	State Status[1], State Rank[2] and Federal Status[3]	Global Rank[4]	Park Status[5]
Vascular Plant	*Panax quinquefolius*	American ginseng	TN=S-CE; VA=ST	G3	Present in Park
Vascular Plant	*Paronychia argyrocoma*	silvery nailwort	KY=E, S1; TN=T, S1	G4	Present in Park
Vascular Plant	*Penstemon calycosus*	longsepal beardtongue	VA=S1	G5	Present in Park
Vascular Plant	*Phlox amplifolia*	large-leaved phlox	VA=S2	G4	Present in Park
Vascular Plant	*Polygonatum biflorum var. commutatum*		TN=S2	T5	Present in Park
Vascular Plant	*Polygonum arifolium*	halberd-leaf tearthumb	TN=T, S1	G5	Present in Park
Vascular Plant	*Prosartes maculata*		KY=S	G3	Present in Park
Vascular Plant	*Ranunculus allegheniensis*	Allegheny mountain buttercup	TN=S1	G4	Present in Park
Vascular Plant	*Rhododendron catawbiense*	catawba rhododendron	KY=N, S2	G5	Present in Park
Vascular Plant	*Rhododendron minus*	Carolina rhododendron	TN=S2	G4	Present in Park
Vascular Plant	*Robinia hispida var. rosea*	bristly locust	KY=N, S2	T3	Present in Park
Vascular Plant	*Rosa setigera*	prairie rose	VA=S1	G5	Present in Park
Vascular Plant	*Rosa virginiana*	Virginia rose	TN=S, SH	G5	Present in Park
Vascular Plant	*Rubus canadensis*	smooth blackberry	KY=E, S1	G5	Present in Park
Vascular Plant	*Ruellia purshiana*	pursh's wild-petunia	TN=S, S1	G3	Present in Park
Vascular Plant	*Salvia urticifolia*	nettle-leaf sage	KY=E, S1	G5	Present in Park
Vascular Plant	*Saxifraga michauxii*	michaux's saxifrage	KY=T, S2	G4	Present in Park
Vascular Plant	*Scutellaria incana*	hoary skullcap	VA=S2	G5	Present in Park
Vascular Plant	*Silene ovata*	ovate catchfly	KY=E, S1; TN=E, S2S1	G3	Present in Park
Vascular Plant	*Silene rotundifolia*	roundleaf catchfly	VA=S2	G4	Present in Park
Vascular Plant	*Silphium terebinthinaceum*	prairie rosinweed	TN=S2S1	G4	Present in Park
Vascular Plant	*Sisyrinchium albidum*	white blue-eyed grass	VA=S2	G5	Present in Park
Vascular Plant	*Smilax ecirrata*	upright carrionflower	VA=S1	G5	Present in Park

Table 6. Organisms on CUGA's Local List with a park status of Present in Park or Probably Present, which are state listed, federally listed, and/or possess a state rank of S1 or S2 (continued).

Category	Scientific Name	Common Name	State Status[1], State Rank[2] and Federal Status[3]	Global Rank[4]	Park Status[5]
Vascular Plant	*Solidago curtisii*		KY=T, S2	G4	Present in Park
Vascular Plant	*Solidago roanensis*	roan mountain goldenrod	KY=T, S1	G4	Present in Park
Vascular Plant	*Streptopus lanceolatus var. roseus*	twistedstalk	TN=S1	T4	Present in Park
Vascular Plant	*Symphyotrichum laeve*	smooth blue aster	KY=N, S2	G5	Present in Park
Vascular Plant	*Trillium undulatum*	painted trillium	KY=T, S2	G5	Present in Park
Vascular Plant	*Vaccinium erythrocarpum*	southern mountain cranberry	KY=E, S1	G5	Present in Park
Vascular Plant	*Vitis labrusca*	fox grape	KY=S, S2	G5	Present in Park
Vascular Plant	*Woodsia appalachiana*	Appalachian cliff fern	KY=H, SH; TN=S, S1	G4	Present in Park

[1] Data obtained from NatureServe (June 5, 2008). The official endangerment status or level of legal protection the state has assigned to this species.
KY - E=A taxon in danger of extirpation and/or extinction throughout all or a significant part of its range in Kentucky. T=A taxon likely to become endangered within the foreseeable future throughout all or a significant part of its range in Kentucky. S=A taxon that should be monitored due to various concerns related to it's continued viability. N=None.
TN - E=Endangered (plants and animals) Any species or subspecies whose prospects of survival or recruitment within the state are in jeopardy or are likely to become so within the foreseeable future. T=Threatened (plants and animals) - Any species or subspecies that is likely to become an endangered species within the foreseeable future. S=Special Concern (plants) - Any species or subspecies of plant that is uncommon in Tennessee, or has unique or highly specific habitat requirements or scientific value and therefore requires careful monitoring of its status. D=Deemed in need of management (nongame animals). This category is analogous to "Special Concern." CE= Commercially Exploited.
VA - SE=state endangered (protected). ST= state threatened (protected). SC= special concern (animals on a non-regulatory list).
[2] Data obtained from NatureServe (June 5, 2008). The rounded NatureServe conservation status, developed by NatureServe and its network of member (state) programs, of a species from a state/province perspective, characterizing the relative imperilment of the species. S1=Critically Imperiled, S2=Imperiled, S3=Vulnerable, S4=Apparently Secure, S5=Secure, B=Breeding population, N=Non-breeding population, SNR=State Conservation Status not yet assessed. Refer to <http://www.natureserve.org/explorer/nsranks.htm> for additional information on ranks.
[3] Data obtained from NatureServe (June 5, 2008). U.S. Endangered Species Act: Current status of the taxon as designated or proposed by the U.S. Fish and Wildlife Service (USFWS) or the U.S. National Marine Fisheries Service, and as reported in the U.S. Federal Register in accordance with the U.S. Endangered Species Act of 1973, as amended.
[4] Data obtained from NatureServe (June 5, 2008). The rounded NatureServe conservation status, developed by NatureServe and its network of member programs, of a species from a global (i.e., rangewide) perspective, characterizing the relative imperilment of the species. G1=Critically Imperiled, G2=Imperiled, G3=Vulnerable, G4=Apparently Secure, G5=Secure. Refer to <http://www.natureserve.org/explorer/ranking.htm> for additional information on ranks.
[5] Refer to the Appendix for definitions of Park Status categories.

APPENDIX D. AGENCY CONSULTATION

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Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

February 3, 2016

Sula Jacobs
Superintendent, Cumberland Gap NHP
Attn: Fire Management Plan
91 Barlett Park Road
Middlesboro, KY 40965

Re: Cumberland Gap National Park-Fire Management Plan

Dear Ms. Jacobs:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Cumberland Gap Slopes Conservation Site is within the proposed project area. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. The Cumberland Gap Slopes Conservation Site has been given a biodiversity rank of B2 which represents a site of very high biodiversity. The natural heritage resource of concern associated with this site is:

Myotis sodalis	Indiana bat	G2/S1/LE/LE

The Indiana bat ranges from the western Ozarks north and east to Michigan and New England, and south to Alabama and Arkansas (NatureServe, 2009). In Virginia, there are records in mountainous regions of the western part of the state. Male and female Indiana bats congregate in the fall to hibernate in caves and mine tunnels in dense clusters. While many males continue to use these underground roosts in the summer, females form maternity colonies under the loose bark of trees such as shagbark hickory, oaks and maples. These bats emerge in the evenings to feed on moths, flies and other insects over tree-lined streams and upland woods.

Indiana bats are sensitive to flooding, pesticide poisoning, and disturbance by human beings, such as vandalism, spelunkers, cave commercialization, and research (Dalton & Handley, 1991; Harvey, 1992). Please note that this species is currently classified as endangered by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF).

DCR recommends adherence to Indiana bat protection guidelines and coordination with USFWS and VDGIF to ensure compliance with protected species legislation.

In addition, the Indian Creek-Wheeler Hollow Stream Conservation Unit and the Indian Creek-Barnes Hollow Stream Conservation Unit are within and/or downstream of the project area. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Indian Creek-Wheeler Hollow SCU and Indian Creek-Barnes Hollow SCU have been given a biodiversity ranking of B3, which represents a site of high significance. The natural heritage resources associated with Indian Creek-Wheeler Hollow SCU site are:

Cambarus jezerinaci	Spiny scale crayfish	G3/S2/NL/NL
Pleuronaia barnesiana	Tennessee pigtoe	G2G3/S2/SOC/NL
Elimia arachnoidea	Spider elimia	G2G3/S2/NL/LE

The Spiny scale crayfish has a restricted range in southwestern Virginia and eastern Kentucky and Tennessee. In Virginia, it is found in first and second order spring-fed streams draining into the Powell River, living under rocks in mid-stream and along stream edges (Thoma, 2000). Threats to the Spiny scale crayfish include degradation of water quality due to deforestation and mining activities which may increase sediments, water temperatures, or pollutant loads (NatureServe, 2009). To minimize adverse impacts to the aquatic ecosystem the implementation of erosion and sediment control measures during all land disturbing activities should be undertaken.

The Tennessee pigtoe is a freshwater mussel which occurs in the Cumberland regions of the Tennessee River in Tennessee, Alabama, and Virginia (NatureServe, 2009). In Virginia, there are records from the Clinch, Powell, and Holston drainages (NatureServe, 2009). Please note this species is designated as a species of concern by the United States Fish and Wildlife Service (USFWS).

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species.

The freshwater snail species, Spider elimia, is known from small streams in Tennessee and southwestern Virginia (NatureServe, 2014). It has recently been found in tributaries to the Powell River in Lee and western Wise Counties, VA, and a tributary to the Clinch River, just south of the Virginia border (Dillon and Robinson, 2007). There are historical records from the Holston River drainage in Virginia, but these have not been confirmed in recent years, and possibly may be extirpated (Dillon and Robinson, 2007).

It is found in small, rich, hardwater creeks and springfed streams (Dillon, 2006). Eggs are deposited on hard surfaces from spring to mid-summer and it may take up to 2 years to reach maturity (Dillon, 2006).

As with many freshwater snails, poor water quality, including impacts from mining, coal processing, sewage treatment, and deforestation are all potential threats. This species may also be vulnerable to siltation from earth moving activities (Dillon and Robinson, 2007). Please note that this species is currently classified as endangered by the Virginia Department of Game and Inland Fisheries (VDGIF).

Indian Creek and Gap Creek have been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as Threatened and Endangered Species Waters for the Spider elimia.

The natural heritage resource associated with Indian Creek-Barnes Hollow Stream Conservation Unit is the Tennessee pigtoe.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations during site preparation and other ground disturbing activities. Due to the legal status of the spider Elimia, DCR recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

There is potential for the Northern Long-eared bat (*Myotis septentrionalis*, G1G3/S3/LT/NL) to occur within the project area. The Northern Long-eared bat is a small insect-eating bat characterized by its long-rounded ears that when folded forward extend beyond the tip of the nose. Hibernation occurs in caves, mines and tunnels from late fall through early spring and bats occupy summer roosts comprised of older trees including single and multiple tree-fall gaps, standing snags and woody debris. Threats include white nose syndrome and loss of hibernacula, maternity roosts and foraging habitat (NatureServe, 2014). Due to the decline in population numbers, the Northern Long-eared bat has been federally listed as "threatened" by the United States Fish and Wildlife Service (USFWS).

Due to the legal status of the Northern Long-eared bat, if tree removal is proposed for the project DCR recommends coordination with the USFWS in accordance with the final 4d rule effective February 16, 2016.

This project is also within the range of and overlies potential habitat for the state and federally threatened Madison Cave isopod (*Antrolana lira*, G2G4/S2/LT/LT). Because this species is a groundwater obligate crustacean, knowledge of its presence at specific locations within its range is poor, and sampling to determine its presence is difficult and frequently inconclusive. Projects involving the following components have potential to impact this species: 1) withdrawal of water from wells or lowering the water table, 2) alteration of sinkholes, cave entrances, or sinking streams, 3) waste water injection, 4) quarrying, 5) nutrient applications lacking a certified nutrient management plan, or 6) discharge of water to a conveyance that discharges to a karst feature downstream. If the project meets one or more of these criteria, please coordinate with the DCR Karst Protection Coordinator Wil Orndorff (Wil.Orndorff@dcr.virginia.gov or 540-230-5960). In addition, due to the legal status of the Madison Cave isopod, DCR recommends coordination with the US Fish and Wildlife Service (USFWS) and Virginia Department of Game and Inland Fisheries (VDGIF) to ensure compliance with protected species legislation.

If karst features are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov) to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or "improvement" of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice. New "Karst Assessment Guidelines" developed by the Virginia Cave Board for land development can be found at http://www.dcr.virginia.gov/natural-heritage/document/karst-assessment-guidelines.pdf.

DCR fully supports the use of unplanned ignitions when these activities can be safely used to meet resource management objectives.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The VDGIF maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov. This project is located within 2 miles of a documented occurrence of a federal and state listed animal. Therefore, DCR recommends coordination with USFWS and VDGIF, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

S. Rene' Hypes
Natural Heritage Project Review Coordinator

CC: Troy Anderson, USFWS
Ernie Aschenbach, VDGIF
Wil Orndorff, DCR-Karst

Literature Cited

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee ES Office
446 Neal Street
Cookeville, Tennessee 38501

February 10, 2016

Ms. Sula Jacobs
Superintendent
Cumberland Gap National Historical Park
91 Bartlett Park Road
Middlesboro, Kentucky 40965

Subject: FWS #16-CPA-0210. Species list for Cumberland Gap National Historical Park, Claiborne County, Tennessee.

Dear Ms. Jacobs:

Thank you for your correspondence of January 6, 2016, regarding updates to the Cumberland Gap National Historical Park (Park) Fire Management Plan. The Park is requesting an updated species list to incorporate in their Environmental Assessment for the updated Plan. U.S. Fish and Wildlife Service personnel in the Tennessee Field Office have reviewed the information submitted, and we provide the following list of federally listed species that occur within or near the Park in the state of Tennessee.

Table 1: Species of concern for the Cumberland Gap National Historical Park

Common Name	Scientific Name	Federal Status	Critical Habitat
Blackside dace	*Phoxinus cumberlandensis*	Threatened	Not present
Spotfin chub	*Erimonax monachus*	Threatened	Not present
Slender chub	*Erimystax cahni*	Threatened	Present in the Powell River
Yellowfin madtom	*Noturus flavipinnis*	Threatened	Present in the Powell River
Cumberlandian combshell	*Epioblasma brevidens*	Endangered	Present in the Powell River
Finerayed pigtoe	*Fusconaia cuneolus*	Endangered	Not Present
Fluted kidneyshell	*Ptychobranchus subtentum*	Endangered	Present in the Powell River
Oyster mussel	*Epioblasma capsaeformis*	Endangered	Present in the Powell River

Table 1: Continued

Purple bean	*Villosa perpurpurea*	Endangered	Present in the Powell River
Rough rabbitsfoot	*Quadrula cylindrica strigillata*	Endangered	Present in the Powell River
Slabside pearlymussel	*Pleuronaia dolabelloides*	Endangered	Present in the Powell River
Snuffbox	*Epioblasma triquetra*	Endangered	Not present
Shiny pigtoe	*Fusconaia cor*	Endangered	Not present
Spiny riversnail	*Io fluvialis*	Species of concern	Not present
Indiana bat	*Myotis sodalis*	Endangered	Not present
Gray bat	*Myotis grisescens*	Endangered	Not present
Northern long eared bat	*Myotis septentrionalis*	Threatened	Not present

Thank you for the opportunity to comment on this proposed action. If you have any questions regarding the information which we have provided, please contact Sarah Harrison of my staff at 931/525-4991 or at *sarah_harrison@fws.gov*.

Sincerely,

Acting for Mary E. Jennings
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 NEAL STREET
COOKEVILLE, TN 38501
PHONE: (931)528-6481 FAX: (931)528-7075

Consultation Code: 04ET1000-2016-SLI-0325 February 08, 2016
Event Code: 04ET1000-2016-E-00482
Project Name: Fire Management Plan Update for Cumberland Gap NHP

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Fire Management Plan Update for Cumberland Gap NHP

Preliminary Species list

Provided by:

Tennessee Ecological Services Field Office
446 NEAL STREET
COOKEVILLE, TN 38501
(931) 528-6481

Expect additional Species list documents from the following office(s):

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Kentucky Ecological Services Field Office
J C WATTS FEDERAL BUILDING, ROOM 265
330 WEST BROADWAY
FRANKFORT, KY 40601
(502) 695-0468
http://www.fws.gov/frankfort/

Consultation Code: 04ET1000-2016-SLI-0325
Event Code: 04ET1000-2016-E-00482

Project Type: ** OTHER **

Project Name: Fire Management Plan Update for Cumberland Gap NHP
Project Description: The existing fire management plan (FMP) needs to be updated to include 4,000 acres of new lands and to allow for the use of unplanned ignitions. The EA for the FMP will evaluate two alternatives: 1. No Action-maintain status quo with regard to wildland fire management and the FMP would not be updated. Continue current levels of prescribed fire and mechanical treatments. 2. Proposed Action- the FMP would be updated to include the new lands and the use of wildland fire for multiple objectives.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Bell, KY | Harlan, KY | Claiborne, TN | Lee, VA

United States Department of Interior
Fish and Wildlife Service

Project name: Fire Management Plan Update for Cumberland Gap NHP

Endangered Species Act Species List

There are a total of 14 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Clams	Status	Has Critical Habitat	Condition(s)
Cumberlandian combshell *(Epioblasma brevidens)* Population: Wherever found; Except where listed as Experimental Populations	Endangered	Final designated	
Dromedary pearlymussel *(Dromus dromas)* Population: Wherever found; Except where listed as Experimental Populations	Endangered		
Fineraved pigtoe *(Fusconaia cuneolus)* Population: Wherever found; Except where listed as Experimental Populations	Endangered		
Fluted kidneyshell *(Ptychobranchus subtentum)*	Endangered	Final designated	
Orangefoot pimpleback *(Plethobasus cooperianus)*	Endangered		
Oyster mussel *(Epioblasma capsaeformis)* Population: Wherever found; Except where listed as Experimental Populations	Endangered	Final designated	

Rough rabbitsfoot *(Quadrula cylindrica strigillata)*	Endangered	Final designated	
Sheepnose Mussel *(Plethobasus cyphyus)*	Endangered		
Shiny pigtoe *(Fusconaia cor)* Population: Wherever found; Except where listed as Experimental Populations	Endangered		
Fishes			
Blackside dace *(Phoxinus cumberlandensis)* Population: Entire	Threatened		
Spotfin Chub *(Erimonax monachus)* Population: Entire, except where listed as an experimental population	Threatened	Final designated	
Mammals			
Gray bat *(Myotis grisescens)* Population: Entire	Endangered		
Indiana bat *(Myotis sodalis)* Population: Entire	Endangered		
Northern long-eared Bat *(Myotis septentrionalis)*	Threatened		

Critical habitats that lie within your project area

There are no critical habitats within your project area.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
J C WATTS FEDERAL BUILDING, ROOM 265, 330 WEST
BROADWAY
FRANKFORT, KY 40601
PHONE: (502)695-0468 FAX: (502)695-1024
URL: www.fws.gov/frankfort/

Consultation Code: 04EK1000-2016-SLI-0142 February 08, 2016
Event Code: 04EK1000-2016-E-00574
Project Name: Fire Management Plan Update for Cumberland Gap NHP

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Fire Management Plan Update for Cumberland Gap NHP

Preliminary Species list

Provided by:

Kentucky Ecological Services Field Office
J C WATTS FEDERAL BUILDING, ROOM 265
330 WEST BROADWAY
FRANKFORT, KY 40601
(502) 695-0468
http://www.fws.gov/frankfort/

Expect additional Species list documents from the following office(s):

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Tennessee Ecological Services Field Office
446 NEAL STREET
COOKEVILLE, TN 38501
(931) 528-6481

Consultation Code: 04EK1000-2016-SLI-0142
Event Code: 04EK1000-2016-E-00574

Project Type: ** OTHER **

Project Name: Fire Management Plan Update for Cumberland Gap NHP
Project Description: The existing fire management plan (FMP) needs to be updated to include 4,000 acres of new lands and to allow for the use of unplanned ignitions. The EA for the FMP will evaluate two alternatives: 1. No Action-maintain status quo with regard to wildland fire management and the FMP would not be updated. Continue current levels of prescribed fire and mechanical treatments. 2. Proposed Action- the FMP would be updated to include the new lands and the use of wildland fire for multiple objectives.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Bell, KY | Harlan, KY | Claiborne, TN | Lee, VA

Endangered Species Act Species List

There are a total of 8 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Clams	Status	Has Critical Habitat	Condition(s)
fanshell *(Cyprogenia stegaria)*	Endangered		
Northern riffleshell *(Epioblasma torulosa rangiana)* Population: Entire	Endangered		
Sheepnose Mussel *(Plethobasus cyphyus)*	Endangered		
Fishes			
Blackside dace *(Phoxinus cumberlandensis)* Population: Entire	Threatened		The action area of the proposed project includes the Upper Cumberland HUC 05130101.
Insects			
Icebox Cave beetle *(Pseudanophthalmus frigidus)*	Candidate		
Mammals			
Gray bat *(Myotis grisescens)*	Endangered		

Population: Entire			
Indiana bat *(Myotis sodalis)* Population: Entire	Endangered		
Northern long-eared Bat *(Myotis septentrionalis)*	Threatened		

Critical habitats that lie within your project area

There are no critical habitats within your project area.

From: Beeler, Jennifer
To: Coleman Burnett; Sula Jacobs; Gene Wesloh; Shane Sturgill; Sasha Ernst; Christopher Phillips; Rob Klein
Subject: Fwd: Official Species list request
Date: Friday, February 19, 2016 11:03:26 AM

Hello all,

Please see the response below from the KY USFWS office.
Thanks
jenny

---------- Forwarded message ----------
From: **Miller, Jessica** <jessica_miller@fws.gov>
Date: Fri, Feb 19, 2016 at 9:45 AM
Subject: Fwd: Official Species list request
To: jenny_beeler@nps.gov

Thank you for your recent species list request. The official species list for the county in which your proposed project is located is below:

Endangered, Threatened, Proposed, & Candidate Species in BELL County, Kentucky

Group	Species	Common name	Legal* Status	Known** Potential	Special Comments
Mammals	*Myotis sodalis*	Indiana bat	E	K	
	Myotis grisescens	gray bat	E	K	
	Myotis septentrionalis	northern long-eared bat	T	K	
Mussels	*Alasmidonta atropurpurea*	Cumberland elktoe	E	P	The Cumberland elktoe occurs within the Upper Cumberland watershed in Bell County.
Fishes	*Phoxinus cumberlandensis*	blackside dace	T	K	Blackside dace occur within HUCs 0513010101, 0513010102, and 0513010106 in Bell County.
	Etheostoma sagitta	Cumberland arrow darter	C	K	Cumberland arrow darter occur within HUCs 0513010101, 0513010102, and 0513010106 in Bell County.
	Etheostoma spilotum	Kentucky arrow darter	P	P	Kentucky arrow darter may occur within the Kentucky River watershed in Bell County
Insects	*Pseudanopthalmus frigidus*	icebox cave beetle	C	K	Endemic to Icebox Cave, Bell County

Notes:
* Key to notations: E = Endangered, T = Threatened, P = Proposed , C = Candidate, CH = Critical Habitat

**Key to notations: K = Known occurrence record within the county, P = Potential for the species to occur within the county based upon historic range, proximity to known occurrence records, biological, and physiographic characteristics.

Endangered, Threatened, Proposed & Candidate Species in HARLAN County, Kentucky

Group	Species	Common name	Legal* Status	Known** Potential	Special Comments
Mammals	*Myotis grisescens*	gray bat	E	K	
	Myotis sodalis	Indiana bat	E	K	
	Myotis septentrionalis	northern long-eared bat	T	K	
Fishes	*Phoxinus cumberlandensis*	blackside dace	T	K	Within Harlan County, blackside dace are known to occur within HUCs 0513010101, 0513010102, 0513010103.
	Etheostoma sagitta	Cumberland arrow darter	C	K	Within Harlan County, Cumberland arrow darter are known to occur within HUCs 0513010101, 0513010102, 0513010103.
	Etheostoma spilotum	Kentucky arrow darter	C	K	Within Harlan County, Kentucky arrow darter are known to occur within HUC 0510020202.

NOTES:

* Key to notations: E = Endangered, T = Threatened, P = Proposed , C = Candidate, CH = Critical Habitat

**Key to notations: K = Known occurrence record within the county, P = Potential for the species to occur within the county based upon historic range, proximity to known occurrence records, biological, and physiographic characteristics

We must advise you that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitats and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.

For project-specific technical assistance or section 7 consultation, please send a detailed description of the proposed project to Lee Andrews; Field Supervisor, USFWS Kentucky Ecological Services; 330 West Broadway, Rm 265; Frankfort, KY 40601.

Please contact me if you have any questions or need further assistance as you continue to develop the plans for your proposed project.

Sincerely,

--

Jessica Blackwood Miller

Fish & Wildlife Biologist

Kentucky Field Office

U.S. Fish & Wildlife Service

330 W. Broadway, Suite 265

Frankfort, KY 40601

Ph: (502) 695-0468 ext. 104

Fax: (502) 695-1024

---------- Forwarded message ---------
From: <fwhq_ecos_support@fws.gov>
Date: Mon, Feb 8, 2016 at 10:48 AM
Subject: Official Species list request
To: Jessica_Miller@fws.gov

To: IPaC point(s) of contact for Kentucky Ecological Services Field Office -- 42431

Project Location: Bell, KY | Harlan, KY | Claiborne, TN | Lee, VA

This is an IPaC-generated official species list request. The person indicated below has requested a Section 7 official species list for a project that lies either partially or wholly within your office's Section 7 jurisdiction.

Jenny Beeler
National Park Service
Cumberland Gap NHP
91 Bartlett Park Road
Middlesboro 40965
jenny_beeler@nps.gov
Phone: (606) 246-1113

This individual has received contact information for your office and has been informed that they will receive an official species list within 30 days.

For your convenience, IPaC has created a TAILS species list record with the IPaC-generated preliminary species list document attached. To open the TAILS record, copy the URL http://ecos.fws.gov/tails/report/S7ByElementId.do?elementId=747846 and enter it into an internet browser. The browser will require you to log into ECOS and will then open the record. The activity code for the record is 04EK1000-2016-

SLI-0142.

If you have any problems opening your TAILS record, please contact our help desk at http://ecos.fws.gov/ecp/help.

Please note that this project spans multiple participating FWS offices. The other offices are listed below, along with their level of IPaC species list authorization. A separate TAILS record and species list has been created for each office. A TAILS bundle containing all the office TAILS records has also been created for each office.

Virginia Ecological Services Field Office -- Preliminary and official species lists
Tennessee Ecological Services Field Office -- Preliminary species lists only

The code for your office's bundle is: 04EK1000-2016-B-0298
The title of your office's bundle is: Fire Management Plan Update for Cumberland Gap NHP

The general location of the project can be viewed in google maps by clicking https://www.google.com/maps/place/36.62440633542545N83.61150025740527W.

--
Jessica Blackwood Miller
Fish & Wildlife Biologist
Kentucky Field Office
U.S. Fish & Wildlife Service
330 W. Broadway, Suite 265
Frankfort, KY 40601
Ph: (502) 695-0468 ext. 104
Fax: (502) 695-1024

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
PHONE: (804)693-6694 FAX: (804)693-9032
URL: www.fws.gov/northeast/virginiafield/

Consultation Code: 05E2VA00-2016-SLI-1378 February 08, 2016
Event Code: 05E2VA00-2016-E-01676
Project Name: Fire Management Plan Update for Cumberland Gap NHP

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and

endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Fire Management Plan Update for Cumberland Gap NHP

Official Species List

Provided by:

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Expect additional Species list documents from the following office(s):

Tennessee Ecological Services Field Office
446 NEAL STREET
COOKEVILLE, TN 38501
(931) 528-6481
Kentucky Ecological Services Field Office
J C WATTS FEDERAL BUILDING, ROOM 265
330 WEST BROADWAY
FRANKFORT, KY 40601
(502) 695-0468
http://www.fws.gov/frankfort/

Consultation Code: 05E2VA00-2016-SLI-1378
Event Code: 05E2VA00-2016-E-01676

Project Type: ** OTHER **

Project Name: Fire Management Plan Update for Cumberland Gap NHP
Project Description: The existing fire management plan (FMP) needs to be updated to include 4,000 acres of new lands and to allow for the use of unplanned ignitions. The EA for the FMP will evaluate two alternatives: 1. No Action-maintain status quo with regard to wildland fire management and the FMP would not be updated. Continue current levels of prescribed fire and mechanical treatments. 2. Proposed Action- the FMP would be updated to include the new lands and the use of wildland fire for multiple objectives.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Bell, KY | Harlan, KY | Claiborne, TN | Lee, VA

United States Department of Interior
Fish and Wildlife Service

Project name: Fire Management Plan Update for Cumberland Gap NHP

Endangered Species Act Species List

There are a total of 23 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Clams	Status	Has Critical Habitat	Condition(s)
Appalachian monkeyface *(Quadrula sparsa)*	Endangered		
birdwing pearlymussel *(Lemiox rimosus)* Population: Wherever found, Except where listed as Experimental Populations	Endangered		
Cracking pearlymussel *(Hemistena lata)* Population: Wherever found, Except where listed as Experimental Populations	Endangered		
Cumberland monkeyface *(Quadrula intermedia)* Population: Wherever found, Except where listed as Experimental Populations	Endangered		
Cumberlandian combshell *(Epioblasma brevidens)* Population: Wherever found, Except where listed as Experimental Populations	Endangered	Final designated	
Dromedary pearlymussel *(Dromus dromas)*	Endangered		

Population: Wherever found, Except where listed as Experimental Populations			
fanshell *(Cyprogenia stegaria)*	Endangered		
Finerayed pigtoe *(Fusconaia cuneolus)* Population: Wherever found, Except where listed as Experimental Populations	Endangered		
Fluted kidneyshell *(Ptychobranchus subtentum)*	Endangered	Final designated	
Littlewing pearlymussel *(Pegias fabula)* Population: Entire	Endangered		
Oyster mussel *(Epioblasma capsaeformis)* Population: Wherever found, Except where listed as Experimental Populations	Endangered	Final designated	
Purple bean *(Villosa perpurpurea)*	Endangered	Final designated	
Rough rabbitsfoot *(Quadrula cylindrica strigillata)*	Endangered	Final designated	
Sheepnose Mussel *(Plethobasus cyphyus)*	Endangered		
Shiny pigtoe *(Fusconaia cor)* Population: Wherever found, Except where listed as Experimental Populations	Endangered		
Slabside Pearlymussel *(Pleuronaia dolabelloides)*	Endangered	Final designated	
Snuffbox mussel *(Epioblasma triquetra)*	Endangered		

Fishes			
Blackside dace *(Phoxinus cumberlandensis)* Population: Entire	Threatened		
Slender chub *(Erimystax cahni)* Population: Entire	Threatened	Final designated	
Yellowfin madtom *(Noturus flavipinnis)* Population: Entire, except where EXPN	Threatened	Final designated	
Mammals			
Gray bat *(Myotis grisescens)* Population: Entire	Endangered		
Indiana bat *(Myotis sodalis)* Population: Entire	Endangered		
Northern long-eared Bat *(Myotis septentrionalis)*	Threatened		

United States Department of Interior
Fish and Wildlife Service

Project name: Fire Management Plan Update for Cumberland Gap NHP

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Appendix A: FWS National Wildlife Refuges

There are no refuges within your project area.

COMMONWEALTH of VIRGINIA

Department of Historic Resources

Molly Joseph Ward
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

January 19, 2016

Sula Jacobs, Superintendent
National Park Service
Cumberland Gap National Historical Park
US 25E South
P. O. Box 1848
Middlesboro, KY 40965-1848

Re: Spatial Fire Management Plan
Lee County, Virginia
DHR File No. 2016-0013
Received January 14, 2016

Dear Ms. Jacobs:

Thank you for your letter of January 7, 2015 informing us that the National Park Service (NPS) is developing a Spatial Fire Management Plan for Cumberland Gap National Historical Park. We understand that NPS plans to use the National Environmental Policy Act process to comply to comply with Section 106 of the National Historic Preservation Act. Our principal concern will be potential effects to historic properties, in particular archaeological sites with above-ground features. We look forward to receiving the Environmental Assessment and will be happy to work with you to bring the 106 process to a successful resolution. This will benefit both our workloads as the Streamlined Review Process under the Service-wide Programmatic Agreement may be used only if the park has an approved fire management plan (III.C.7).

If you have any questions concerning our comments, or if we may provide any further assistance, please do not hesitate to contact me at (804) 482-6088.

Sincerely,

Ethel R Eaton

Ethel R. Eaton, Ph.D., Senior Policy Analyst
Review and Compliance Division

Administrative Services
10 Courthouse Ave.
Petersburg, VA 23803
Tel: (804) 862-6408
Fax: (804) 862-6196

Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7029
Fax: (540) 868-7033

Bettina Ring
State Forester

COMMONWEALTH of VIRGINIA

DEPARTMENT OF FORESTRY
900 Natural Resources Drive, Suite 800
Charlottesville, VA 22903
www.dof.virginia.gov
(434) 977-6555
Fax: (434) 296-2369

February 09, 2016

Ms. Sula Jacobs
National Park Service
Cumberland Gap National Park
91 Bartlett Park Road
Middlesboro, KY 40965

Dear Ms. Jacobs;

On behalf of State Forester Bettina Ring and the Virginia Department of Forestry, I am writing to provide comments on the proposed revision of the Fire Management Plan for Cumberland Gap National Park, as requested in your letter dated January 4, 2016.

The Virginia Department of Forestry (VDOF) recognizes the value and the increasing need for fire as a management tool in Appalachian forest ecosystems. As such, the VDOF supports the incorporation of unplanned ignitions in the Park's fire management plan, as indicated in the proposed revision.

Because the VDOF is responsible for wildfire suppression throughout the Commonwealth we are concerned that a departure from an expectation of total suppression within the Park will increase the potential for managed fires to accidently expand beyond their planned borders. Managed fires which turn into wildfires have the potential for negative impacts on private lands in the area, which are under our jurisdictional authority for suppression, and these fires would likely result in larger and more expensive fire suppression operations than would normally be the case.

As a result, the VDOF requests the inclusion of the following provisions in the new plan to help address the potential need for increased fire suppression on private land adjacent to the Park. The VDOF asks that our agency be provided with: 1) notification through our Salem Regional Office when the decision is made to manage an unplanned ignition for resource benefits on any fire that is burning in, or could threaten any lands in Virginia, and 2) a daily notification of fire status, projected movement, and an evaluation of risk to private and state lands until that fire is controlled.

As Fire Management Director for the VDOF, I will be glad to serve as our agency's primary point of contact to help incorporate the recommended provisions or to develop additional cooperative procedures that may be needed to support the new plan. I do commend you for working to better incorporate managed fire into the overall management objectives of the Park and I look forward to working with you to help support these goals.

Sincerely,

John Miller

cc: Bettina Ring, State Forester
Ed Stoots, Western Regional Forester