National Park Service
U.S. Department of the Interior

Mammoth Cave National Park
Kentucky

FINDING OF NO SIGNIFICANT IMPACT
Fire Management Plan

Recommended:

March 11, 2019

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Superintendent, Mammoth Cave National Park

Date

Approved:

3/14/2019

for Robert A. Vogel
Regional Director, Southeast Region, National Park Service

Date

INTRODUCTION

In December 2018, the National Park Service (NPS) issued an environmental assessment (EA) describing the effects associated with revising and implementing the Fire Management Plan (FMP) for Mammoth Cave National Park (MACA or park) to manage wildfire, use prescribed fire, as well as implement mechanical and manual hazard fuel reduction treatments. The EA, through the Selected Alternative, delineates the types of fire management operations allowed in the park, whereas the associated operations-focused Spatial Fire Management Plan (SFMP) displays how the Selected Alternative's fire management operations will be implemented.

The purpose of the federal action is to revise and update the FMP for the park to comply with the NPS's wildland fire policy directives and Director's Order (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 2008). In addition, the purpose of the revision is to allow for the use of wildfires for multiple objectives, including resource benefits.

This Finding of No Significant Impact (FONSI) has been prepared in accordance with the requirements of the National Environmental Policy Act of 1969, as amended (NEPA), its implementing regulations (40 CFR 1500-1508), the Department of the Interior NEPA regulations (43 CFR 46), and NPS Director's Order 12, Conservation Planning, Environmental Impact Analysis and Decision-Making, and the NPS NEPA handbook.

The statements and conclusions reached in this FONSI are based on documentation and analysis provided in the EA and associated decision file. To the extent necessary, relevant sections of the EA are incorporated by reference below.

SELECTED ALTERNATIVE AND RATIONALE FOR THE DECISION

The Selected Alternative (Alternative 2: *Manage Fire for Multiple Objectives*) will allow for implementation of updated fire management at the park that reflects changes in federal wildland policy, guidance, and practices from ongoing improvements in the science of wildland fire management. The FMP will function programmatically and provide for a flexible range of options and activities that will be used to respond to changes in environmental conditions and the specific needs of fire management within the park. The subsequent SFMP will include the development of a multi-year fuels treatment plan, which will be reviewed and revised by the park on an annual basis. The Selected Alternative will 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 and manual treatments) within the entire park. This alternative will provide greater efficiency and flexibility to meet resource management goals and objectives.

The following are the objectives of the park's FMP:

1. Ensure that firefighter and public safety are the highest priority in all fire management activities.
2. Utilize the strategy of "manage wildfire for multiple objectives, including resource benefits" where appropriate, and suppress all wildland fires regardless of ignition source when there is a need to protect the public, prevent fire spread onto private property, or protect the natural and cultural resources of MACA.

3. Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with local fire management agencies.
4. Use prescribed fire where and when appropriate as a tool to manage vegetation within park boundaries, and where acceptable, across park boundaries to attain resource and fire management goals and objectives.
5. Modify fuel complexes around developed areas, along wildland-urban interface boundary areas, and in proximity of cultural sites to reduce fire behavior and intensity to a manageable level in order to protect critical sites.
6. Promote public understanding of wildland fire management programs and goals and objectives.
7. Manage wildland fires in concert with federal, state, and local air quality regulations to protect the air quality of the local and adjacent airsheds.
8. Enhance the protection of natural resources with fire management activities. This includes taking actions to:
    a. Protect and enhance threatened and endangered species and their habitats;
    b. Sustain a healthy ecosystem;
    c. Perpetuate or restore natural ecosystem processes when practical; and
    d. Prevent the further invasion and spread of non-native invasive plants.

FIRE MANAGEMENT STRATEGIES

The selected alternative continues the suppression of wildfires when necessary, and allows for management of wildfire for multiple objectives, including resource benefits. The selected alternative continues the use of prescribed fire and allows for both mechanical and manual treatment of vegetation and fuels.

Wildfire Suppression Strategies

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

Management of Wildfire for Multiple Objectives, Including Resource Benefits

Per federal wildland fire management policy, wildfires may be managed to accomplish specific resource management goals and objectives when appropriate conditions exist. The use of wildfire, an unplanned ignition, to meet multiple objectives, including resource benefits, will be based on priorities identified in the FMP, as well as prescriptions contained in operational plans. This approach will only be possible where allowing the wildfire to burn under managed conditions does not threaten life, property, and critical natural and cultural resources.

The decision to manage a wildfire, or part of a wildfire, for multiple objectives is allowed in the Selected Alternative. Management of wildfire 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. Upon deciding to manage an unplanned ignition, the fire

management team will develop a monitoring and future containment plan for the wildfire and gather the firefighting resources in place for a positive 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., a fire dependent natural area in the park).

Wildfire may be used to reduce hazardous fuels, restore fire in fire-adapted ecosystems, improve wildlife habitat, and restore native vegetation. Managing wildfires for resource objectives will require continuous monitoring, Minimum Impact Strategy and Tactics (MIST, described below and in Attachment A), and use of resource advisors to ensure that critical natural and cultural resources are not threatened.

FUEL MANAGEMENT STRATEGIES

Fuel management strategies as determined by the Selected Alternative in the EA, include the use of prescribed fire, and mechanical and manual fuel treatment as described in detail in Section 2.3.2.2 of the EA. Under the Selected Alternative of this EA, prescribed fire, mechanical and manual treatments, with current and future mitigation measures discussed in the EA, will be used in areas identified by the park in the associated SFMP's multi-year fuels treatment plan. The associated SFMP's required annual coordination with an interdisciplinary team, subject matter experts, and external stakeholders will provide valuable input for adapting the fire management program as needed. The multi-year fuels treatment plan will 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. Initial planning efforts by the FMP interdisciplinary team have identified a fuel treatment goal of up to 1280 acres per year using both mechanical and manual treatments in addition to prescribed fire. This goal may change from year to year depending on available funding.

Prescribed Fire

Prescribed fire will continue to be used to reduce hazardous fuels and to restore fire-adapted ecological communities at MACA. The selected alternative will allow up to 12,000 acres of prescribed burning to occur at MACA per decade in support of fire adapted ecosystem restoration and hazard fuel reduction projects.

Mechanical and Manual Vegetation and Fuels Management

The selected alternative will allow MACA to expand the use of mechanical and manual vegetation and fuels treatment options for the reduction of hazard fuels, restoration of fire adapted ecological communities, maintaining defensible space and fuel breaks to protect MACA infrastructure, minimizing the risk of fire spreading to private property, and for managing cultural landscapes. Mechanical and manual fuel reduction projects, which consists of 700 acres of mechanical and 100 acres of manual fuels treatment projects over the next decade, (EA Table 3), will continue to protect fire sensitive sites, selected by park staff, by reducing hazardous fuels and invasive species in and adjacent to those designated sites.

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 2014: Chapter 2, pg.

1). MIST is the concept of using the minimum tool to safely and effectively accomplish a task (NPS 2014). The application of MIST, in combination with the list of park-specific mitigation measures and best management practices (BMPs) (Attachment A), will provide the measures necessary to protect park resources during the application of fire and fuel management strategies.

RATIONALE FOR THE DECISION

Alternative 2 was selected because it allows for implementation of a full range of fire management activities, including wildfire suppression, the management of wildfire for multiple objectives, and fuels management (prescribed fire, mechanical and manual treatments) within the park. The Selected Alternative will provide a programmatic framework for long-term use of fire in the park, which will be effective in helping to achieve the following resource management objectives that apply to those parts of the landscape that generally depend upon fire to maintain fire-dependent species:

1. Reintroduce fire to approximate processes that have occurred on the park's landscape for thousands of years in order to maintain biodiversity within the park.
2. Reduce fuels to minimize the risk of severe wildfires and to facilitate restoration of fire-adapted species.

The Selected Alternative minimizes damage to the biological and physical environment, and best protects, preserves, and enhances historical, cultural, and natural resources, thereby making it the environmentally preferred alternative. In addition, the Selected Alternative utilizes fire management mitigation measures to protect listed threatened and endangered species (Attachment A: Mitigation Measures and Best Management Practices).

MITIGATION MEASURES and 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 in Attachment A: *Mitigation Measures and Best Management Practices* will be implemented as part of the Selected Alternative.

PUBLIC INVOLVEMENT

Public, or external, scoping was conducted through the NPS Planning, Environment and Public Comment website where a scoping notice and document were posted on September 7, 2011, to inform the public of the proposed project. The scoping document was also sent to MACA's mailing list to solicit feedback. The public scoping period ended October 7, 2011. A draft EA was made available for public review and comment through the PEPC website at: http://parkplanning.nps.gov/MACA. Press releases were sent to local media outlets and posted on the park's public website. The public comment period was December 7, 2018 to January 7, 2019. It was later re-opened for 2 weeks until February 15, 2019, due to the government shutdown. MACA held a public meeting on December 13, 2018. No comments were received during the public meeting. Three comments were received during the public comment period.

Attachment B provides a summary of public comments received and the NPS response to those comments. Comments focused on smoke impacts, impacts to plants and animals, and the role of fire in the park. Several edits were made to the EA as a result of public and agency comments. Some of the edits were editorial changes made for clarification. The errata section describes editorial changes and additions made to the FMP as a result of public and agency comments.

FINDING OF NO SIGNIFICANT IMPACT

No potential for significant adverse impacts to park resources as a result of implementation of a revised FMP has been identified. The conclusion of no significant impact was determined based on the analysis compiled from a combination of scientific data and professional judgment from NPS staff and documented in the EA. As defined by 40 CFR 1508.27, significance, as used in NEPA, requires consideration of context and intensity. The following considerations, included in 40 CFR 1508.27, are relevant to this finding of no significant impact.

Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that on balance the effect will be beneficial.

The EA analyzed potential impacts of the actions on all topics identified during internal and public scoping. There were no significant impacts identified, either beneficial or adverse. A revised FMP using wildfire suppression, the management of wildfire for multiple objectives, including resource benefits and fuels management (prescribed fire, mechanical and manual treatments) will result in short-term adverse impacts to local air quality primarily in the form of smoke, particulate matter, ozone, and associated reduced visibility. Impacts from unplanned ignitions will be short term, infrequent, and unpredictable. Wildfires have the potential to contribute more pollutants to the surrounding communities due to the lack of control over atmospheric conditions when unplanned wildfires begin. Impacts from wildfires would be infrequent as there are few actual wildfire starts in MACA. Impacts from prescribed burns will be short term, lasting the duration of each prescribed fire. Under the Selected Alternative, an estimated 12,000 acres per decade will undergo treatment by prescribed fire, 700 acres per decade of mechanical treatments, and 100 acres per decade of manual treatments. Given that this acreage will likely be treated over a series of prescribed burn events and the park's commitment to implement smoke management BMPs, impacts to air quality will be short term, lasting the duration of the prescribed burn.

There are vegetation communities at MACA that evolved with fire and would benefit from periodic fire to maintain species diversity, composition, and community structure. Conversely there are other vegetation communities such as Big Woods where fire is not desired. The selected alternative's prescribed fire program is designed to emulate fire regimes to benefit fire-dependent vegetation communities. It is the intent of this plan that prescribed fire will be avoided in non-fire dependent vegetation communities. The few wildfires that do occur at MACA would be suppressed if they were in non-fire-dependent vegetation communities. Wildfires occurring in fire-dependent vegetative communities may be managed for resource benefits. The selected alternative will further reduce fuel build-up over time in fire-dependent vegetation communities, leading to increased resilience of fire-dependent vegetation communities and increased protection of non-fire-dependent communities due to less intense wildfires in the park.

Under the Selected Alternative, disturbance associated with fire management activities, including vehicular and equipment access, construction of fire lines and fuel breaks, and the loss of vegetation will adversely impact soils and vegetation. These impacts are expected to be localized and short term, lasting the duration of the fire, with recovery expected within one to two growing seasons. Long-term beneficial impacts to these resources are expected to occur as the result of improved ecosystem functioning and reduced potential for high intensity wildfire. Impacts will be minimized through implementation of the Mitigation Measures and BMPs identified in Attachment A.

Potential impacts to wildlife may include direct mortality due to fire and fire management activities, as well as indirect impacts due to loss of forage and cover habitat for one to two growing seasons following a fire. Some species that prefer dense vegetation or litter may be adversely impacted until vegetation cover is restored. Long-term impacts to wildlife include improved habitat quality and structure that will provide benefits to most species, particularly species dependent on fire-created openings. Many species will benefit from diverse habitat structure created by prescribed fire, mechanical and manual vegetation management, and wildfire management. The selected alternative will have long-term beneficial impacts to wildlife and associated habitat due to maintenance and restoration of a variety of habitat types. The use of prescribed fire, increased ability to use mechanical and manual fuels treatment, and managing wildfires for multiple benefits will all increase the diversity and variety of fire adapted vegetation. The selected alternative will further reduce hazard fuels, which will reduce wildfires that require aggressive suppression and management actions, thereby reducing impacts from fire suppression activities over time. Adverse impacts to individual species will be offset by mitigation measures (Attachment A: *Mitigation Measures and Best Management Practices*), such as avoiding sensitive breeding seasons for tree roosting bats. The short-term impacts will be offset by the long-term beneficial impacts associated with reduced hazard fuel loads and decreased wildland fire intensities.

The degree to which the Proposed Action affects public health and safety.

In accordance with NPS Management Policies (2006), the NPS will 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 prescribed burns and wildfire, the revision of the FMP is not anticipated to impact public health and safety.

Unique characteristics of the area such as proximity to historic or cultural resources, ecologically critical areas, wetlands or floodplains, etc.

Wildfires have the potential to adversely affect both recorded and unrecorded cultural resources within the park. Prior to initiating a prescribed fire, the NPS will develop a prescribed burn plan, which will include advanced coordination with cultural resource staff to identify sensitive cultural locations and protocols for burning near cultural resources. Should new archeological resources be identified during fire management activities, the park's cultural resource specialist will be contacted immediately, and the site(s) will be recorded, delineated, and protected, as necessary, in consultation with appropriate tribal and state officials. Temporary effects on cultural landscapes will include unsightly burned and scorched vegetation and unvegetated areas from both prescribed burns and more intense unplanned wildfires. The effects on

vegetation will be expected to last one or two growing seasons, depending on the intensity and size of the fire event.

Portions of the park are considered a floodplain due to seasonal flooding and elevation relative to adjacent waterways, and there are wetlands scattered throughout the park. Wetlands consist of small ponds, marshes, shrub swamps, and wet forest areas. The Selected Alternative will not affect floodplain or wetland values because no prescribed fire ignition will take place in these areas. Heavy equipment use in the floodplain/wetlands will be avoided and other impacts to floodplains/wetlands will be avoided through mitigation measures identified in Attachment A. Additionally, wildfire incidence is minimal and unlikely to burn in the wet areas where floodplains and wetlands are found. The Selected Alternative will 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, 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.

The Selected Alternative will cause no significant impacts to historic or cultural resources, floodplains, wetlands, or ecologically critical areas. No federally listed wild and scenic rivers occur within the park although the Green River is designated as an Outstanding State Water Resource and a state Wild River.

The degree to which the possible effects on the quality of the human environment are highly uncertain or involve unique or unknown risks.

The risk to the quality of the human environment associated with the Selected Alternative will be both adverse and beneficial. Planned projects and management responses to unplanned wildfires pose some inherent risk to the human environment; although planned actions and management response to wildfire are not unique, and are relatively certain, wildfire can change rapidly due to changing conditions associated with wildfire events.

The degree to which the action may adversely affect historic properties in or eligible for listing on the National Register of Historic Places, or other significant scientific, archeological, or cultural resources.

Because of the application of MIST and other mitigation measures, the park determined that there will be no adverse effects to cultural resources. A discussion of the cultural resources and cultural landscapes contained within the park can be found in the EA in Section 1.8.2 Cultural Impact Topics and Section 3.2 Cultural Resources. These cultural resources and landscapes will be prepared for protection during any planned fire management activity, and no adverse effects are expected to occur under the Selected Alternative. If discovery of cultural resources occurs during fire management activities, work in the area will cease and qualified NPS personnel will assess the sites and recommend an appropriate course of action to the park Superintendent in consultation with the Kentucky State Historic Preservation Office (SHPO), as well as any tribes that attach religious and cultural significance to a historic property.

On January 15, 2019, the SHPO provided conditional concurrence that the fire management plan would result in No Adverse Effect on Historic Properties. The Kentucky SHPO requested clarification of some of the language used in the FMP EA, and that clarification has been provided to Kentucky SHPO and in the EA as described in the errata section in Attachment B.

The park will continue to coordinate with Kentucky SHPO during specific prescribed fire planning and implementation.

The degree to which the action may adversely affect an endangered or threatened species or its habitat.

A description of the endangered or threatened species that potentially occur within the park can be found in EA Section 3.1.7 *Species of Special Concern*. Federally listed threatened or endangered species occurring in the park include: Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), Northern long-eared bat (*Myotis septentrionalis*), spectaclecase (*Margaritifera monodonta*), clubshell (*Pleurobema clava*), fanshell (*Cyprogenia stegaria*), snuffbox (*Epioblasma triquetra*), catspaw (*Epioblasma obliquata*), pink mucket (*Lampsilis abrupta*), ring pink (*Obovaria retusa*), sheepnose (*Plethobasus cyphyus*), rough pigtoe (*Pleurobema plenum*), rabbitsfoot (*Theliderma cylindrica*), and Kentucky cave shrimp (*Palaemonias ganteri*). The park also contains designated critical habitat for the Kentucky cave shrimp, rabbitsfoot mussel, and diamond darter (*Crystallaria cincotta*). Many of the mitigation measures and best management practices identified in Attachment A are designed to avoid and minimize impacts to threatened and endangered species and were developed in consultation with the US Fish and Wildlife Service (USFWS).

On March 8, 2019, the USFWS concurred with the May Affect, Not Likely to Adversely Affect determination for the gray bat, mussels, Kentucky cave shrimp, and designated critical habitat for the Kentucky cave shrimp, rabbitsfoot mussel, and diamond darter. The park and USFWS will continue to coordinate on impacts to Indiana and Northern long-eared bats, and the USFWS has indicated that they will issue a final Biological Opinion (BO) prior to burn implementation. The park will implement any terms and conditions identified in the BO.

CONCLUSION

As described above, the selected alternative does not constitute an action meeting the criteria that normally requires preparation of an environmental impact statement (EIS). The selected alternative will not have a significant effect on the human environment in accordance with Section 102 (2) (c) of NEPA.

Based on the foregoing, it has been determined that an EIS is not required for this project and, thus, will not be prepared.

Attachment C contains the non-impairment determination for the Selected Alternative.

REFERENCES AND LITERATURE CITED

40 CFR 1500-1508 National Environmental Policy Act 1969. CEQ Regulations for Implementing the Procedural Provisions of NEPA

43 CFR 46 National Environmental Policy Act 1969. Implementation of the National Environmental Policy Act of 1969

Commonwealth of Kentucky 401 KAR 53:010 Division for Air Quality: General Administrative Procedures – Definitions

Hardy, C.C., R.D. Ottmar, J.L. Peterson, J.E. Core, and P. Seamon. 2001. Smoke Management Guide for Prescribed and Wildland Fire: 2001 edition. PMS 420-2. NFES 1279. Boise, Idaho: National Wildfire Coordination Group.

National Park Service (NPS). 2006. NPS Management Policies. Available at: http://www.nps.gov/policy/MP2006.pdf. Accessed on November 2014.

National Park Service (NPS). 2014. National Park Service Reference Manual 18, Wildland Fire Management

National Wildfire Coordinating Group (NWCG). 2014. Interagency Prescribed Fire Planning and Implementation Procedures Guide. Available at: http://www.nwcg.gov/sites/default/files/products/pms484.pdf. Accessed March 29, 2016.

16 United States Code [USC], 2016. Conservation Code for the United States

U.S. Department of the Interior and U.S. Department of Agriculture. 2016. Interagency Standards for Fire and Fire Aviation. Available at: https://www.nifc.gov/PUBLICATIONS/redbook/2016/FrontCoverOutside.pdf. Accessed April 7, 2016.

U.S. Department of the Interior and U.S. Department of Agriculture, 2016. 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

ATTACHMENT A

MITIGATION MEASURES AND 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 Best Management Practices discussed below will be implemented as part of the Selected Alternative.

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.

PHYSICAL RESOURCES

Air Quality

*The following fire management mitigation measures concerning **air quality** would be implemented as follows:*

A prescribed fire plan (or burn plan) would be developed to meet specific vegetation management objectives and 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 and/or lead vehicles would be used 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. MACA staff is responsible for notifying those on the contact list.

Park staff would coordinate with 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.

Prescribed fires would be planned 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 National Wildfire Coordinating Group (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.

All prescribed burning and pile burning will comply with the Commonwealth of Kentucky State Implementation Plan Commonwealth of Kentucky (401 KAR 53:010). *Ambient air quality standards concerning air quality guidelines and smoke management regulations*.

Unhealthy or hazardous accumulations of smoke as determined by levels indicated in the Kentucky Smoke Implementation Plan will trigger an aggressive suppression action that will continue until air quality attains acceptable levels.

When adjacent land management agencies are managing prescribed fires or wildfires, cooperation and coordination will be initiated to minimize cumulative smoke impacts.

BIOLOGICAL RESOURCES

Vegetation

1. Non-native species invasion and fire management activities: Recognizing that fire management activities cause disturbance, opportunities exist for non-native plant species colonization. For example, fire suppression has contributed to the invasion of non-native thistles in some areas. If non-native plants are found, natural resources staff will develop appropriate mitigation measures (i.e. cutting seed heads, herbicide treatments, or manually removing plants). Additionally, staff will modify their prescribed

fire practices if certain activities are determined to contribute to invasions of non-native plants.

2. Pile burning: To ensure that impacts from pile burning would be minimized, piles would be kept small (typically four feet wide, eight feet long, and four feet tall) to minimize the extent of vegetation and soil damage, and also to allow mycorrhizal fungi and other soil organisms to re-colonize patches of sterilized soil. This would also facilitate nutrient cycling processes and help plants reestablish. Raking duff from adjacent areas over the burn-pile footprint will also be considered on a case-by-case basis for the operational plan when burning piles.
3. Slash: Debris from cut vegetation (slash) will either be lopped and scattered to a depth of no more than 18 inches and burned during a subsequent prescribed fire, or piled and burned outside of fire season (October - April).

Wildlife

1. Stream crossings would be limited to set and existing locations.
2. Log jams and debris would be left in streams to protect fish and aquatic insect habitat.
3. Fire chemical use within the floodplain, wetlands, and other sensitive areas must be approved by the Superintendent and 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.
4. 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.
5. The use of large mechanized equipment would require Superintendent approval.
6. Transport of fire personnel and equipment would use existing roads and trails wherever possible.
7. Aviation use would be carefully considered and impacts to wildlife mitigated through timing of operations, exclusion of low-level aviation use over sensitive wildlife habitat, or avoidance of certain areas of the park.
8. Fire effects monitoring on species and habitat would be used to inform multi-entry prescribed burning and ecosystem maintenance activities.
9. Fire management personnel would be briefed on potential resources of concern and known locations within a burn unit in order to facilitate avoidance potentially sensitive resources.
10. Mop-up methods would use MIST techniques to protect natural resources, including soils, water resources, vegetation, and wildlife.

Species of Special Concern
The park will consult with the USFWS for effects to federally listed species when developing individual prescribed burn plans for activities or impacts not already covered by the consultation on the programmatic FMP EA.

During the planning phase of any fire management activity, the presence of special-status species in the area will be evaluated. Park personnel will evaluate existing databases and maps and may request additional surveys for field verification. Site-specific mitigation measures will be developed in the biological assessment that is provided to the Fish and Wildlife Service and will be followed. If a prescribed fire unit includes habitat for special-status species, actions will be taken to avoid nesting season and/or other sensitive periods for plants and animals. Providing direct protection of certain areas (such as nesting trees), altering the time or season of burning, or simply not allowing fire into parts of the unit are examples of possible mitigation measures for sensitive plants and wildlife. All suppression activities necessary to extinguish a fire will follow current MIST.

Prescribed fire and mechanical/manual clearing, removing, or thinning trees, including snags, would occur outside the maternity season) as determined through consultation with USFWS, minimizing the potential for eliminating a roost tree and injuring or killing federally listed bat species.

The timing restrictions related to bat species listed above for prescribed burns and mechanical/manual 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:

1. After providing for public and firefighter safety, attempt to prevent any wildfire from burning to within 0.25 miles of a known hibernaculum
2. 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
3. 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.*
4. 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.
5. In the event of a wildfire, resource specialists would examine maps and information resources to assess and discuss potential effects of the fire.

6. Aviation use would be carefully considered and impacts to wildlife mitigated through timing of operations, exclusion of low-level aviation use over sensitive wildlife habitat, or avoidance of certain areas of the park.
7. Fire effects monitoring on species and habitat would be used to inform multi-entry prescribed burning and ecosystem maintenance activities.
8. 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.

Additional mitigation measures specific to special-status plants:

1. Where possible, avoid ground-disturbing activities, such as line construction, manual or mechanical/manual treatments, or pile burning, in areas of known special-status plant populations and in areas of suitable habitat.
2. Only in emergencies, construct fire line through suitable habitat by using natural barriers, such as the streambed, to delimit the burn area. As a last resort, if no natural barriers exist, construct fire line by using minimal line construction techniques (i.e. removal of duff layer only) to link natural barriers. All constructed fire lines would be rehabilitated.
3. Monitor special-status plant response to fire management activities.

The timing restrictions related to bat species listed above for prescribed burns and mechanical/manual treatments would also provide protection for migratory bird species during the bird nesting season as required under the Migratory Bird Treaty Act.

Specific to managing wildland fire for multiple objectives, the park would implement the following mitigation measures:

1. After providing for public and firefighter safety, attempt to prevent any wildfire from burning to within 0.25 miles of a known hibernaculum
2. 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
3. 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 is used. Control line construction within wetlands and floodplains 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 must be approved by the Superintendent and 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 consult 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 over sensitive wildlife habitat, 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

*The following fire management mitigation measures concerning **cultural resources** would be implemented as follows:*

Pre-Incident Planning

1. Planning for fire management actions will include avoidance and minimization of effects on known cultural resources using various measures as recommended by cultural resource staff.

2. Cultural resource inventories will be completed for each fire management project area to identify resources that may be significant and are susceptible to adverse effects from fire or fire management actions.

3. Fuel loads will be evaluated at cultural resource sites, and those fuels may be reduced as part of ongoing fuel reduction programs.

4. The park will continue to consult with Native American tribes about fire management planning and specific fire management actions in order to identify issues and resources of concern and to implement the most appropriate treatments.

5. 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 avoid or minimize adverse effects on these resources during fire management activities, or how to mitigate adverse effects after the management activities, and would coordinate compliance with Section 106 of the National Historic Preservation Act, as appropriate.

6. The park will continue to work with the Southeast Archeological Center to use existing and develop better site prediction geographic information system (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.

7. Historic structures and sensitive cultural sites would be protected from wildland fire via fuel reduction plans in an effort to provide defensible space.

The possible effects of fire and fire management activities on cultural resources will be mitigated by the following actions:

1. Prior to the start of work, archeologists, cultural resource specialists, or other resource management staff will instruct crews in identification of cultural materials and will review federal and state laws protecting archeological sites and artifacts.

2. All cultural sites within the project area will be identified and located by an archeologist, cultural resource specialist, or other resource management staff member. These sites should be avoided during fire management activities.

3. An archeologist, cultural resource specialist, or resource management staff member will be integrated into planning and response activities.

4. Following each project or treatment, a report will be sent to the SHPO.

Incident Response

1. Fire management teams will solicit the advice of archeologists, cultural resource specialists, and/or other resource management staff on cultural resource issues and concerns to avoid affects to cultural resources.

2. 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.

3. To avoid affects to cultural resources, archeologists, cultural resource specialists, and/or other resource management staff will, whenever possible, aid in positioning crew camps, holding lines, and other fire suppression-related activities outside of culturally sensitive areas.

4. Archeologists, cultural resource specialists, and/or other resource management staff will be assigned as resource advisors to fire management teams to advise of known significant cultural resources in areas where potential effects of fire could be avoided or minimized through emergency fuel reduction.

5. 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:

    a. Keeping engines or slip-on units on existing roads;

    b. Not using heavy equipment (e.g., bulldozers, plows) for constructing control line;

    c. Not using fireline explosives in areas of known cultural resource significance;

    d. Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of fireline construction whenever possible;

    e. Keeping fireline width as narrow as possible;

    f. When necessary, mapping, marking, or flagging cultural resources during wildfire suppression, rehabilitation, and prescribed burn implementation (and removing flagging immediately after the fire event);

    g. Providing all workers with basic training about cultural resources;

    h. 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.

    i. Soaker hoses, sprinklers, or foggers would be used in mop-up, avoiding boring and hydraulic action;

j. 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; and

k. In instances of wildfire, a post-fire data recovery and/or restoration program would be developed that is sensitive to cultural resource concerns.

Social

Visitor Use and Experience

*The following fire management mitigation measures concerning **visitor use and experience** would be implemented as follows:*

1. Firefighter and public safety would be the highest priority in all fire management activities.
2. Prescribed fires would not be ignited in proximity to park structures when prevailing winds carry smoke towards the structures.
3. 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.
4. Educational outreach would be implemented prior to any closure or restrictions to explain the role of fire as a management tool.
5. Fire management staff would work with protection staff and local agencies on posting smoke hazard signs if smoke could impact roadways.
6. 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.
7. Visitors would be excluded from the immediate vicinity of the wildfire or prescribed burn when fire management activities are underway.
8. 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.
9. 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).

NPS fire management requires the fire manager and firefighter to select management actions commensurate with the fire's potential or existing behavior, yet leaves minimal environmental impact. To assist firefighters in reducing short and long-term environmental impacts federal firefighting agencies have developed minimum impact tactics guidelines. A comprehensive look at these guidelines is found at the following link. https://www.nps.gov/fire/wildland-fire/about/nps-reference-manual-18.cfm

Minimum Impact Strategy and Tactics are used in all fire management operations at MACA. The intent of utilizing MIST is to safely and effectively complete the fire management operation with minimal impact to resources.

Specific MIST procedures at MACA are:

1. Any off-road use of vehicles, plows, and other mechanized equipment must be approved by the Superintendent.
2. Any use of retardant will be reviewed by an assigned resource advisor and approved by the Superintendent
3. Consider during mop-up: Cold-trailing fireline, using wetline or sprinklers as control line, using natural or human made barriers to limit fire spread, burning out sections of fireline, limiting width and depth of fireline necessary to limit fire spread.
4. Locate pumps and fuel sources to minimize impacts to streams.
5. Minimize cutting of trees and snags to those that pose safety or line construction concerns, prune lower branches to remove ladder fuels as opposed to falling the tree.
6. Minimize bucking of logs to check/extinguish hot spots; preferably roll logs to extinguish and return logs to original position: scatter branches and other debris in accordance with guidelines contained in the Fireline Handbook (PMS 410-1).
7. Utilize extensive cold-trailing and/or hot-spot detection devices along perimeter.
8. Use mop-up kits and other low pressure nozzles setting to prevent erosion.
9. Water bars will be placed on steep slopes.

Tactics and equipment used for suppression and for holding operations on prescribed burns will be selected to minimize the impact commensurate with values at risk. Use of bull dozers or tractor plows is prohibited except with the permission of the Superintendent. In areas closed to public motorized use, vehicles will only be used when necessary for protection of sensitive resources, life, safety, and private property. Snag falling will be limited to those trees necessary to secure control lines.

ATTACHMENT B

PUBLIC COMMENTS RECEIVED WITH NPS RESPONSES AND EA ERRATA

Set forth below are responses from the NPS to all substantive comments submitted on the document entitled Environmental Assessment, Mammoth Cave National Park, Fire Management Plan. DO 12 defines a substantive comment as one that does one or more of the following:

1. Question, with reasonable basis, the accuracy of the information in the EA.
2. Question, with reasonable basis, the adequacy of the environmental analysis in the EA.
3. Present reasonable alternatives other than those presented in the EA.
4. Cause changes or revision in the proposal.

The following table summarizes the public comments received and the NPS responses to the comments. The EA errata follows the comment and response summary table.

Number	Public Comment	NPS Response
1	In light of the damage done to Big woods area of Mcnp, that being old growth and virgin timber that is not replaceable. I am in favor of NO burning until suitable steps can be taken to insure the old forest areas are exempt from burn practices. There is no way we can recall that forest, a state and national treasure to its former glory.	The NPS, as stated in this EA, will not allow prescribed fire projects in the Big Woods area and no managed wildfire for other objectives, including resource objectives, will be allowed.
2	What is the Natural History of fire in the park? Why is the park burning to match prehistoric era instead of natural fire events? Will science be down before and after a fire? What species will be studied? How many years will studies be performed prior to the first burn to establish a base line?	Vegetation in the park is not naturally prone to fire under the current climatic conditions which extend back in time several thousand years. Native American set fire transformed the vegetation and greatly increased biodiversity in the Mammoth Cave area. The park conducts prescribed burns to restore native prairie grasses and wildflowers in open areas and also to prevent the replacement of oak-hickory stands by beech and maple. This latter problem is called mesophication and is a major problem in the southeast. Fire effects monitoring is an integral part of prescribed burning. Monitoring plots are established prior to a burn and all vegetation is inventoried. Then post burn

Number	Public Comment	NPS Response
		monitoring in the same plot is repeated at one, five, and ten year intervals. Beyond that, vegetation in the park is monitored long-term regardless of prescribed burns.
3	Has the park studied the carbon footprint of a controlled fire as compared to the natural breakdown of organic material?	Carbon cycling via prescribed fire is faster than decay, but both processes release modern carbon back into the environment. Neither process releases significant fossil carbon into the environment and so either process does not affect the natural carbon budget. However, by burning we get the added benefit of biodiversity conservation and the reduction of hazardous accumulations of fuel in the interest of preventing catastrophic wildfire.
4	Is a prescribed fire a good idea in regards to the recent global warming report put out by the Trump administration (and other reports)?	Global warming or climate change is linked to the combustion of fossil fuels like coal and oil.
5	Is a prescribed fire a “neighborly” thing to do? Smoke reached all the way to Elizabethtown KY during the last prescribed fire.	Prescribed burning is important for biodiversity conservation and reduction of hazard fuels. Smoke has been a problem in the past therefore the park has greatly reduced the size of prescribed fire plots to generate far less smoke per burn.
6	Burning in March and April may impact a lot of wildlife including amphibians, reptiles, ground nesting birds, etc. The fire plan says you will burn between January and April (page 17 lines 33 thru 35), but later, it states prescribed fires will be implemented outside the breeding season (Page 39 lines 19 thru 22). Which is correct?	The park has greatly reduced the size of burn units so that only a small portion of a given population would be affected. During March there are very few nesting birds, amphibians (if active) are in wet habitats and reptiles are generally not active yet. Burns in April will be minimized unless a cold spring season delays green up of the vegetation.
7	What are the sources used to determine the mortality rate of fauna during a prescribed fire? (Page 41 lines 31 thru 34)? “Overall fire management activities are expected to have a long term beneficial effect on wildlife by maintaining or restoring a variety of habitat types” (Page 42 lines 18 thru 19). Please reference source. Please reference source for Section, 3.1.8.1.2. page 45	Statements on anticipated mortality of fauna on pages 41 and 45 are based on previous park experience. In the past during much larger prescribed burns, park did not experience significant wildlife mortality. Likewise, the statement on page 42 quoted is based on the general principle that if habitat is restored then all populations in the biological community benefit.
8	Please reference source for page 46, lines 1-16 The use of helicopters to	We could not find anything about helicopters.

Number	Public Comment	NPS Response
	drop incendiary spheres may terrorize fauna.	
9	Page 6 Line 31, sentence is cut off.	To the text, added: "(see Mapsheet 2 of the SFMP)."
10	What effect does burning hundreds of acres have on wildlife: snakes, lizards, birds, skinks, which have already emerged, and the migrant nesting birds which are rapidly declining? What about all the trees and shrubs which have already leafed out? (We are not talking about invasives here).	Based upon experience during past prescribed burns that were much larger then currently being planned, the park has not experienced significant mortality in wildlife. Except for small scale growing season burns in grassland areas, the park does not plan to use prescribed fire after green up. Growing season burns can be very effective in controlling exotic plants such as Microstegium.
11	Many years ago had a late frost which burned back and did damage to our trees. It is terribly hard on trees to leaf out again. And what about the "cat face" damage done to the mature trees, to say nothing of the young trees coming up in the understory?	The park does not anticipate burning vegetation after green up except for small scale growing season burns in grasslands. Prescribed fire helps with oak regeneration and helps fight back beech and maple invading oak and hickory stands.
12	How much does this burn contribute to climate change? And if we continue to get rain and the plan to burn goes forward, how much more smoke will be created from the wet material on the ground?	Burning downed branches and forest leaf litter puts modern carbon back into the atmosphere where it will continue to be part of the carbon cycle. Burning fossil fuels is what drives climate change. If fuel moistures are too wet or too dry then a proposed burn will be "out of prescription" and not carried out.

EA ERRATA

Clarifying language was added to the EA, but no substantive changes were made to the alternatives considered nor the analysis presented. The changes described below were made in response to public and agency comments, to correct errors, or to provide clarification of information presented in the EA. In addition to the descriptions below, an edited version of the EA showing where specific changes were incorporated will be posted on parkplanning.nps.gov along with this FONSI.

Changes to acreages of prescribed fire and mechanical fuels reduction projects were made to correct matters of inconsistency within the document and to allow for a slight increase of 10 additional acres of mechanical fuel treatment each year.

Throughout the document, the maximum number of acres that will be treated with prescribed fire over the course of a decade was changed from 10,470 to 12,000. This change was made because the maximum number of acres treated annually is 1,200; therefore, 12,000 acres per decade is the correct number, rather than 10,470. Table 3 in the EA provides a summary of treatment acres.

Throughout the document, the maximum number of acres that will be treated with mechanical treatment in any one year was changed from 60 to 70 to allow for mowing over a slightly larger area in order to prevent woody vegetation encroachment into grassland habitat in the park. Accordingly, the maximum number of acres treated mechanically in a decade was increased from 600 to 700. Table 3 in the EA provides a summary of treatment acres.

Throughout the document, the total maximum number of acres treated annually with prescribed fire (1,200), mechanical treatment (70), and manually (10) is reported as 1,280, and the total over the course of a decade is 12,800 acres. Table 3 in the EA provides a summary of treatment acres.

3.1.7 Species of Special Concern.

The paragraph relevant to bats moved from discussion of eagles to be part of discussion of bats.

Response to public review comment 9: Page 6 Line 31, sentence is cut off.

As the page numbers have shifted since the draft EA, this change is addressed in Section 1.3.3, in the last sentence in the first paragraph: Added: “see Mapsheet 2 of the SFMP.”

Changes to EA as a response to the Kentucky SHPO review are as follows:

Within section 3.2, a subsection entitled *Cultural Resource Documentation* was added that explains the early research of cultural resources during the pre-park decades of the 1940s, 50s, and 60s. The discussion goes on to summarize the last 40 years of systematic archaeological survey that was done in the park in the 1970s, 80s, 90s, and 2000s. This section provides an overview of previous research and survey that has carried our understanding of cultural resource inventories and conditions to how we currently understand them today.

Within section 3.2, a subsection entitled *Cultural Resource Categories* offers definitions of 5 cultural resource categories that have organized to consider fire mitigation measures and best

management practices that will offer the greatest potential to avoid and minimize effects on cultural resources. These categories include open sites, caves and rock shelters, structural sites (including historic structures listed on the List of Classified Structures), cultural landscapes, and ethnographic resources. Resources eligible for listing to the National Register of Historic Places are found under each of these categories. The generalized treatments to identify and avoid under prescribed burns and fuels reduction activities in the FMP remains consistent for all resources, regardless of historic significance.

At the end of section 3.2.1.5, a subsection entitled *Cultural Resource and Section 106 Summary*, explains the recommended findings of effect as they relate to Section 106 of the National Historic Preservation Act.

ATTACHMENT C

NON IMPAIRMENT DETERMINATION

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of the Interior and the NPS to manage units "to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations" (16 United States Code [USC] 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress" (16 USC 1a –1). NPS Management Policies (2006), Section 1.4.4, explains the prohibition on impairment of park resources and values.

While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the Nation Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

The NPS has discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park (NPS 2006: Section 1.4.3). However, the NPS cannot allow an adverse impact that would constitute impairment of the affected resources and values (NPS 2006: Section 1.4.3). An action constitutes an impairment when its impacts "harm the integrity of Park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006: Section 1.4.5). To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts" (NPS 2006: Section 1.4.5).

This determination on impairment has been prepared for the Selected Alternative described in this FONSI. An impairment determination is made for all resource impact topics (air quality, vegetation, wildlife, species of special concern, and cultural resources) analyzed in detail in the EA for the Selected Alternative. These resources were determined to be potentially impacted due to an update of the MACA fire management program.

Air Quality

The Selected Alternative will result in short-term adverse impacts to local air quality primarily in the form of smoke and particulate matter, ozone and associated reduced visibility from prescribed fires and wildfires. Impacts from wildfires will be short term, infrequent, and unpredictable in size and location. Smoke impacts from wildfires have the potential to contribute more smoke to the surrounding communities due to the lack of control over atmospheric conditions when unplanned wildfires begin. Impacts from prescribed fires will be short term and minimal due to the implementation of the Interagency Prescribed Fire Planning and

Implementation Procedures Guide (Product Management System [PMS] 484) (NWCG 2014). The prescribed fire plan will follow the PMS 484 prescribed fire plan template (Appendix A of PMS 484) 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 will be trained in emission reduction techniques as outlined in the NWCG Smoke Management Guide (Hardy et al. 2001) and continuous monitoring will be required throughout the burn.

The Selected Action will not result in impairment of air quality within or adjacent to the park because adverse impacts will be short term, associated with the duration of wildfires. Prescribed fires and management of wildfire for multiple objectives will be managed to avoid adverse impacts to air quality.

Vegetation, Including Nonnative Species and Special Status Species

Hardwood forests in the park are being invaded by shade-tolerant and fire intolerant tree species, causing a shift in the park's vegetative communities. The park is also experiencing a buildup of dense stands of trees and understory vegetation in some areas that contributes to fuel loading. Prescribed fire will reduce fuel loading and mitigate fire behavior to improve suppression effectiveness given an unplanned ignition in the park. No more than 12,000 acres per decade of the park will undergo treatment by prescribed fire, 700 acres per decade of mechanical fuels treatments and 100 acres per decade of manual fuels treatments under the Selected Alternative. This acreage will likely be treated over a series of prescribed burn events; therefore, impacts to vegetation will be localized in discrete areas. Impacts from management actions (prescribed fire, mechanical and manual treatment) will be short term and adverse during the treatment process, but will last for just one to two growing seasons as the area is naturally restored. Removal of vegetation through the use of wildfire for multiple objectives will have short- term, minor effects on vegetation. These adverse impacts are expected to last one or two vegetation growing seasons to allow the vegetation to become re-established after the wildfire event. Fire tolerant and resistant species will recover over time. Beneficial impacts to plant productivity and ecological function will occur over the long term. The Selected Alternative will not result in impairment of vegetation resources at the park because the wider impacts to the plant population and community composition will be long term and beneficial due to improved nutrient cycling and plant productivity and improved resilience to wildfires.

Wildlife, Including Nonnative Species and Special Status Species

Fire management activities under the Selected Alternative will be managed in a way to optimize benefits to wildlife and their habitats and minimize adverse impacts. Under the Selected Alternative, there will 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 will be limited to the duration and location of treatment activity.

The Selected Alternative will result in short-term, adverse impacts to wildlife during fire management activities, but are not expected to be substantial or rise to population levels. Suppression activities related to wildfires will last the duration of the wildfire event, but most wildlife species will be able to escape the area and utilize adjacent habitat. Species in less mobile life stages (juvenile or nestling) and less mobile species (small mammals, amphibians,

and reptiles) are expected to be most impacted by fire. However, most species evolved in the presence of fire and have behavioral and other adaptations making populations resilient to fire. No more than 12,000 acres per decade of the park will undergo treatment by prescribed fire, 700 acres per decade of mechanical fuels treatments and 100 acres per decade of manual fuels treatments under the Selected Alternative., meaning that suitable and available habitat for many wildlife species will persist in other areas of the park during prescribed burn events. Foraging opportunities may decrease for some species during the disturbance event, but may increase following fire. The intensity of the impact to wildlife from wildfires is expected to be reduced by implementation of fuel reduction activities (prescribed fire, mechanical and manual treatments) under the Selected Alternative. Further, over the long term, improvements to vegetation is expected to result in improved ecosystem functioning and increased habitat diversity. Under the Selected Alternative, the park will implement prescribed burns, allowing for control of the fire location, season, and intensity. In this way, sensitive resources such as listed species can be deliberately avoided and impacts to such resources will not result in impairment.

Cultural Resources, Including Archeological Resources and Cultural Landscapes
The Selected Alternative will result in no adverse effects to historic properties within the park. Wildfires have the potential to cause damage or loss of archeological artifacts as a result of vegetation removal, increased soil erosion, and heating. Suppression actions could result in disturbance, exposure, or compaction of archeological sites, with unknown sites being at greatest risk since mitigation measures will not be applied.

Under the Selected Alternative, fire behavior will be mitigated through the proactive measures of prescribed fire, mechanical and manual fuels treatments. Under a reduced fire behavior scenario, the result of decreased fuel loadings in treated areas, suppression actions in treated areas are expected to be reduced in intensity and suppression is more likely to be successful with reduced duration of the fire event. As a result, potential adverse impacts to cultural resources will be mitigated. Adverse impacts to unidentified cultural resources may result from using wildfire for multiple objectives, particularly if unknown archeological sites are located where fires are allowed to burn. However, park managers will have the option of suppressing fires near known archeological sites to protect them. Under the Selected Alternative, removal of dense fuels and vegetation will result in long-term benefits to cultural resources due to lower potential losses from unpredictable and potentially severe wildfires. Effects to cultural resources resulting from fire management actions will be minimized through the use of mitigation measures and involvement of cultural resource advisors during wildfires and planned fire management operations.

Catastrophic wildfires may also result in the removal of important cultural landscape features, resulting in adverse effects if buildings and structures are consumed by fire. The use of proactive fire management activities will 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 will 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 will help maintain more open forest structures where present within the cultural landscapes.

The Selected Alternative will not result in impairment of cultural resources within the park because mitigation measures will be followed during fire management activities and long-term

benefits will be realized through improved defensible space around historic structures and known artifacts.