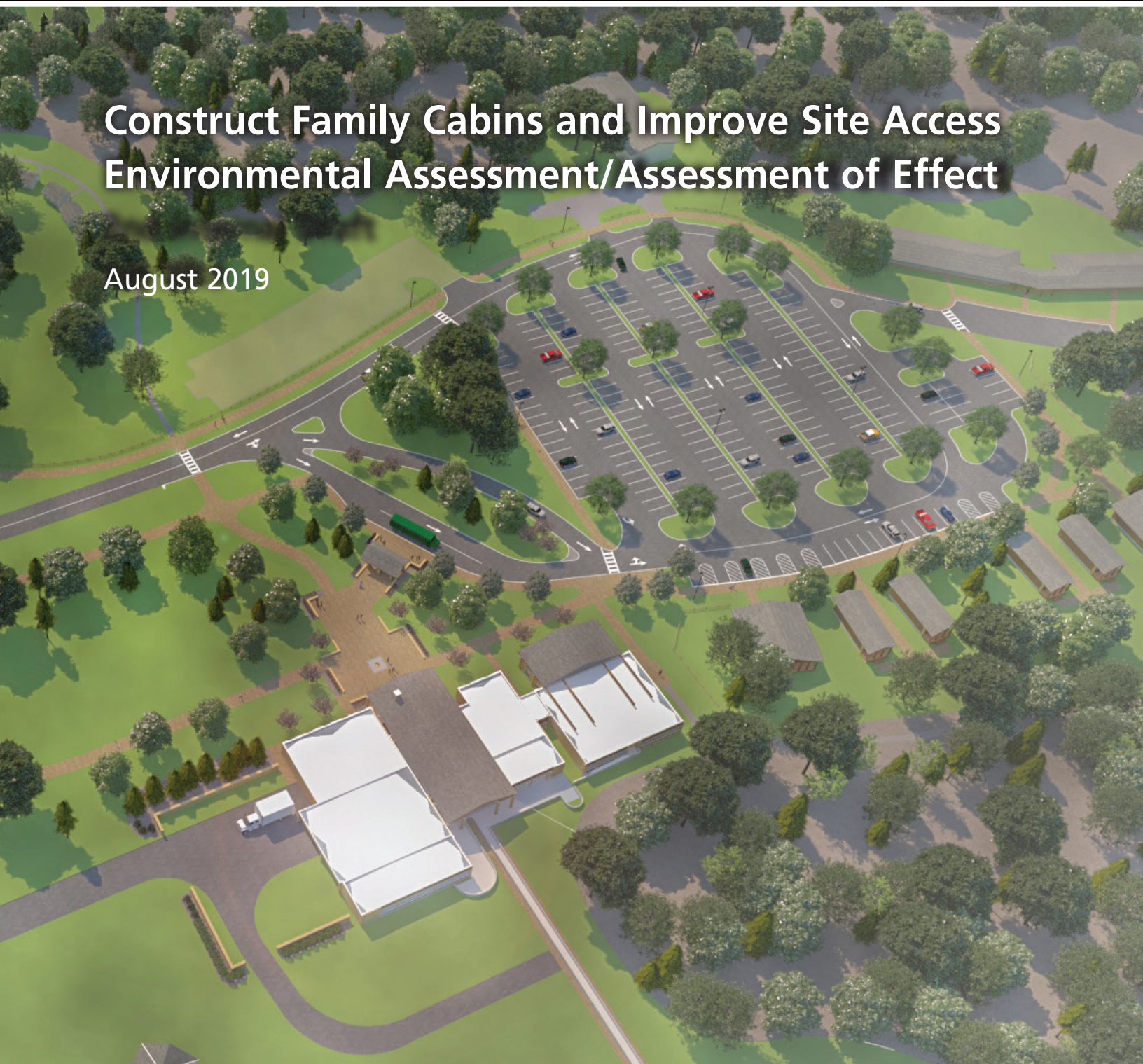




Construct Family Cabins and Improve Site Access Environmental Assessment/Assessment of Effect

August 2019



**US Department of the Interior
National Park Service
Mammoth Cave National Park**

**Construct Family Cabins and Improve Site Access
Environmental Assessment/Assessment of Effect**

August 2019

Mammoth Cave National Park (the park) comprises 52,830 acres in Edmonson, Hart, and Barren Counties in the Commonwealth of Kentucky, approximately 100 miles northeast of Nashville, Tennessee and approximately 100 miles south of Louisville, Kentucky. The park is best known for preserving Mammoth Cave, currently the longest known cave system in the world, with more than 400 miles of surveyed cave passages.

Lodging at the park is concession-operated, and there are currently very limited to no lodging options available for larger families or for group gatherings such as family reunions, depending upon seasonal weather and planned closures. Additionally, the existing parking lot has deferred maintenance issues such as large potholes and crumbling edges. The current circulation patterns and configuration of the Lodge at Mammoth Cave (the lodge) parking area and access road are not intuitive and provide no sense of arrival. The National Park Service (NPS) is proposing to construct a series of cabins that can accommodate these larger families and groups as well as reconfigure the access road and parking area to address ongoing deferred maintenance, provide more intuitive wayfinding, and reestablish the cultural landscape.

This environmental assessment/assessment of effect (EA/AOE) evaluates two alternatives: a no-action alternative and the proposed action. The no-action alternative would continue the current management of the project area and lodging operations. The proposed action would include the consolidation of parking for the lodge to the west, relocation of the access road, reestablishment of open greenspace with trees, and the construction of a series of family cabins. Both alternatives have the potential to result in a combination of beneficial and adverse impacts on Cultural Landscapes and Visitor Use and Experience.

Note to Reviewers and Respondents:

This EA/AOE will be on formal public and agency review for 30 days from the release date. If you wish to comment, please provide comments on the park's website at <http://parkplanning.nps.gov/maca> or by mailing to the name and address below. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

Mammoth Cave National Park (the park) comprises 52,830 acres in Edmonson, Hart, and Barren Counties in the Commonwealth of Kentucky, approximately 100 miles northeast of Nashville, Tennessee and approximately 100 miles south of Louisville, Kentucky (figure 1). The park is best known for preserving Mammoth Cave, currently the longest known cave system in the world, with more than 400 miles of surveyed cave passages.

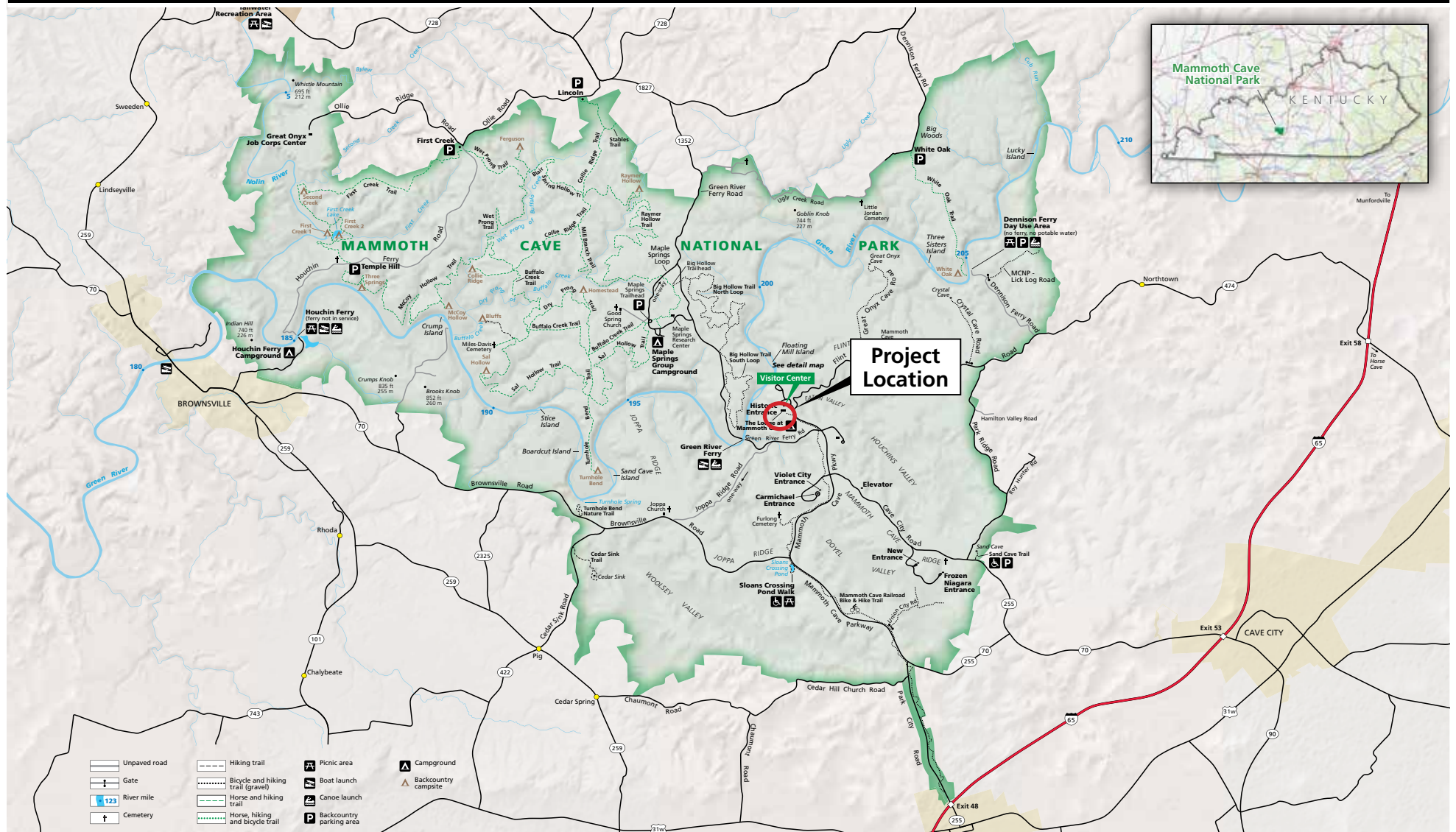
Lodging at the park is concession-operated and is currently limited to four options: the Woodland Cottages, the Hotel Cottages, the Sunset Terrace Lodge, and the accessible Heritage Trail Rooms in the Lodge at Mammoth Cave (the lodge). While the Woodland Cottages consist of one four-bedroom unit, one three-bedroom unit, fifteen two-bedroom units, and four one-bedroom units, all are configured with only bedrooms and bathrooms with no common areas or kitchens. Each of the other lodging options provide single bedrooms that can accommodate between two and four guests. The park currently has very limited to no lodging options available for larger families or for group gatherings such as family reunions. Additionally, the existing parking lot has deferred maintenance issues such as large potholes and crumbling edges. The current circulation patterns and configuration of the hotel parking area and access road are not intuitive and provide no sense of arrival. The National Park Service (NPS) is proposing to construct a series of cabins that can accommodate these larger families and groups and to reconfigure the access road and parking area for more intuitive wayfinding while also addressing many deferred maintenance issues.

This environmental assessment/assessment of effect (EA/AOE) evaluates two alternatives: a no-action alternative and the proposed action. The proposed action includes constructing up to eight cabin units adjacent to the Lodge at Mammoth Cave and a reconfigured parking lot and access road. This EA/AOE analyzes the potential impacts these alternatives would have on natural and cultural resources as well as the human environment. It has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code [USC] 4332[2] [C]); the implementing regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1500-1508.9); the Department of the Interior NEPA regulations (43 CFR Part 46); and NPS Director's Order #12: *Conservation Planning, Environmental Impact Analysis and Decision-Making* (NPS 2011) and the accompanying NEPA Handbook (NPS 2015b). This document was also prepared to satisfy the requirements of Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (36 CFR Part 800) and includes an assessment of effect on historic properties.

PURPOSE OF AND NEED FOR ACTION

Purpose

The purpose of this project is to provide a concession-operated lodging option that can accommodate larger families or gatherings such as family reunions, as well as to address many deferred maintenance issues, improve ongoing safety concerns, provide parking, and provide intuitive circulation routes to the lodge parking area that create a sense of arrival, reestablish and improve the cultural landscape, reduce congestion, increase the number of parking spaces, and improve visitor interaction.



Source: NPS Cartography

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FIGURE 1
Project Vicinity

Need

The project is needed because the park currently has very limited lodging options that can accommodate larger families (more than 4), multi-generational travel, or gatherings such as family reunions, depending upon seasonal weather and planned closures. Currently, only four concession-operated lodging options are offered at the park: The Woodland Cottages, the Hotel Cottages, the Sunset Terrace Lodge, and the accessible Heritage Trail Rooms in the Lodge at Mammoth Cave. These options are limited and cannot accommodate larger parties year-round. Additionally, accommodations for larger families or gatherings are very limited in the local community outside of the park.

This project is also needed because the current parking lot has substantial deferred maintenance and the configuration of the entrance road and lodge parking area provides no sense of arrival or an appropriate setting for the lodge. Current circulation routes are not intuitive to the visitor upon arrival. The historic character of the landscape has been altered over time and the paved parking lot south of the lodge has replaced the original open green space. These alterations have eliminated any visual continuity for the visitor to the cultural and historic landscape setting associated with the former 1925 hotel south of the parking lot, which was razed in 1979. Additionally, the current approach to the lodge is visually dominated by the service area of the lodge. The lodge entrance is visually lost, and the existing parking areas do not relate well to the entrance. Finally, the site does not meet current accessibility standards, and there are issues related to pedestrian connectivity to the lodge and surrounding areas, which create ongoing safety concerns. Connectivity issues include circulation paths that cross through sections of the existing parking lot to return to the main lodge lobby and a confusing entrance to the lodge from the park entrance road.

PROJECT AREA

As shown on figure 2, the proposed action would be designed within the developed area surrounding the existing lodge and its support facilities. This area consists of the visitor parking lot adjacent to the Lodge at Mammoth Cave, the existing dilapidated tennis and shuffleboard courts, the open lawn where the Heritage Trail wing rooms previously stood, and all green spaces, sidewalks, landscaping, and roads in between these facilities. The parking lot south of the lodge offers approximately 190 lined parking spaces in two distinct sections and is used daily by visitors seeking the concession facilities and the visitor center. During the busier summer months when demand exceeds all existing paved parking, visitors are directed to park in lawn areas and along road shoulders. The project area is bounded to the east by Mammoth Cave Entrance Road, to the north by the Lodge at Mammoth Cave, extending west to the natural enclosure of the oak-hickory forest, and southward by the open green space in front of the Hotel Cottages.



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FIGURE 2
Project Area

ISSUES AND IMPACT TOPICS

Issues

During the scoping process, specific considerations and concerns were identified as critical to this project area. Along with the purpose of and need for the proposed action, these topics guided the development of alternatives and contributed to the selection of impact topics, as identified in the next section.

The project area includes a cultural landscape. The project area includes a portion of the core visitor services area of the park, which includes layers of important cultural landscapes, some of which precede the development of the national park. Implementing the proposed action would introduce new structures, would remove historic tennis courts and shuffleboard courts, and alter the existing circulation patterns. The proposed action would also reintroduce open greenspace and remove a non-historic parking lot south of the lodge. These actions have the potential to change the spatial organization, views, appearance, and the integrity of setting and feeling.

The parking lot has deferred maintenance issues. The existing parking lot south of the lodge has many deferred maintenance issues including cracks in the pavement, large potholes, and crumbling of pavement along the edges of the parking lot. Additionally, the striping and arrows painted on the pavement through the parking lot is faded, which may make it more difficult for visitors to follow. In addition to the issues related to condition of the pavement, accessibility of the parking lot and walkways does not meet current accessibility standards. While the existing accessible parking spaces and walkways are generally accessible, they were constructed prior to changes in regulation of the Architectural Barriers Act Accessibility Standard.

Overall wayfinding and orientation through the access road and parking area is not intuitive. The current configuration of the access road and parking lot does not provide intuitive wayfinding and can be confusing to visitors. When approaching the lodge from the park entrance road, the initial view the visitor has is of a large service area. The main entrance of the lodge is not the dominant view and does not provide a sense of arrival. The park entrance, including the access road and the parking lot, offers several confusing decision points when approaching the lodge, and the expected circulation pattern is not intuitive. Visitors must rely on striping and arrows to navigate through the parking lot.

Lodging options are currently limited and unable to accommodate large groups. The park offers several options for visitor lodging, but only two Woodland Cottages are large enough to accommodate large families or groups (up to 6 people) and are open depending upon seasonal weather and planned closures. The park's current lodging concessioner has reported that they get numerous requests for these types of accommodations, which they are currently unable to provide. Lodging options for these families and groups is also limited in the nearby communities outside of the park.

Impact Topics Analyzed in this Environmental Assessment/Assessment of Effect

Impact topics are resources within the project area that could be affected, either beneficially or adversely, by the range of alternatives presented in this EA/AOE. Impact topics considered in this document were identified based on the issues raised during scoping, site conditions, federal laws, regulations, Executive Orders, NPS *Management Policies 2006*, Director's Orders, and staff knowledge of the park's resources. This section provides an overview of the impact topics that were retained for analysis in this EA/AOE.

Cultural Landscapes. NEPA, NHPA, the NPS Organic Act, NPS Management Policies 2006, Director's Order #12, and Director's Order #28: *Cultural Resource Management Guideline* require the consideration of impacts on any cultural resource that might be affected by a proposed federal action. The park is listed as a United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Heritage site and features a documented cultural landscape. Contributing resources of the cultural landscape encompass the buildings, circulation systems, spatial organization, vegetation, land uses and activities, views, and small-scale features which date mainly to the 1930s through the 1970s. The Lodge at Mammoth Cave has undergone many alterations and is not considered historic; however, its contributing views and related circulation systems contribute to the cultural landscape. The proposed action has the potential to result in changes to these resources, including the addition of new structures into the cultural landscape, the removal of historic shuffleboard and tennis courts, and the removal of some vegetation. Therefore, the impact topic of cultural landscapes was retained for detailed analysis.

Visitor Use and Experience. Recreation related to and enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks (NPS 2006). The NPS strives to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in parks. One of the Fundamental Resources and Values of the park, according to the park's Foundation Document, is the opportunity for connection to the resources (NPS 2014). At the park, visitors enjoy a range of recreational opportunities including hiking, biking, equestrian use, and river activities including paddle sports and fishing. The proposed action is meant to uphold the park's tradition of hospitality and enhancing the visitor experience, which includes safety in and around the lodging facilities. The visitor experience at the park could be enhanced through the addition of family cabins and site access improvements. By providing lodging options that can accommodate larger groups, the park can allow for more visitors to engage with and enjoy park resources. Furthermore, reconfiguring the parking lot would improve access to the lodge, open up more green space for recreating, improve pedestrian connectivity, and accommodate more vehicles in the parking lot during peak summer months. Therefore, the impact topic of visitor use and experience was retained for detailed analysis.

Impact Topics Dismissed from Further Analysis

The following presents an overview of impact topics that were considered but ultimately dismissed from further analysis in this EA/AOE. An impact topic was initially considered but dismissed from further analysis if it was determined that the resource is not present in the project area or because any potential impacts would be less than minor, typically temporary, and localized.

Special Status Species. The project area is within range of three special status bat species: the Gray Bat (*Myotis grisescens*), the Indiana Bat (*Myotis sodalis*), and the Northern Long-Eared Bat (*Myotis septentrionalis*). The project area is within the vicinity of known hibernaculum, and these species are known to use nearby trees to roost during select times of the year. Mitigation measures would be in place to avoid impacts on these species, including restrictions on removing occupied bat roost trees to avoid disturbance during the roost season. Additionally, the NPS would complete consultation with the US Fish and Wildlife Service prior to taking action. Therefore, the impact topic of special status species was considered but dismissed from further analysis.

Archeological Resources. Because some ground disturbance would be required for improvements included with the proposed action, archeological resources were considered. Some areas have been

previously surveyed, and no significant resources were identified. In August 2018, a qualified archeological technician from the NPS Southeast Archeological Center conducted an archeological assessment within the project area. During this assessment, cultural materials were uncovered in several shovel test sites; however, no significant cultural resources were located, and no new sites were recorded. Additionally, it was noted in the assessment that the soils within these areas have been disturbed by prior development activities. Therefore, the assessment concluded that no significant intact archeological deposits are likely to be encountered or affected by this project (NPS 2018).

Outside of the 2018 survey area, NPS archeologists have researched and identified the location of the 1925 Mammoth Cave Hotel footprint. The hotel was razed in 1979 and, following removal of the majority of building materials, the site was filled with remaining materials and soil. The graded surface has been repurposed as lawn space and re-integrated as a part of the cultural landscape for the past 40 years. Surface observations and limited shovel tests have confirmed the presence of building debris in the footprint area, but previously utilized methods (i.e. hand excavation) have been unable to remove the demolished materials to the full breadth and depth of this remaining feature. The surface observations have determined that these materials are out of the original structural context and offer no new information regarding the design and/or function of this resource that was well documented, architecturally. The proposed action has the potential to result in changes to this resource, and archeological monitoring will confirm the lack of *in situ* (in the original place of deposition) archeological resources.

If during construction, previously unknown archeological resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and, if significant resources could not be preserved *in situ*, an appropriate mitigation strategy (e.g., the excavation, recordation, and mapping of cultural remains prior to disturbance to ensure the recovery of archeological data that otherwise would be lost) would be developed in consultation with the State Historic Preservation Office (SHPO) and, as appropriate, associated American Indian tribes. The NPS will utilize an archeological monitor during ground disturbing activities to mitigate the potential for adverse impacts. Mitigation measures have been put in place that will minimize impacts; therefore, the impact topic of archeological resources was considered but dismissed from further analysis in this environmental assessment. If archeological monitoring identifies significant resources during construction, further analysis of impacts may be needed and would be conducted under a future compliance effort.

Water Quality. Although there is the potential for construction activities and runoff from the proposed parking lot to affect water quality, the NPS is proposing a new storm water filter that would increase the overall stormwater capacity of the site. Standard erosion and sediment mitigation measures would be in place to mitigate potential adverse impacts related to construction activities. Additionally, due to removal of existing impervious surfaces (including the tennis courts), consolidation of the parking lot, and creation of new greenspace, there would be no net increase in overall impervious surfaces related to the parking lot and the access road within the project site. Therefore, the impact topic of water quality was considered but dismissed from further analysis.

Dark Skies. Nighttime views and environments are among the critical park features protected by the NPS. The NPS is applying for International Dark Sky Park status for the park through the International Dark-Sky Association, an NPS partner that sets responsible lighting standards. Although some lighting would be added for the new parking lot and family cabins, those lights would be dark-sky compliant and

would not adversely affect the overall dark sky status. Therefore, the impact topic of dark skies was considered but dismissed from further analysis.

Wetlands. A wetland delineation was conducted by a qualified wetlands professional in October 2018 to determine if any jurisdictional wetlands exist within the project area. The delineation determined that a Palustrine Emergent (PEM) wetland approximately 0.038 acres in size is located near the western boundary of the project area. However, the proposed action would avoid any impacts on that wetland, and no ground disturbance would occur within the immediate vicinity. See Appendix A: Wetland Technical Report for additional information. Therefore, the impact topic of wetlands was considered but dismissed from further analysis.

CHAPTER 2: ALTERNATIVES

This chapter describes actions that would take place under each alternative for family cabin construction and site access improvements at the park. CEQ regulations for implementation of the NEPA process call for the alternatives considered in a document to include a no-action alternative. The description and evaluation of this alternative provides a baseline to which the action alternatives can be compared. This EA/AOE evaluates two alternatives: the no-action and the proposed action. The elements of these alternatives are described in the following sections. Impacts associated with the alternatives are described in “Chapter 3: Affected Environment and Environmental Consequences.”

NO-ACTION ALTERNATIVE

Under the no-action alternative, existing lodging operations would continue under the current conditions using the existing infrastructure, and no family cabins would be constructed. See figure 3 for a site plan of the existing conditions. The existing four concession-operated lodging options would remain the only lodging options outside of campgrounds within the park boundaries: the Woodland Cottages, the Hotel Cottages, the Sunset Terrace Lodge, and accessible rooms in the Lodge at Mammoth Cave. The park has very limited existing options that are large enough to accommodate large families or groups.

The parking layout at the lodge would remain centered in front of the lodge entrance under the no-action alternative, and current site deficiencies would persist. There would continue to be no sense of arrival as visitors approach the lodge and immediately view the service area. Vehicular access to the lodge would remain unintuitive and the site would continue to not fully meet current accessibility requirements. Additionally, ongoing safety concerns, such as pedestrians crossing the main entrance road, would continue.

The existing access road would remain in its current configuration with the bus drop-off and service area prominently displayed within guests’ viewshed as they approach the lodge. The existing parking lot would continue to offer approximately 190 lined parking spaces and serve both visitors seeking the visitor center and the concession facilities. During the busy summer months, the park would continue to direct



Existing parking lot with the Lodge at Mammoth Cave in background

visitors to park in lawn areas and along road shoulders when demand exceeds the existing paved parking areas provided. The dilapidated tennis courts and shuffleboard courts to the south of the parking lot would remain in place.

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FIGURE 3
No-Action Alternative: Site Plan

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PROPOSED ACTION / NPS PREFERRED ALTERNATIVE

The proposed action would accommodate lodging for larger groups and implement site access improvements by constructing family cabins and reconfiguring the parking lot and access road. Proposed improvements are detailed below and are shown in figures 4 and 5.

The proposed family cabins would be constructed adjacent to the Lodge at Mammoth Cave in the existing open grassy area to the west. This alternative plans for up to eight family cabin units which could be constructed in a phased approach. The cabins could consist of a combination of duplexes and single cabins to provide a lodging option for larger groups. Each cabin would be able to sleep eight to ten guests and would include the following:

- i two bedrooms
- i a kitchen/dining area
- i at least one bathroom
- i a living room
- i a loft
- i an eight-foot-wide covered porch between the cabins and in front of the duplex

The duplex style cabins would be constructed side-by-side with a common roof over each cabin duplex. The overall dimension for each of the family cabin duplexes would be approximately 64 feet by 38 feet. The single cabins would have a similar overall footprint as one half of the duplex style.

The proposed action would also consist of consolidating the parking from the front of the lodge to the west to create a contiguous green space and natural character setting for the lodge. The NPS would relocate the access road away from the front of the lodge to improve ongoing safety concerns, reduce congestion, improve the view of the lodge and visitor center from the access road, and improve the viewshed from the lodge. The relocated road would also provide more intuitive wayfinding to the lodge, proposed family cabins, and reconfigured parking lot. A new bus and service road would be constructed to the east of the lodge to separate bus and delivery traffic from visitor traffic. The existing parking lot in front (south) of the lodge would be converted into green space, and new pedestrian connections would be added between the lodge, new parking lot, and existing pedestrian walkways. This would be undertaken to reduce or eliminate current pedestrian/vehicle conflicts. All proposed pedestrian circulation routes would comply with current accessibility standards. Trees would be planted throughout the project area to complement the cultural landscape. A bus drop-off and bus shelter would be constructed near the front entrance of the lodge, which would allow through traffic to bypass these larger vehicles and easily access the parking area. The reconfigured parking lot would provide for a one-way circulation loop in order to improve vehicle flow and provide an intuitive circulation pattern. The parking lot improvements under the proposed action would increase the capacity of the parking area to 260 vehicles. This parking lot would include parking for the new family cabins along the northern edge of the parking lot. An overflow parking lot would be constructed on the opposite side of the access road along the southern edge of the proposed parking lot. The existing shuffleboard and tennis courts would be removed to accommodate the larger parking lot and overflow lot. Additionally, tree removal within an approximately 2-acre area would be required to the northeast, south, and west of the tennis courts. Most of this area is lawn interspersed with mature trees, though a small, approximately 0.25-acre area of more dense vegetation would be removed to the west of the tennis courts.

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FIGURE 4
Proposed Action: Site Plan



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FIGURE 5
Proposed Action: Rendering

MITIGATION MEASURES OF THE ACTION ALTERNATIVE

To minimize environmental impacts related to the action alternative, the NPS would implement mitigation measures whenever feasible. Exact mitigation measures to be implemented would depend upon the final design and approval of plans by relevant agencies and would be determined during future design and construction phases. The following is a list of actions that could take place:

- i Instruct all contractor employees on the sensitivity of the general environment and monitor their activities by NPS staff in order to mitigate and minimize potential impacts on natural and cultural resources during construction. Corridors for construction vehicle movement would be established and defined on the ground. Staging of construction equipment would be restricted to the road corridor, parking lots, and other identified previously disturbed areas to avoid impacts on natural and cultural resources.
- i Clearly state all protection measures in the construction specifications and instruct workers to avoid conducting activities beyond the fenced construction zone.
- i Fence all areas in order to keep related disturbances within an NPS-defined and minimal impact area required for construction.
- i Implement standard noise abatement measures during construction. Standard noise abatement measures could include the following elements: a schedule that minimizes impacts on adjacent noise-sensitive uses, the use of the best available noise control techniques wherever feasible, the use of hydraulically or electrically powered impact tools when feasible, and location of temporary noise sources as far from sensitive uses as possible.
- i Minimize soil erosion by limiting the time that soil is left exposed and by applying other erosion control measures, such as erosion matting and silt fencing in construction areas to reduce erosion, surface scouring, and discharge to water bodies.
- i Remove invasive plants from construction areas using approaches prescribed in the NPS Integrated Pest Management Program.
- i Implement measures to prevent invasive plants from returning to sites where they have been removed, such as ensuring that construction-related equipment arrives at the site free of mud or seed-bearing materials and certifying that all seeds and straw material are weed-free.
- i Rehabilitate areas that are disturbed, either during construction or areas that were previously disturbed, with NPS-approved vegetation, as per NPS standards and consistent with the cultural landscape report.
- i Immediately implement NHPA Section 106 procedures if any unknown significant archeological resources are uncovered during ground-disturbing activities. If previously unknown archeological resources are discovered during construction, all work in the immediate vicinity of the discovery shall be halted until the resources are identified and documented and an appropriate mitigation strategy developed, if necessary, in accordance with pertinent laws and regulations, including the stipulations of the 2008 Programmatic Agreement Among the NPS (US Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.
- i Tree removal would not take place during the bat roosting season from April 1–October 15. If it is determined that a tree needs to be removed during this time, the park's Science and Resources Management Division will be consulted prior to taking action.

ALTERNATIVES CONSIDERED BUT DISMISSED

Alternative elements were identified during the concept development and internal scoping processes. Some of these were determined to be unreasonable or much less desirable than similar options included in the analysis and were therefore not carried forward for analysis in this EA/AOE. The descriptions below summarize the alternative options that were considered but dismissed from further analysis and the rationale behind the dismissal.

Other Parking Lot and Access Road Configurations

Several configurations of the parking lot and access road were considered during the planning process, including the following:

- i Eliminate vehicular connections to the service area but maintain a portion of the access road location in front of the lodge.
- i Reconfigure the parking area but retain its location in front of (south of) the lodge to maintain two distinct parking areas.

These other parking lot and access road configurations were dismissed because they did not correct the ongoing safety concerns, reestablish the cultural landscape, provide screening for the service area, or provide intuitive wayfinding and circulation as well as the proposed action.

Other Family Cabin Sites

Several other locations for the family cabins were considered during the planning process, including the following:

- i North of the visitor center, in the picnic area adjacent to the Woodland Cottages
- i North of the visitor center, in the lower picnic area west of the Woodland Cottages
- i West of the existing parking lot, in the wooded area north of the Sunset Terrace Lodge
- i South of the existing parking lot, adjacent to the Hotel Cottages

The locations north of the visitor center in the lower picnic area and adjacent to the Woodland Cottages were dismissed because there is not sufficient parking to serve the new cabins and there are currently no utilities adjacent to the proposed building sites at these locations. Bringing utilities to these areas would substantially increase the cost of the project, resulting in an alternative that would not be feasible to implement.

The location in the wooded area north of the Sunset Terrace Lodge was dismissed because of its proximity to sensitive archeological resources. Implementation of this alternative would have resulted in unacceptable impacts on these resources that would be avoided by implementing other alternatives.

The location south of the lodge adjacent to the Hotel Cottages was dismissed because it was determined that the new cabins would have an unacceptable visual impact on the adjacent Hotel Cottages. The Hotel Cottages are contributing resources to the cultural landscape and their setting of the semi-circular siting of the cottages with open lawn in front and dense woodland vegetation behind them is considered an important smaller landscape. Placing new cabins within this area would substantially alter the views, feeling, and spatial patterns of a smaller landscape that is relatively intact. Implementation of this alternative would have resulted in adverse impacts that would be avoided by implementing other alternatives.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the current environmental conditions in and surrounding the project as they relate to each impact topic retained for analysis, as outlined in chapter 1. These conditions serve as a baseline for understanding the resources that could be impacted by implementing the project. This chapter then analyzes the beneficial and adverse impacts that would result from implementing any of the alternatives considered in this EA/AOE.

GENERAL METHODOLOGY FOR ANALYZING IMPACTS

In accordance with the CEQ regulations for implementation of NEPA, direct, indirect, and cumulative impacts are described under each impact topic (40 CFR 1502.16), and the impacts are assessed in terms of context and intensity (40 CFR 1508.27). Where appropriate, mitigating measures for adverse impacts are also described and incorporated into the evaluation of impacts. The specific methods used to assess impacts for each resource may vary; therefore, these methodologies are described under each impact topic.

Cumulative Impacts Analysis Methodology

Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative impacts were determined for each impact topic by combining the impacts of the alternative being analyzed and other past, present, and reasonably foreseeable future actions that would also result in beneficial or adverse impacts. Several actions were identified through the project scoping process and are summarized below.

Past, Present, and Reasonably Foreseeable Future Actions

Hotel Roof and Exterior. The National Park Service is planning to repair leaks and improve the general appearance of the Lodge at Mammoth Cave roof. The current flat roof has chronic leak problems and there is no insulation in the roof, walls, or windows of the lodge building. Further, the architectural character of the Lodge at Mammoth Cave does not match the character of the park’s visitor center. Renovation of the roof and exterior walls is needed to address these issues. This action has the potential to affect resources included under the impact topics of “cultural landscapes” and “visitor use and experience.”

Woodland Cottages. The National Park Service is planning to install insulation and HVAC systems in the 20 Woodland Cottages. This action will help increase comfort in the cottages and will allow them to be used by visitors throughout the year, while still maintaining their historic character. This action has the potential to affect resources included under the impact topic of “visitor use and experience.”

Hotel Cottages. The National Park Service is planning to improve electric service to the 10 Hotel Cottages, built in the 1930s. Some still have original fuses and “wire and post” electric systems while lacking electrical disconnects for each cottage and grounded outlets. This action will replace wiring with systems that conform to the National Electric Code. This action has the potential to affect resources included under the impact topic of “visitor use and experience.”

Campground upgrades. The Mammoth Cave Campground currently has 2 RV sites and 110 tent sites (including group sites). This project could expand options to include many RV sites that would include electric, water, and possibly sewer hook-ups, roughly the same amount of tent sites, group sites, and possibly sites that could incorporate tents on platforms. There could also be a major rehabilitation of the campground store, and the restrooms in the campground loops could be expanded to include showers. This action has the potential to affect resources included under the impact topic of “visitor use and experience.”

Heritage Trail Boardwalk. The NPS is planning to rehabilitate or rebuild the existing boardwalk along the Heritage Trail for improved visitor access. This boardwalk is located to the northwest of the Lodge at Mammoth Cave; the proposed family cabins would be located directly south of this section of trail. This action has the potential to affect resources included under the impact topic of “visitor use and experience.”

Previous projects related to visitor experience. Other past projects have improved the visitor experience of the park, including Lodge at Mammoth Cave renovations, renovation of the Sunset Terrace Lodge, and replacement of walkways. Additionally, lodging rooms in the park were eliminated with the removal of the Heritage Wing of the Lodge at Mammoth Cave in 2015 due to a multitude of issues in which the cost to renovate exceed the cost benefit. These actions have the potential to affect resources included under the impact topic of “visitor use and experience.”

CULTURAL LANDSCAPE

Affected Environment

The project area is part of a greater core visitor services landscape atop the broad ridgeline surrounding the Mammoth Cave Historic Entrance, which has been a popular tourist attraction since the early nineteenth century. The cultural landscape within the project area encompasses the buildings, circulation systems, spatial organization, vegetation, land uses and activities, views, and small-scale features which date mainly to the 1930s through the 1970s, although some features predate this period. The immediate setting of the project area lies on top of a ridge with gradually descending areas to the east and west. An overarching period of significance for the park is determined to be 1806-1941; however, most of the buildings, structures, much of the circulation system, and some of the existing vegetation in the project area date to two well-known federal building programs: the Civilian Conservation Corps (CCC) (1933-1942) and the Mission 66 program of the NPS (1956-1966) (NPS 2015a). The more recent buildings at Mammoth Cave, including the existing Lodge at Mammoth Cave and the Sunset Terrace Lodge units, were all built during the NPS’s Mission 66 program. The Mission 66 program was a 10-year program instituted by the NPS in 1956 to improve visitors’ experiences in national parks throughout the country. These improvements included updated road systems, employee housing, and visitor centers.

One of the character-defining features of the cultural landscape within the project area is the open landscape composed of broad grass lawn framed by groves and rows of cedar trees and mature deciduous shade trees south of the Lodge at Mammoth Cave and parking area. Some of the individual trees and the established spatial organization of the open space and tree massing retain high integrity to the period of significance for the area. Within the project area, the vegetation is primarily mowed lawn, established landscaping shrubs, and scattered trees. Herbaceous species and other hardwood species can be found throughout the project area. Woody vegetation surrounds the maintained lawns and landscaping and are typical of the species composition found in the natural forests of the park, including Kentucky bluegrass

(*poa pratensis* L.), eastern red cedar (*Juniperus virginiana*), and American sycamore (*Platanus occidentalis*) (NPS 2013). Cedar tree groves were planted in association with the circa 1920 and 1930 arched entrance approach to the 1925 Mammoth Cave Hotel and grounds; several of these trees remain extant on the landscape today. Extant deciduous trees evident around the Hotel Cottages landscape appear on a 1937 site plan for this area (NPS 2015a).

Contributing structures of the cultural landscape include the tennis and shuffleboard courts to the southwest of the lodge, built by the CCC in the late 1930s, which are currently in dilapidated condition which make the courts unusable. The tennis courts are paved in asphalt and surrounded by a chain link fence. A portion of the fence is original to the early park development period, according to the cultural landscape report (NPS 2015a). In recent years, these courts have also served to play basketball but are otherwise used minimally, as reported by the NPS.

Pedestrian circulation within the project area includes pedestrian trails and boardwalks connecting the Lodge at Mammoth Cave, parking lot, visitor center, the Hotel Cottages, and other sites outside of the project area including the camp store and amphitheater. Most of these pedestrian walkways replaced earlier circulation routes through the project area and do not contribute to the cultural landscape. The exception is the alignment of the pedestrian walkways in the vicinity of the Hotel Cottages. Vehicular circulation within the cultural landscape includes an entrance road from Mammoth Cave Parkway to the lodge and parking area. At the west end of the parking lot, another road leads to the Sunset Terrace Lodge units and associated parking. A service road is located to the south of the lodge parking lot adjacent to the



Existing parking lot south of the Lodge at Mammoth Cave

tennis courts. All of the vehicular circulation routes through the project area have replaced earlier circulation patterns and are not considered contributing resources to the cultural landscape (NPS 2015a). Views within the project area have changed over the decades due to continued development in the core visitor services area. The large parking area has created a major disruption to visitor flow from the lodge to any facilities, site amenities, or trail systems in the surrounding area. It also has eliminated any visual continuity for the visitor to the cultural and historic landscape setting associated with the former 1925 hotel south of the parking lot. Today, views include the non-historic Lodge at Mammoth Cave and large paved parking areas. West of the parking lot, guests also have views of an open green space, which is where the Heritage Trail wing rooms once stood, and where the proposed family cabins would be constructed and the area revegetated. The access road to the lodge and visitor center is also a key part of visitors' viewsheds and offers first glimpses of the core visitor services area as guests approach; however, the view of the lodge service area dominates the view from the access road. Though most views of the project area have changed due to development, some remain from the period of significance. Contributing views within the project area include the views to the original hotel site and to the Hotel Cottages across the open landscape with extant mature vegetation, maintained lawn, and cedar groves. Additionally, mature vegetation surrounds the project area, which helps retain integrity to the period of significance for the area (NPS 2015a).

Methodology

Potential impacts on cultural resources are evaluated based on changes to character-defining features of the resources, which are the characteristics of a historic property that qualify the property for inclusion in the National Register. This approach is derived from the Secretary of the Interior's Standards for Treatment of Historic Properties, Director's Order #28: *Cultural Resource Management Guidelines*, as well as the regulations of the Advisory Council on Historic Preservation implementing the provisions of NHPA. Character-defining features contribute to a property's integrity, which is composed of location, design, setting, materials, workmanship, feeling, and/or association. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, as well as a visual chronicle of its history. The current conditions of cultural resources, as presented under the "Affected Environment" section above, were compared with the alternatives described in chapter 2 to determine the impacts on the historic structure and cultural landscapes.

This section analyzes impacts on the cultural landscape under NEPA; the analysis of effects on the cultural landscape in compliance with NHPA Section 106 is presented in the "Assessment of Effect on Historic Properties" section at the end of this chapter.

Impacts of No-Action Alternative

Under the no-action alternative, there would be no changes to the existing historic views, circulation patterns, the original tennis and shuffleboard courts, or cultural vegetation. The original viewshed offering first glimpses of the core visitor services area as guests approach from the historic entrance road would remain untouched; however, the parking lot and access road configuration would allow the bus drop-off and service area to continue to dominate the view upon arriving at the lodge. The bus drop-off is visually disruptive to the parking and pedestrian flow, and also poses accessibility and safety challenges. Guests would also continue to experience pedestrian connectivity and wayfinding challenges using non-intuitive circulation paths to the lodge and surrounding areas. Part of these circulation paths also include walking through sections of the existing parking lot to return to the main lodge lobby. The existing, non-historic

pedestrian and vehicular circulation patterns would remain, and the only contributing circulation patterns remaining would be the pedestrian walkways nearest to the Hotel Cottages. The historic tennis and shuffleboard courts would also remain in place under the no-action alternative. Extant cultural vegetation on the property would remain intact, including the established spatial organization of the original lawn, tree massings, and traditional vegetation. Under the no-action alternative, there would be no new structures added within the cultural landscape. Overall, the no-action alternative would allow existing circulation routes, viewsheds, vegetation, and structures to remain intact and would have no impact on the cultural landscape.

Impacts of Proposed Action / NPS Preferred Alternative

Under the proposed action, the cultural landscape would be altered by the removal of existing features and the addition of new features. The consolidation of the parking lot to the west of the lodge would result in the removal of existing hardscape in front of the lodge that is a non-contributing feature to the cultural landscape. Conversion of this area into greenspace would restore the open landscaped character of the cultural landscape that was lost due to development of the parking lot, which would be considered a beneficial impact on the cultural landscape. With the modifications to the parking lot configuration, the existing 1939 tennis and shuffleboard courts, which have not been maintained for many years and could be considered a visual nuisance, would be removed to make room for the expansion. The loss of these elements would be an adverse impact on contributing resources of the cultural landscape; however, these resources are small features of the overall cultural landscape and their loss would not diminish the overall historic character of the landscape. Similarly, although some mature trees to the west of the tennis courts would also be removed, the impact of the loss of vegetation would be relatively small when compared to the abundance of vegetation that would remain within and surrounding the project area. Furthermore, the NPS would plant new trees and vegetation in and around the expanded parking lot, including landscaped islands to restore the landscaped character.

The proposed changes to the pedestrian and vehicular circulation patterns through the relocation of the access road and new pedestrian trails would result in new circulation patterns in the landscape. However, the existing roads and trails that would be modified are not contributing features of the landscape and are not historic circulation routes. Changes to visitor circulation could lead to alterations in visitor experience of some elements of the cultural landscape. For example, visitors using the pedestrian trails would experience walking along trails with vegetated backdrops, and the visitors' first view of the lodge from the access road would no longer be of the service area. These changes would result in a beneficial impact on the cultural landscape.

The proposed action would result in beneficial impacts related to views within the cultural landscape. The area to the south of the lodge would be revegetated after removal of the parking lot, which would restore the historic views across the open landscape with maintained lawn and vegetation. Additionally, the remaining historic views to the original hotel site and to the Hotel Cottages would be unchanged.

Under the proposed action, the construction of family cabins adjacent to the Lodge at Mammoth Cave would result in the introduction of non-historic structures into the cultural landscape. However, these cabins would be designed to be compatible with the surrounding landscape and aesthetic of the existing buildings. Additionally, they would be only one-and-a-half stories in height and would be set in a previously developed area; therefore, they would not disrupt any intact historic views or vistas within the

project area. Although this alternative would introduce new structures, the cabins would not alter the land use patterns in the area because it has historically and continues to be used for visitor lodging. Similarly, given that this area was previously cleared and developed, this action would have no impact to vegetation in this area.

Overall, implementing site access improvements and constructing family cabins would have a beneficial impact on the cultural landscape. Although some historic features such as the tennis and shuffleboard courts, vegetation, and appearance would be altered or removed, the action would also restore historic elements and views to the cultural landscape.

Cumulative Impacts

Other past, present, or reasonably foreseeable actions that have or would contribute to the cumulative impacts on the cultural landscape include the Lodge at Mammoth Cave roof and exterior project. The lodge roof and exterior project proposes to repair leaks and improve the general appearance of the Lodge at Mammoth Cave. The project would also change the appearance of the lodge by creating an entrance plaza. Completing this project would result in a slight beneficial impact on the cultural landscape due to the modification in appearance of the lodge, which would be more compatible with the existing visitor center aesthetic and the landscape overall.

Under the no-action alternative, there would be no impacts on the cultural landscape. Although other past, present, and reasonably foreseeable actions may affect the area's cultural landscape, the no-action alternative would have no new impacts on the cultural landscape and therefore would not contribute to the impacts of other actions. Consequently, there would be no cumulative impacts on cultural landscapes under the no-action alternative.

Under the proposed action, there would be an overall beneficial impact on the cultural landscape due to the restoration of contributing features of the landscape's spatial organization, including open greenspace and vegetation patterns south of the lodge. When considered with the actions identified above, the overall beneficial impact of the proposed action would contribute to the slight beneficial impact of the lodge roof and exterior project. Therefore, the overall cumulative impact on the cultural landscape would be beneficial from the actions proposed under the proposed action.

Conclusion

There would be no impacts on the cultural landscape under the no-action alternative because there would be no changes to the project area. The proposed action would result in a combination of adverse and beneficial impacts due to the addition of non-historic elements, the removal of historic elements, and the restoration of open greenspace south of the lodge. Although the removal of the historic tennis and shuffleboard courts would remove contributing resources from the cultural landscape, they are a relatively small feature when considered with the overall contributing resources and character-defining features that would remain such as the spatial organization, land use, and vegetation. The loss of the tennis and shuffleboard courts would not alter the cultural landscape in a manner that would diminish the overall historic integrity of the site. Additionally, the removal of vegetation, while contributing to the feeling and aesthetic of the cultural landscape, would be relatively small when compared to the existing vegetation, particularly in the forested areas, that would remain. The proposed action would result in beneficial impacts on the cultural landscape by removing the non-historic parking area directly in front of the lodge and consolidating parking to the

west. This would allow the NPS to reestablish historic vegetation and spatial patterns in this area by creating open lawns with future mature trees and pedestrian circulation paths. Although the pedestrian and vehicular circulation patterns under the proposed action would be new patterns, they would be compatible with the cultural landscape and would follow historic land use of the project area. Overall, the proposed action would allow the NPS to reestablish some of the lost integrity of the cultural landscape that resulted from continued development through the park's history.

VISITOR USE AND EXPERIENCE

Affected Environment

In 2018, an estimated 533,206 recreational visitors travelled to the park (NPS 2019b). Park visitation is heaviest during the summer. The primary focus of the project area is the core visitor services area of the park. Currently, the Lodge at Mammoth Cave is fully operational from March through October and offers more limited services from November through February. According to NPS data, during the busy summer months, existing lodging options are between 87 and 98 percent occupied on a nightly basis (NPS 2019a). The lodge is proximal to and provides convenient access to the Historic Entrance of Mammoth Cave and the visitor center (each approximately 300 feet away). The parking lot on the south side of the lodge offers approximately 190 lined parking spaces and serves both visitors seeking the visitor center and the concession facilities. Overnight visitors have various options for room accommodations. Four rooms are located within the lodge building and provide fully ADA-accessible accommodations. Twenty rooms are located in Sunset Terrace Lodge at the far western edge of the project area. Set back from the lodge, these rooms provide motel units in a quieter, forested area. Two of these rooms are ADA accessible. The Sunset Terrace Lodge has covered walkways and plazas with outdoor tables and chairs and a parking lot with space for 30 vehicles. The Lodge at Mammoth Cave is approximately 600 feet away. The Woodland Cottages are located to the north of the visitor center and include 20 units with one to four bedrooms in a forested area. These cottages currently lack heating or cooling and are only seasonally available. The final lodging option at the park are the Hotel Cottages; these consist of ten single cottages located in a private setting just south of the existing parking lot.

In addition to the lodging options for visitors, visitor use elements in the project area also include aging recreation facilities, including a dilapidated shuffleboard court and tennis courts, which were built in the late 1930s. These facilities are located to the southwest of the lodge and occasionally also serve as basketball courts but are otherwise rarely used by visitors.

Visitor experience in the parking lot area can be confusing. When visitors first pull off the Mammoth Cave Entrance Road onto the lodge



Existing tennis courts south of lodge parking lot

access road, they see a service area; this introduction to the site does not provide clear direction to the lodge entrance or other visitor areas. As visitors enter the project area, they also see a visual disconnect between the Lodge at Mammoth Cave and the visitor center, as the two buildings contrast greatly in design and materials (NPS 2013). This disconnect contributes to the lack of effective visitor orientation to the project area. It is apparent that existing parking areas were not designed at the time of the current lodge, as the lodge building relates poorly to both parking lots. This results in a series of awkward spaces and flow when experienced together by the visitor; flow is also hindered by lack of direction and any perceivable organization. Furthermore, the site does not fully meet current accessibility standards due to these issues related to pedestrian connectivity to the lodge and surrounding areas. Finally, the amount of parking currently available is inadequate during busy summer months. There are not enough parking spaces to accommodate all vehicles and visitors often park on roadsides.



View from access road towards Lodge at Mammoth Cave with service area in center and Visitor Center in background

Methodology

Potential impacts on visitor use and experience are assessed based on changes to the way people use the project area, as well as how the alternatives would alter visitors' experiences. Recreation related to and enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks (NPS 2006). The NPS strives to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in parks. The current conditions of visitor use and experience, as presented in the "Affected Environment" section above, were compared with the alternatives described in chapter 2 to determine how visitor use and experience would be affected.

Impacts of No-Action Alternative

Under the no-action alternative, existing lodging operations would continue under the current conditions, using the existing facilities and infrastructure. There would continue to be a scarcity of lodging options to accommodate larger groups of visitors, and the current lodging concessioner would not be able to meet demand from large groups. During the busy summer season, lodging occupancy rates are expected to continue at the current rates of between 87 and 98 percent. Lodging capacity would be restricted to the existing 20 Sunset Terrace Lodge rooms, the 4 accessible rooms in the Lodge at Mammoth Cave, the 20 Woodland Cottages, and the 10 Hotel Cottages.

Visitors would continue to use existing circulation paths and non-intuitive wayfinding for parking at the lodge, and access to the lodge would not be improved. The current approach would continue to be visually dominated by the lodge service area and existing parking areas would not orient well to the entrance. There would also continue to be accessibility issues, as the site does not meet current accessibility standards due to issues related to pedestrian connectivity to the lodge and surrounding areas. During the busier summer months when demand exceeds all existing paved parking, visitors would continue to park in lawn areas and along road shoulders, as there would not be enough parking spaces to accommodate all vehicles. Under the no-action alternative, the tennis and shuffleboard courts to the south of the existing parking lot would remain intact.

Overall, the no-action alternative would have a minor adverse impact on visitor use and experience in the park by continuing to provide a non-intuitive and confusing entrance to the lodge as well as by not providing lodging options that can accommodate large groups.

Impacts of Proposed Action / NPS Preferred Alternative

Under the proposed action, improved, supplemental accommodations would increase the overall lodging capacity at the park and would offer more options for large groups. This would have a beneficial impact on visitor use and experience by offering more lodging options that can accommodate large groups. According to the current lodging concessioner, larger groups have been turned away from staying overnight in the park because lodging options they were seeking are not available in the park (NPS 2019a). By responding to visitor demand in offering more lodging options, the proposed action may also have an indirect impact on visitation levels and visitor satisfaction at the park. The increase in overall lodging capacity and options for large groups may result in some overnight visitors feeling more crowded in park amenities if more people are using them at the same time. However, the increase in overnight guests would not increase the feeling of crowding during the day. The increase in the number of overnight guests would be relatively very small when compared to the high daytime visitation the park sees, particularly during the busiest season. During the busiest months (June through August), the park saw between 60,000 and 101,000 monthly visitors in 2018 (NPS 2019c). If the proposed family cabins were full each night during this season, assuming the cabins can sleep a maximum of 80 guests, the cabins would account for only approximately 2,400 monthly visitors to the park. Additionally, the proposed family cabins would be located on the site of the former Heritage Trail wing of the lodge, which was removed in 2015. The maximum capacity of the cabins would not exceed the maximum capacity of the Heritage Trail wing, which had 38 rooms. Therefore, the increase in overall lodging capacity is not expected to result in an increase in the feeling of crowding for visitors and is not expected to result in an adverse impact on visitor use and experience.

Under the proposed action, changes to circulation, the reconfiguration of the parking lot, the addition of green space, and the removal of the tennis and shuffleboard courts would change the way visitors experience the lodge environment. Through improved circulation routes in front of the lodge, visitors would encounter less congestion, ample parking space, and improved pedestrian connections to amenities on the property. All proposed pedestrian circulation routes would comply with current accessibility standards. Visitors would also have more direct access to green space once the parking lot is reconfigured. Furthermore, changes to routes in front of the lodge would help improve the viewshed of the lodge and visitor center from the access road, as well as from the lodge itself. These changes would improve the visitor experience by providing more intuitive wayfinding via the access road to the lodge, the proposed family cabins, and the parking lot. The visitor would also experience better views throughout the area along this access road (see photograph and rendering comparison below). The proposed action would also entail removing the tennis and shuffleboard courts in order to make room for the reconfigured parking lot. While this may reduce visitors' recreational opportunities, the courts are minimally used and the site access improvements and cabin construction would generally improve visitors' use of the facilities.

Constructing the new cabins and reconfiguring the parking lot would result in temporary construction impacts, including partial or full closure of the existing parking lot, construction noise, and construction equipment and materials within the views of visitors. However, these impacts would only last the duration of construction, which is expected to be a total of one year.

Overall, the proposed action would be expected to have a beneficial impact on visitor use and experience.

Cumulative Impacts

Other past, present, or reasonably foreseeable actions that have or would contribute to the cumulative impacts on visitor use and experience include the Lodge at Mammoth Cave roof and exterior project, the Woodland Cottages project, the Hotel Cottages project, campground upgrades, the Heritage Trail Boardwalk project, and previous projects conducted to improve the visitor experience. These projects would generally have a beneficial impact on visitor use and experience by providing more comfortable, efficient, and updated accommodations for visitors. Specifically, the Heritage Trail Boardwalk project will have a beneficial impact by offering guests better access to park resources, though the sight and noise of the boardwalk from the proposed family cabins may be a slightly adverse impact to visitors staying in the cabins. The overall cumulative impact on visitor use and experience from these other actions would be beneficial.

Under the no-action alternative, there would be no site access changes or family cabins constructed to improve visitor use and experience, contributing an adverse increment to the cumulative impact on visitor experience. The beneficial impacts of the other past, present, and reasonably foreseeable project combined with the adverse impact of the no-action alternative would result in an overall, cumulative beneficial impact to visitor use and experience. Although there would continue to be a lack of accommodation and intuitive wayfinding, other accommodation improvements would enhance the visitor experience and provide more comfortable options for guests.

Under the proposed action, the construction of new family cabins and site access improvements would contribute a beneficial increment to the cumulative impact on visitor use and experience due to expanded lodging options, improved viewsheds, and more intuitive wayfinding. When considered with the actions



Existing view from access road towards Lodge at Mammoth Cave and associated parking lot



Rendering of view from proposed realigned access road towards Lodge at Mammoth Cave and associated parking lot

identified above, the overall beneficial impact of the proposed action would contribute to a beneficial impact on visitor use and experience. Therefore, the overall cumulative impact of the proposed action would be beneficial.

Conclusion

There would be adverse impacts on visitor use and experience under the no-action alternative because there would be no changes made to improve site access or to expand lodging options. The proposed action would result in beneficial impacts due to the addition of expanded lodging options that can accommodate larger groups, as well as the improved circulation that would improve visitors' connectivity and sense of arrival. Visitors would experience simplified access to green space, an improved viewshed of the lodge and visitor center, and less congestion in an easily navigable parking lot. Although the tennis and shuffleboard courts would be removed to make room for the reconfigured parking lot, the general site access improvements and cabin construction would beneficially impact visitor use and experience. On the whole, the proposed action would allow the NPS to elevate the overall visitor experience.

ASSESSMENT OF EFFECT ON HISTORIC PROPERTIES

Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their undertakings on historic properties. The implementing regulations for Section 106 (36 CFR 800) permit federal agencies to use the NEPA process for environmental assessments in lieu of a separate Section 106 process to meet those requirements (36 CFR 800.8[c]). In compliance with Section 106, the NPS, through this environmental assessment/assessment of effect, has provided the Kentucky State Historic Preservation Officer and associated Native American Tribes with an assessment of effect.

The assessment of effect on historic properties that are presented in this section respond to the requirements of Section 106 of the National Historic Preservation Act, in accordance with the regulations implementing Section 106 (36 CFR 800, Protection of Historic Properties). The effects of the no-action alternative and the proposed action are summarized below. The assessment of effect on historic properties was based on a review of previous studies, consideration of the proposed design concepts, and other information provided by the NPS.

AREA OF POTENTIAL EFFECT

In compliance with Section 106 regulations (36 CFR 800), an area of potential effect is defined for this project. The area of potential effect is defined as the geographic area in which an undertaking may directly or indirectly cause alterations in the character or use of historic properties if such properties exist. The area of potential effect for this project includes the project area and all areas from which changes to the landscape would be visible, as shown on figure 6.

IDENTIFICATION OF HISTORIC PROPERTIES

Historic properties within the area of potential effect include the Mammoth Cave Core Visitor Services Area Cultural Landscape. Several features within the area of potential effect are considered contributing to the cultural landscape including, but not limited to, spatial patterns of open lawn framed by mature trees, the Hotel Cottages and associated pedestrian trails, and the shuffleboard and tennis courts. Historic properties within the area of potential effect are described in detail in the “Affected Environment” section above under the impact topic of “Cultural Landscape.”

In August 2018, a qualified archeological technician from the NPS Southeast Archeological Center conducted an archeological assessment within the project area. During this assessment, cultural materials were uncovered in several shovel test sites; however, no significant cultural resources were located, and no new sites were recorded. Additionally, it was noted in the assessment that the soils within these areas have been greatly disturbed by prior development activities. Therefore, the assessment concluded that no significant intact archeological deposits are likely to be encountered or affected by this project.



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Construct Family Cabins and Improve Site Access
Environmental Assessment/Assessment of Effect

FIGURE 6
Project Area and Area of Potential Effect

ASSESSMENT OF EFFECT

No-Action Alternative

The no-action alternative does not constitute an undertaking under Section 106; therefore, no assessment of effect was completed for this alternative.

Proposed Action / NPS Preferred Alternative

There would be an *adverse effect* on historic properties under the proposed action due to the loss of the shuffleboard and tennis courts, which are considered contributing resources to the cultural landscape.

Under the proposed action, the removal of the parking lot directly in front of the Lodge at Mammoth Cave and the revegetation with lawn and trees would improve the historic character of the project area by reestablishing the open landscape featuring maintained lawns with groves of mature trees and removing the non-historic parking lot. Although the proposed pedestrian trails through this area would not follow the historic pedestrian circulation patterns, they would replace non-historic roads and pedestrian trails and would be more compatible with the cultural landscape than the existing infrastructure. Some mature trees would be removed to accommodate these changes to the project area; however, the removal would be of a relatively small amount of trees when compared to the overall forested area that would remain as a backdrop of the cultural landscape. Additionally, the area where trees would be removed is mostly lawn interspersed with mature trees and is not a forested area. Therefore, tree removal within this approximately 2-acre area in the southwest portion of the project area would not diminish the forested character of the landscape and would not detract from the remaining historic views.

The construction of a larger parking lot to the west of the lodge would require the removal of the 1939 tennis courts and shuffleboard courts. This action would result in the loss of historic structures and small-scale features, including a portion of chain link fence that is original to the early park development period. The action would also change the historic land use in this area from recreational use to parking. The loss of these contributing recreational resources would be considered an adverse effect on the cultural landscape. However, the loss would not diminish the overall historic character or integrity of the landscape, and it would continue to be able to convey association with the CCC era and the period of significance. The NPS will consult with the Kentucky SHPO to develop measures to mitigate the adverse effect resulting from the loss of the historic tennis and shuffleboard courts.

Under the proposed action, the construction of new family cabins would result in the addition of non-historic structures into the cultural landscape. However, these family cabins would be located in a previously-developed area that was previously used for lodging and would not visually detract from extant historic views to or from the historic Hotel Cottages or the original hotel site south of the current lodge parking lot. The appearance of the proposed family cabins would be designed to be compatible with the character of the cultural landscape in terms of material, color, and scale.

Under the proposed action, measures are in place to minimize or avoid adverse effects on historic properties within the area of potential effect, as described in the “Mitigation Measures” in chapter 2 of this document.

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CHAPTER 4: CONSULTATION AND COORDINATION

NPS Director's Order #12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* requires the NPS to make "diligent" efforts to involve the interested and affected public in the NEPA process. This process helps to achieve the following: determine the important issues and eliminate those that are not; allocate assignments among the interdisciplinary team members and/or other participating agencies; identify related projects and associated documents; identify other permits, surveys, consultations, etc. required by other agencies; and create a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made. This chapter documents the agencies and tribes consulted during the NEPA process and summarizes the public review process for this EA/AOE.

AGENCY AND TRIBAL CONSULTATION

During the NEPA process, the NPS contacted the following agencies and tribes for consultation. See appendix B for copies of relevant pieces of correspondence between the NPS and these parties.

- i Advisory Council on Historic Preservation
- i Kentucky Heritage Council
- i Absentee-Shawnee Tribe of Indians of Oklahoma
- i Cherokee Nation
- i Chickasaw Nation
- i Eastern Band of Cherokee Indians
- i Eastern Shawnee Tribe of Oklahoma
- i Shawnee Tribe
- i United Keetoowah Band of Cherokee Indians

The NPS initiated consultation under NHPA Section 106 with the relevant agencies and tribes in a letter dated May 17, 2019. This letter informed the agencies and tribes that the NEPA process would be used to comply with Section 106 requirements pursuant to 36 CFR 800.8.

As required by Section 7 of the Endangered Species Act, the NPS will consult with the US Fish and Wildlife Service on the potential effects of the proposed action on federally listed species.

PUBLIC REVIEW

The EA/AOE will be on formal public and agency review for 30 days and has been distributed to a variety of interested individuals, agencies, and organizations. It also is available on the internet at <https://parkplanning.nps.gov/mac>, and hard copies are available at the Park's headquarters.

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[https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20\(1904%20-%20Last%20Calendar%20Year\)?Park=MACA](https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20(1904%20-%20Last%20Calendar%20Year)?Park=MACA)
- 2019c NPS Stats Website. "Recreation Visitors by Month." Accessed July 16, 2019.
[https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Recreation%20Visitors%20By%20Month%20\(1979%20-%20Last%20Calendar%20Year\)?Park=MACA](https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Recreation%20Visitors%20By%20Month%20(1979%20-%20Last%20Calendar%20Year)?Park=MACA)

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APPENDIX A: WETLAND TECHNICAL REPORT

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Wetlands and Protected Species

Mammoth Cave National Park Environmental Assessment – Construct Family Cabins and Improve Site Access

PREPARED FOR



National Park Service
Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, KY

PREPARED BY



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June 14, 2019

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1

Introduction

At the request of the National Park Service (NPS), VHB delineated the boundaries of jurisdictional wetlands and other waters of the United States (WOUS) regulated under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (RHA). The study area is located within Mammoth Cave National Park (MACA), in Edmonson County, Kentucky (Attachment 1: Figure 1). It includes the parking lot and open areas south of the Lodge at Mammoth Cave (Lodge). The study area consists primarily of paved parking lots and maintained lawn with sparse to moderately dense trees and some landscaped ornamentals.

VHB conducted a detailed wetland delineation within the study area on October 2, 2018. The purpose of the delineation was to define the limits of jurisdictional waters in order to avoid wetland impacts during the planned parking lot reconfiguration and cabin construction. A brief site description is provided below along with Figures (Attachment 1), U.S. Army Corps of Engineers (USACE) wetland data forms (Attachment 2), photographic documentation of site conditions (Attachment 3), and the official species list obtained from the U.S. Fish and Wildlife Service (USFWS) IPaC database (Attachment 4).

2

Methodology

VHB applied the technical criteria outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)*¹ and associated guidance to identify jurisdictional boundaries in the study area. Preliminary site research used soil types identified by Natural Resources Conservation Service² (NRCS; Figure 2 in Attachment 1) as well as features depicted on the USFWS National Wetland Inventory (NWI)³ (Figure 3 in Attachment 1). Wetland flags were placed in the field by VHB, and each flag was geo-located using VHB's mobile technology platform capable of sub-meter accuracy. The results of the field wetland delineation are depicted on the Wetland Delineation Map (Figure 4 in Attachment 1). Data collection for USACE data sheets (Attachment 2) was conducted within representative wetland and upland habitat types along the wetland/upland transition, as appropriate. Plants encountered during sampling were identified to species level using regional references (where physiological characteristics were present), with nomenclature following the most recent National Wetland Plant List⁴. Representative photographs were taken of wetlands/uplands at each data point and are included as Attachment 3.

The USFWS Information for Planning and Consultation (IPaC) system⁵ was used to identify threatened and endangered species which may occur within the study area. At the time of the wetland delineation, a pedestrian survey of each parcel was completed to determine the presence of listed species or their habitats.

¹ U.S. Army Corps of Engineers (USACE). 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Region (Version 2.0)*. Wetland Regulatory Assistance Program. April.

² U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Web Soil Survey. 2018. Available online at <http://websoilsurvey.sc.egov.usda.gov/>. Accessed May 3, 2018.

³ U.S. Fish and Wildlife Service (USFWS). 2018. National Wetland Inventory. Available online at <https://www.fws.gov/wetlands/Data/Mapper.htm>. Accessed May 3, 2018.

⁴ Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 wetland ratings*. *Phytoneuron* 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X.

⁵ USFWS. 2018. *Information for Planning and Consultation*. <https://ecos.fws.gov/ipac/location/index>. Accessed May 3, 2018.

3

Results

3.1 Wetlands

Based on the NRCS Web Soil Survey, the study area is underlain by five soil map units (Attachment 1; Figure 2). Table 1 shows the map unit symbol, map unit name, and hydric classification for each NRCS soil mapped in the subject site.

Table 1 Summary of NRCS Soil Map Units within the Study Area

Map Unit Symbol	Map Unit Name	Hydric Status
CoB	Clarkrange silt loam, 2 to 6 percent slopes	Not hydric
CoC	Clarkrange silt loam, 6 to 12 percent slopes	Not hydric
LyC2	Lily loam, 6 to 12 percent slopes, eroded	Not hydric
RoB	Rosine silt loam, 2 to 6 percent slopes	Not hydric
WbF	Wallen-Bledsoe-Donahue complex, 35 to 50 percent slopes, very rocky	Not hydric

Source: NRCS 2018

The USFWS NWI mapping does not identify any wetlands or water bodies within the study area (Attachment 1; Figure 3).

The detailed wetland delineation conducted by VHB determined that one WOUS, a Palustrine Emergent (PEM) wetland, is present within the study area (Attachment 1; Figure 4). The PEM wetland (0.038 acres) is associated with a small depressional feature located on the flat terrace where the Lodge is located. The hydrology is provided by surface water run-off received from the parking lot and other nearby areas, and numerous hydrology indicators were observed including saturation at the soil surface. Vegetation is dominated by low spikesedge (*Kyllinga pumila*), field paspalum (*Paspalum laeve*), and creeping lespedeza (*Lespedeza repens*). Hydric soil indicator F3 (Depleted Matrix) is present within the wetland.

3.2 Non-Jurisdictional Uplands

Uplands on the property are primarily maintained lawns with scattered trees. Lawns consist of sod grasses typical for this region of Kentucky including Kentucky

bluegrass (*Poa pratensis*) and tall fescue (*Festuca arundinacea*). Trees consist of common tree species such as slippery elm (*Ulmus rubra*), blue ash (*Fraxinus quadrangulata*), sugar maple (*Acer saccharum*), white oak (*Quercus alba*), and tulip poplar (*Liriodendron tulipifera*).

4

Threatened and Endangered Species

The species list obtained through the USFWS IPaC database identified sixteen federally threatened or endangered species potentially occurring within the study area, Table 2.

Table 2 Federally Listed Wildlife Species Potentially Occurring within Study Area

Listed Species	Scientific Name	Federal Status
Mammals		
Gray bat	<i>Myotis grisescens</i>	FE
Indiana bat	<i>Myotis sodalist</i>	FE
Northern long-eared bat	<i>Myotis septentrionalis</i>	FT
Clams		
Clubshell	<i>Pleurobema clava</i>	FE
Fanshell	<i>Cyprogenia stegaria</i>	FE
Northern riffleshell	<i>Epioblasma torulosa rangiana</i>	FE
Orangefoot pimpleback	<i>Plethobasus cooperianus</i>	FE
Pink mucket	<i>Lampsilis abrupta</i>	FE
Purple cat's paw	<i>Epioblasma obliquata obliquata</i>	FE
Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>	FT
Ring pink	<i>Obovaria refusa</i>	FE
Rough pigtoe	<i>Pleurobema plenum</i>	FE
Sheepnose mussel	<i>Plethobesius cyphus</i>	FE
Snuffbox mussel	<i>Epioblasma triquetra</i>	FE
Spectaclecase	<i>Cumberlandia monodonta</i>	FE
Crustaceans		
Kentucky cave shrimp	<i>Palaemonias ganteri</i>	FE
Critical Habitat		
Indiana bat	<i>Myotis sodalist</i>	

Although species specific surveys were not completed, no threatened or endangered species were identified during the onsite pedestrian survey of the study

area. Additionally, no habitat for the clam or crustacean species is present within the study area. According to the known Indiana and northern long-eared bat habitat maps,^{6,7} MACA is summer and swarming habitat for both species. In addition, Edmonson County has known northern long-eared bat hibernacula.⁸

Included in this package are figures supporting the wetland delineation (Attachment 1); USACE regional supplement data sheets (Attachment 2), representative field photographs (Attachment 3), and the species list obtained from the IPaC database (Attachment 4).

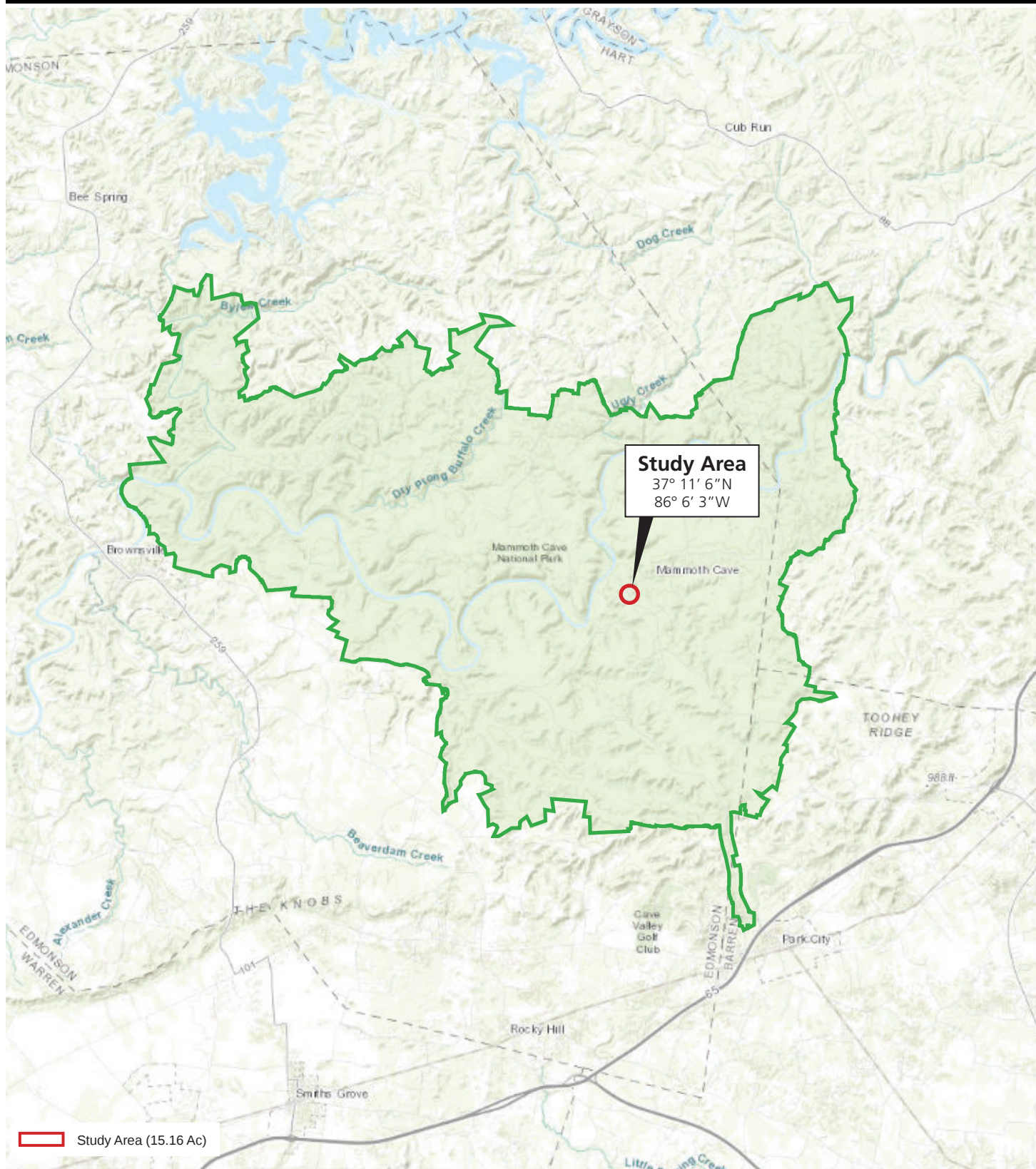
⁶ USFWS. 2018. Known Indiana bat habitat in Kentucky and within 20 miles (January 2018). Located online at https://www.fws.gov/frankfort/pdf/MYSO_Habitat_map.pdf. Accessed: May 14, 2019.

⁷ USFWS. 2018. Known northern long-eared bay habitat in Kentucky and within 20 miles (January 2018). Located online at: https://www.fws.gov/frankfort/pdf/MYSE_Habitat_Map.pdf. Accessed: May 14, 2019.

⁸ USFWS. 2017. Kentucky Topographic Quadrangles Containing Northern Long-Eared Bay Roost Trees and/or Hibernaculum. Located online at: https://www.fws.gov/frankfort/pdf/KY_NLEB_Quad_List.pdf. Accessed: May 14, 2019.

Attachment 1

2018 Wetland Delineation Figures



Construct Family Cabins and Improve Site Access
Wetland Delineation



Source: © 2019 Microsoft Corporation © 2019; NRCS
Digital Soil Survey For Edmonson County, KY

- Study Area (15.16 Ac)
- Soil Map Unit Boundary
- CoB - Clarkrange silt loam, 2-6% slopes
- CoC - Clarkrange silt loam, 6-12% slopes
- LyC2 - Lily loam, 6-12% slopes, eroded
- RoB - Rosine silt loam, 2-6% slopes
- WbF - Wallen-Bledsoe-Donahue complex, 35-50% slopes, very rocky

Construct Family Cabins and Improve Site Access
Wetland Delineation

FIGURE 2
Soils Map



Source: © 2019 Microsoft Corporation © 2019;
USFWS National Wetlands Inventory Data

0 200
SCALE IN FEET

- Study Area (15.16 Ac)
- National Wetland Inventory Data
 - Freshwater Emergent Wetland
 - Freshwater Forested/Shrub Wetland
 - Riverine
 - Lake

Construct Family Cabins and Improve Site Access
Wetland Delineation

FIGURE 3
National Wetlands Inventory Map



Construct Family Cabins and Improve Site Access
Wetland Delineation

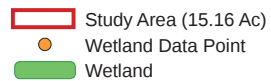
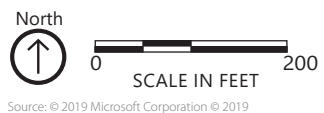


FIGURE 4
Potential Jurisdictional Features

Attachment 2

2018 USACE Data Sheets



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-1

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-1
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace/Hillslope	Local relief (concave, convex, none):	Concave	Slope (%):	0-2
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.185254	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 6 to 12 percent slopes			Datum:	WGS84
				NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	NO	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	NO		
Wetland Hydrology Present?	NO		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located in a shallow depressional area on a hillslope. Area consists of a regularly maintained lawn with turf grass and weed species.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ Aquatic Fauna (B13)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ True Aquatic Plants (B14)	☐ Sparsely Vegetated Concave Surface (B8)	
☐ Saturation (A3)	☐ Hydrogen Sulfide Odor (C1)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Presence of Reduced Iron (C4)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Thin Muck Surface (C7)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)	☐ Other (Explain in Remarks)	☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial (B7)		☐ Geomorphic Position (D2)	
☐ Water-Stained Leaves (B9)		☐ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	NO	Depth (inches):	>12
Saturation Present?	NO	Depth (inches):	>12
		Wetland Hydrology Present?	NO
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No primary and only one secondary indicator of wetland hydrology present; parameter is not met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-1	10YR 3/2	100					loam	
1-6	10YR 4/4	95	10YR 5/8	5	c	m	clay loam	
6-12	10YR 4/4	70	10YR 5/8	5	c	m	clay loam	
6-12	10YR 4/2	25					loam	Mixture of soils
12+							gravel	auger refusal; gravel and rock
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.								² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:				Indicators for Problematic Hydric Soils ³ :				
☐ Histosol (A1)				☐ Dark Surface (S7)	☐ 2 cm Muck (A10)			
☐ Histic Epipedon (A2)				☐ Polyvalue Below Surface (S8)	☐ Coast Prairie Redox (A16)			
☐ Black Histic (A3)				☐ Thin Dark Surface (S9)	☐ Piedmont Floodplain Soils (F19)			
☐ Hydrogen Sulfide (A4)				☐ Loamy Gleyed Matrix (F2)	☐ Very Shallow Dark Surface (TF12)			
☐ Stratified Layers (A5)				☐ Depleted Matrix (F3)	☐ Other (Explain in Remarks)			
☐ 2cm Muck (A10)				☐ Redox Dark Surface (F6)				
☐ Depleted Below Dark Surface (A11)				☐ Depleted Dark Surface (F7)				
☐ Thick Dark Surface (A12)				☐ Redox Depressions (F8)				
☐ Sandy Mucky Mineral (S1)				☐ Iron-Manganese Masses (F12)				
☐ Sandy Gleyed Matrix (S4)				☐ Umbric Surface (F13)				
☐ Sandy Redox (S5)				☐ Piedmont Floodplain Soils (F19)				
☐ Stripped Matrix (S6)				☐ Red Parent Material (F21)				
Restrictive Layer (if observed):								
Type: gravel and rock				Hydric Soil Present? NO				
Depth (inches): 12								
Remarks: No hydric soil indicators present and soil does not meet NTCHS definition of hydric soil; parameter is not met.								

Tree Stratum	Absolute % Cover	Dom. Sp?	Indicator Status*		
(Plot size: 30' radius)					
1. _____	_____	_____	_____	Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u> 0 </u> (A) # Dominants across all strata: <u> 1 </u> (B) % Dominants OBL, FACW, FAC: <u> </u> (A/B)	
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
			= Total Cover	Prevalence Index Worksheet: Total % Cover of: _____ Multiply By: _____ OBL _____ x 1 = _____ FACW _____ x 2 = _____ FAC _____ x 3 = _____ FACU <u> 88 </u> x 4 = <u> 352 </u> UPL <u> 6 </u> x 5 = <u> 30 </u> Sum: <u> 94 </u> (A) <u> 382 </u> (B) Prevalence Index = B/A = <u> 4.06 </u>	
Sapling Stratum	(Plot size: 30' radius)				
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
			= Total Cover	Hydrophytic Vegetation Indicators: _____ Dominance Test is > 50% _____ Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Shrub Stratum	(Plot size: 15' radius)				
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
			= Total Cover	Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height.	
Herb Stratum	(Plot size: 10' radius)				
1. Poa pratensis	85	X	FACU		
2. Taraxacum officinale	3		FACU		
3. Plantago lanceolata	3		UPL		
4. Lespedeza repens	3		UPL		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
11. _____	_____	_____	_____		
12. _____	_____	_____	_____		
			94 = Total Cover		
Woody Vines	(Plot size: 30' radius)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? <u> NO </u>	
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
			= Total Cover		

Remarks: (If observed, list morphological adaptations below).

No hydrophytic vegetation indicators present; parameter is not met.

* Indicator Status utilizes 2016 NWPL



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-2

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-2
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace	Local relief (concave, convex, none):	Convex	Slope (%):	0-2
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.185239	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	NO	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	NO		
Wetland Hydrology Present?	NO		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located on a hilltop. Area consists of a regularly maintained lawn with turf grass and weed species.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ Aquatic Fauna (B13)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ True Aquatic Plants (B14)	☐ Sparsely Vegetated Concave Surface (B8)	
☐ Saturation (A3)	☐ Hydrogen Sulfide Odor (C1)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Presence of Reduced Iron (C4)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Thin Muck Surface (C7)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)	☐ Other (Explain in Remarks)	☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial (B7)		☐ Geomorphic Position (D2)	
☐ Water-Stained Leaves (B9)		☐ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	NO	Depth (inches):	>18
Saturation Present?	NO	Depth (inches):	>18
		Wetland Hydrology Present?	NO
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No primary or secondary indicators of wetland hydrology present; parameter is not met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-3	10YR 3/2	100					loam	
3-14	10YR 3/4	60	7.5YR 3/4	5	c	m	clay loam	
3-14	10YR 5/3	35					clay	
14-18	10YR 5/3	60	7.5YR 3/4	5	c	m	clay	
14-18	10YR 4/4	35					clay loam	mixture of soils
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.								² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :						
☐ Histosol (A1)	☐ Dark Surface (S7)	☐ 2 cm Muck (A10)						
☐ Histic Epipedon (A2)	☐ Polyvalue Below Surface (S8)	☐ Coast Prairie Redox (A16)						
☐ Black Histic (A3)	☐ Thin Dark Surface (S9)	☐ Piedmont Floodplain Soils (F19)						
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Very Shallow Dark Surface (TF12)						
☐ Stratified Layers (A5)	☐ Depleted Matrix (F3)	☐ Other (Explain in Remarks)						
☐ 2cm Muck (A10)	☐ Redox Dark Surface (F6)							
☐ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)							
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)							
☐ Sandy Mucky Mineral (S1)	☐ Iron-Manganese Masses (F12)							
☐ Sandy Gleyed Matrix (S4)	☐ Umbric Surface (F13)							
☐ Sandy Redox (S5)	☐ Piedmont Floodplain Soils (F19)							
☐ Stripped Matrix (S6)	☐ Red Parent Material (F21)							
Restrictive Layer (if observed):								
Type:		Hydric Soil Present?						
Depth (inches):		NO						
Remarks: No hydric soil indicators present and soil does not meet NTCHS definition of hydric soil; parameter is not met.								

Tree Stratum	Absolute % Cover	Dom. Sp?	Indicator Status*	
(Plot size: 30' radius)				
1. _____	_____	_____	_____	Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>1</u> (A) # Dominants across all strata: <u>2</u> (B) % Dominants OBL, FACW, FAC: <u>50%</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
= Total Cover				Prevalence Index Worksheet: Total % Cover of: OBL _____ x 1 = _____ FACW _____ x 2 = _____ FAC <u>38</u> x 3 = <u>114</u> FACU <u>78</u> x 4 = <u>312</u> UPL <u>15</u> x 5 = <u>75</u> Sum: <u>131</u> (A) Multiply By: _____ _____ <u>501</u> (B) Prevalence Index = B/A = <u>3.82</u>
Sapling Stratum				
(Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
= Total Cover				Hydrophytic Vegetation Indicators: _____ Dominance Test is > 50% _____ Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations _____ ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Shrub Stratum				
(Plot size: 15' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
= Total Cover				Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height.
Herb Stratum				
(Plot size: 10' radius)				
1. Poa pratensis	63	X	FACU	
2. Paspalum laeve	38	X	FAC	
3. Trifolium repens	15		FACU	
4. Lespedeza repens	15		UPL	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
131 = Total Cover				
Woody Vines				
(Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
= Total Cover				
Hydrophytic Vegetation Present? <u>NO</u>				
Remarks: (If observed, list morphological adaptations below). No hydrophytic vegetation indicators present; parameter is not met. * Indicator Status utilizes 2016 NWPL				



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-3

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-3
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace/Hillslope	Local relief (concave, convex, none):	Concave	Slope (%):	3-5
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.184979	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	NO		
Wetland Hydrology Present?	YES		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located in a depressional area on a hillslope. Area consists of a regularly maintained lawn.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ Aquatic Fauna (B13)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ True Aquatic Plants (B14)	☐ Sparsely Vegetated Concave Surface (B8)	
☐ Saturation (A3)	☐ Hydrogen Sulfide Odor (C1)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Presence of Reduced Iron (C4)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Crayfish Burrows (C8)	
☒ Algal Mat or Crust (B4)	☐ Thin Muck Surface (C7)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)	☐ Other (Explain in Remarks)	☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial (B7)		☐ Geomorphic Position (D2)	
☐ Water-Stained Leaves (B9)		☐ Microtopographic Relief (D4)	
		☒ FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	NO	Depth (inches):	>18
Saturation Present?	NO	Depth (inches):	>18
		Wetland Hydrology Present?	YES
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: At least one primary or two secondary indicators of wetland hydrology present; parameter is met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix			Redox Features				
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-4	10YR 3/3	95	7.5YR 3/4	5	c	m	clay loam	
4-18	10YR 4/3	60	7.5YR 5/8	10	c	m	clay loam	
4-18	10YR 4/2	30					clay	mixture of soils
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.								
² Location: PL=Pore Lining, M=Matrix.								
Hydric Soil Indicators:				Indicators for Problematic Hydric Soils ³ :				
☐ Histosol (A1)				☐ Dark Surface (S7)	☐ 2 cm Muck (A10)			
☐ Histic Epipedon (A2)				☐ Polyvalue Below Surface (S8)	☐ Coast Prairie Redox (A16)			
☐ Black Histic (A3)				☐ Thin Dark Surface (S9)	☐ Piedmont Floodplain Soils (F19)			
☐ Hydrogen Sulfide (A4)				☐ Loamy Gleyed Matrix (F2)	☐ Very Shallow Dark Surface (TF12)			
☐ Stratified Layers (A5)				☐ Depleted Matrix (F3)	☐ Other (Explain in Remarks)			
☐ 2cm Muck (A10)				☐ Redox Dark Surface (F6)				
☐ Depleted Below Dark Surface (A11)				☐ Depleted Dark Surface (F7)				
☐ Thick Dark Surface (A12)				☐ Redox Depressions (F8)				
☐ Sandy Mucky Mineral (S1)				☐ Iron-Manganese Masses (F12)				
☐ Sandy Gleyed Matrix (S4)				☐ Umbric Surface (F13)				
☐ Sandy Redox (S5)				☐ Piedmont Floodplain Soils (F19)				
☐ Stripped Matrix (S6)				☐ Red Parent Material (F21)				
Restrictive Layer (if observed):				Hydric Soil Present?				
Type:				NO				
Depth (inches):								
Remarks: No hydric soil indicators present and soil does not meet NTCHS definition of hydric soil; parameter is not met.								

Remarks: (If observed, list morphological adaptations below).
Indicator 1 (Rapid Test) present due to dominance of FACW or OBL species.
* Indicator Status utilizes 2016 NWPL



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-4

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-4
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace	Local relief (concave, convex, none):	Concave	Slope (%):	0-2
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.185359	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	NO		
Wetland Hydrology Present?	YES		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located in a depressional area on a flat hilltop. The area is regularly mowed and maintained.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☒ Surface Water (A1)	☐ Aquatic Fauna (B13)	☒ Surface Soil Cracks (B6)	
☒ High Water Table (A2)	☐ True Aquatic Plants (B14)	☐ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	☐ Hydrogen Sulfide Odor (C1)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Presence of Reduced Iron (C4)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Thin Muck Surface (C7)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)	☐ Other (Explain in Remarks)	☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial (B7)		☐ Geomorphic Position (D2)	
☐ Water-Stained Leaves (B9)		☐ Microtopographic Relief (D4)	
		☒ FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	YES	Depth (inches):	1
Water Table Present?	YES	Depth (inches):	0
Saturation Present?	YES	Depth (inches):	0
		Wetland Hydrology Present?	YES
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: At least one primary or two secondary indicators of wetland hydrology present; parameter is met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix			Redox Features				
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-4	10YR 4/3	75	7.5YR 5/8	10	c	m	clay loam	Gravel 10%; charcoal 5%
4-12	10YR 4/2	40	7.5YR 5/8	10	c	m	clay loam	
4-12	10YR 4/3	40					clay loam	gravel 5%; charcoal 5%
12+							gravel	Auger refusal, gravel and rock
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.								
² Location: PL=Pore Lining, M=Matrix.								
Hydric Soil Indicators:				Indicators for Problematic Hydric Soils ³ :				
☐ Histosol (A1)	☐ Dark Surface (S7)			☐ 2 cm Muck (A10)				
☐ Histic Epipedon (A2)	☐ Polyvalue Below Surface (S8)			☐ Coast Prairie Redox (A16)				
☐ Black Histic (A3)	☐ Thin Dark Surface (S9)			☐ Piedmont Floodplain Soils (F19)				
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)			☐ Very Shallow Dark Surface (TF12)				
☐ Stratified Layers (A5)	☐ Depleted Matrix (F3)			☐ Other (Explain in Remarks)				
☐ 2cm Muck (A10)	☐ Redox Dark Surface (F6)							
☐ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)							
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)							
☐ Sandy Mucky Mineral (S1)	☐ Iron-Manganese Masses (F12)							
☐ Sandy Gleyed Matrix (S4)	☐ Umbric Surface (F13)							
☐ Sandy Redox (S5)	☐ Piedmont Floodplain Soils (F19)							
☐ Stripped Matrix (S6)	☐ Red Parent Material (F21)							
Restrictive Layer (if observed):				Hydric Soil Present?				
Type: gravel and rock				NO				
Depth (inches): 12								
Remarks: No hydric soil indicators present and soil does not meet NTCHS definition of hydric soil; parameter is not met.								

Remarks: (If observed, list morphological adaptations below).

Indicator 1 (Rapid Test) present due to dominance of FACW or OBL species.

** Indicator Status utilizes 2016 NWPL*



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-5

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-5
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace	Local relief (concave, convex, none):	Convex	Slope (%):	3-5
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.184851	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	NO	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	YES		
Wetland Hydrology Present?	NO		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located on gentle hillslope. Area consists of a regularly maintained lawn with turf grass and weedy species.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
Surface Water (A1)	Aquatic Fauna (B13)	Surface Soil Cracks (B6)	
High Water Table (A2)	True Aquatic Plants (B14)	Sparsely Vegetated Concave Surface (B8)	
Saturation (A3)	Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)	
Water Marks (B1)	Oxidized Rhizospheres on Living Roots (C3)	Moss Trim Lines (B16)	
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Dry-Season Water Table (C2)	
Drift Deposits (B3)	Recent Iron Reduction in Tilled Soils (C6)	Crayfish Burrows (C8)	
Algal Mat or Crust (B4)	Thin Muck Surface (C7)	Saturation Visible on Aerial Imagery (C9)	
Iron Deposits (B5)	Other (Explain in Remarks)	Stunted or Stressed Plants (D1)	
Inundation Visible on Aerial (B7)		Geomorphic Position (D2)	
Water-Stained Leaves (B9)		Microtopographic Relief (D4)	
		FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	NO	Depth (inches):	>18
Saturation Present?	NO	Depth (inches):	>18
		Wetland Hydrology Present?	NO
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No primary or secondary indicators of wetland hydrology present; parameter is not met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth	Matrix		Redox Features				
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture
0-6	10YR 3/2	95	7.5YR 3/4	5	c	p	clay loam
6-18	2.5Y 4/3	90	10YR 3/6	10	c	m	loamy clay
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.							
² Location: PL=Pore Lining, M=Matrix.							
Hydric Soil Indicators:				Indicators for Problematic Hydric Soils ³ :			
Histosol (A1)			Dark Surface (S7)				2 cm Muck (A10)
Histic Epipedon (A2)			Polyvalue Below Surface (S8)				Coast Prairie Redox (A16)
Black Histic (A3)			Thin Dark Surface (S9)				Piedmont Floodplain Soils (F19)
Hydrogen Sulfide (A4)			Loamy Gleyed Matrix (F2)				Very Shallow Dark Surface (TF12)
Stratified Layers (A5)			Depleted Matrix (F3)				Other (Explain in Remarks)
2cm Muck (A10)			X Redox Dark Surface (F6)				
Depleted Below Dark Surface (A11)			Depleted Dark Surface (F7)				
Thick Dark Surface (A12)			Redox Depressions (F8)				
Sandy Mucky Mineral (S1)			Iron-Manganese Masses (F12)				
Sandy Gleyed Matrix (S4)			Umbric Surface (F13)				
Sandy Redox (S5)			Piedmont Floodplain Soils (F19)				
Stripped Matrix (S6)			Red Parent Material (F21)				
³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.							
Restrictive Layer (if observed):				Hydric Soil Present?			
Type:				YES			
Depth (inches):							
Remarks: Indicator F6 (Redox Dark Surface) present and soil meets NTCHS definition of hydric soil; parameter is met.							

Tree Stratum	(Plot size: <u>30' radius</u>)	Absolute % Cover	Dom. Sp?	Indicator Status*	
1.					Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>0</u> (A) # Dominants across all strata: <u>2</u> (B) % Dominants OBL, FACW, FAC: <u>0%</u> (A/B)
2.					
3.					
4.					
5.					
6.					
7.					
			= Total Cover		Prevalence Index Worksheet: Total % Cover of: OBL <u> </u> x 1 = <u> </u> FACW <u> </u> x 2 = <u> </u> FAC <u> </u> x 3 = <u> </u> FACU <u>44</u> x 4 = <u>176</u> UPL <u>63</u> x 5 = <u>315</u> Sum: <u>107</u> (A) Multiply By: <u> </u> <u> </u> <u> </u> <u> </u> <u> </u> <u> </u> (B) Prevalence Index = B/A = <u>4.59</u>
			= Total Cover		
Shrub Stratum (Plot size: <u>15' radius</u>)					
1.					
2.					
3.					
4.					
5.					
6.					
7.					
			= Total Cover		Hydrophytic Vegetation Indicators: ☐ Dominance Test is > 50% ☐ Prevalence Index is <= 3.0 ☐ Problematic Hydrophytic Vegetation ¹ (explain) ☐ Rapid Test for Hydrophytic Vegetation ☐ Morphological Adaptations ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
			= Total Cover		
Herb Stratum (Plot size: <u>10' radius</u>)					
1.	<u>Lespedeza repens</u>	<u>63</u>	<u>X</u>	<u>UPL</u>	
2.	<u>Poa pratensis</u>	<u>38</u>	<u>X</u>	<u>FACU</u>	
3.	<u>Trifolium repens</u>	<u>3</u>		<u>FACU</u>	
4.	<u>Fragaria virginiana</u>	<u>3</u>		<u>FACU</u>	
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
		<u>107</u>	= Total Cover		Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height.
			= Total Cover		
Woody Vines (Plot size: <u>30' radius</u>)					
1.					
2.					
3.					
4.					
5.					
			= Total Cover		Hydrophytic Vegetation Present? <u>NO</u>

Remarks: (If observed, list morphological adaptations below).

No hydrophytic vegetation indicators present; parameter is not met.

* Indicator Status utilizes 2016 NWPL



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-6

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-6
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace/Hillslope	Local relief (concave, convex, none):	Convex	Slope (%):	3-5
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.184964	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	NO		
Wetland Hydrology Present?	NO		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located on gentle hillslope within wood grave near cabins, parking lots, and gravel roads.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
Surface Water (A1)	Aquatic Fauna (B13)	Surface Soil Cracks (B6)	
High Water Table (A2)	True Aquatic Plants (B14)	Sparsely Vegetated Concave Surface (B8)	
Saturation (A3)	Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)	
Water Marks (B1)	Oxidized Rhizospheres on Living Roots (C3)	Moss Trim Lines (B16)	
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Dry-Season Water Table (C2)	
Drift Deposits (B3)	Recent Iron Reduction in Tilled Soils (C6)	Crayfish Burrows (C8)	
Algal Mat or Crust (B4)	Thin Muck Surface (C7)	Saturation Visible on Aerial Imagery (C9)	
Iron Deposits (B5)	Other (Explain in Remarks)	Stunted or Stressed Plants (D1)	
Inundation Visible on Aerial (B7)		Geomorphic Position (D2)	
Water-Stained Leaves (B9)		Microtopographic Relief (D4)	
		FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	NO	Depth (inches):	>18
Saturation Present?	NO	Depth (inches):	>18
		Wetland Hydrology Present?	NO
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No primary or secondary indicators of wetland hydrology present; parameter is not met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (in)	Matrix		Redox Features			Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	
0-18	2.5Y 4/4	100					loam
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.							
² Location: PL=Pore Lining, M=Matrix.							
Hydric Soil Indicators:				Indicators for Problematic Hydric Soils ³ :			
Histosol (A1)			Dark Surface (S7)			2 cm Muck (A10)	
Histic Epipedon (A2)			Polyvalue Below Surface (S8)			Coast Prairie Redox (A16)	
Black Histic (A3)			Thin Dark Surface (S9)			Piedmont Floodplain Soils (F19)	
Hydrogen Sulfide (A4)			Loamy Gleyed Matrix (F2)			Very Shallow Dark Surface (TF12)	
Stratified Layers (A5)			Depleted Matrix (F3)			Other (Explain in Remarks)	
2cm Muck (A10)			Redox Dark Surface (F6)				
Depleted Below Dark Surface (A11)			Depleted Dark Surface (F7)				
Thick Dark Surface (A12)			Redox Depressions (F8)				
Sandy Mucky Mineral (S1)			Iron-Manganese Masses (F12)				
Sandy Gleyed Matrix (S4)			Umbric Surface (F13)				
Sandy Redox (S5)			Piedmont Floodplain Soils (F19)				
Stripped Matrix (S6)			Red Parent Material (F21)				
Restrictive Layer (if observed):							
Type:				Hydric Soil Present?			
Depth (inches):				NO			
Remarks: No hydric soil indicators present and soil does not meet NTCHS definition of hydric soil; parameter is not met.							

Tree Stratum (Plot size: <u>30' radius</u>)	Absolute % Cover	Dom. Sp?	Indicator Status*	
1. <u>Ulmus rubra</u>	<u>63</u>	<u>X</u>	<u>FAC</u>	Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>3</u> (A) # Dominants across all strata: <u>4</u> (B) % Dominants OBL, FACW, FAC: <u>75%</u> (A/B)
2. <u>Fraxinus quadrangulata</u>	<u>15</u>		<u>UPL</u>	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
	<u>78</u>	= Total Cover		Prevalence Index Worksheet: Total % Cover of: _____ Multiply By: _____ OBL _____ x 1 = _____ FACW _____ x 2 = _____ FAC <u>116</u> x 3 = <u>348</u> FACU <u>44</u> x 4 = <u>176</u> UPL <u>15</u> x 5 = <u>75</u> Sum: <u>175</u> (A) <u>599</u> (B) Prevalence Index = B/A = <u>3.42</u>
Sapling Stratum (Plot size: <u>30' radius</u>)				
1. <u>Ulmus rubra</u>	<u>15</u>	<u>X</u>	<u>FAC</u>	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
	<u>15</u>	= Total Cover		Hydrophytic Vegetation Indicators: <u>X</u> Dominance Test is > 50% _____ Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Shrub Stratum (Plot size: <u>15' radius</u>)				
1. <u>Ulmus rubra</u>	<u>38</u>	<u>X</u>	<u>FAC</u>	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
	<u>38</u>	= Total Cover		Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height.
Herb Stratum (Plot size: <u>10' radius</u>)				
1. <u>Chasmanthium latifolium</u>	<u>38</u>	<u>X</u>	<u>FACU</u>	
2. <u>Parthenocissus quinquefolia</u>	<u>3</u>		<u>FACU</u>	
3. <u>Polystichum acrostichoides</u>	<u>3</u>		<u>FACU</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
	<u>44</u>	= Total Cover		
Woody Vines (Plot size: <u>30' radius</u>)				Hydrophytic Vegetation Present? <u>YES</u>
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
		= Total Cover		

Remarks: (If observed, list morphological adaptations below).

Indicator 2 (Dominance Test) present with >50% of dominant species across all vegetation strata FAC or wetter.

* Indicator Status utilizes 2016 NWPL



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-7

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-7
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace	Local relief (concave, convex, none):	Convex	Slope (%):	0-2
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.185921	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	NO	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	NO		
Wetland Hydrology Present?	NO		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located on hilltop. Area consists of a regularly maintained lawn with turf grass and weedy species.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
Surface Water (A1)	Aquatic Fauna (B13)	Surface Soil Cracks (B6)	
High Water Table (A2)	True Aquatic Plants (B14)	Sparsely Vegetated Concave Surface (B8)	
Saturation (A3)	Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)	
Water Marks (B1)	Oxidized Rhizospheres on Living Roots (C3)	Moss Trim Lines (B16)	
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Dry-Season Water Table (C2)	
Drift Deposits (B3)	Recent Iron Reduction in Tilled Soils (C6)	Crayfish Burrows (C8)	
Algal Mat or Crust (B4)	Thin Muck Surface (C7)	Saturation Visible on Aerial Imagery (C9)	
Iron Deposits (B5)	Other (Explain in Remarks)	Stunted or Stressed Plants (D1)	
Inundation Visible on Aerial (B7)		Geomorphic Position (D2)	
Water-Stained Leaves (B9)		Microtopographic Relief (D4)	
		FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	NO	Depth (inches):	>18
Saturation Present?	NO	Depth (inches):	>18
		Wetland Hydrology Present?	NO
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No primary or secondary indicators of wetland hydrology present; parameter is not met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (in)	Matrix		Redox Features					
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-18	10YR 5/3	75	10YR 3/6	25	c	p	clay loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.								² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:								Indicators for Problematic Hydric Soils ³ :
Histosol (A1)	Dark Surface (S7)			2 cm Muck (A10)				
Histic Epipedon (A2)	Polyvalue Below Surface (S8)			Coast Prairie Redox (A16)				
Black Histic (A3)	Thin Dark Surface (S9)			Piedmont Floodplain Soils (F19)				
Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)			Very Shallow Dark Surface (TF12)				
Stratified Layers (A5)	Depleted Matrix (F3)			Other (Explain in Remarks)				
2cm Muck (A10)	Redox Dark Surface (F6)							
Depleted Below Dark Surface (A11)	Depleted Dark Surface (F7)							
Thick Dark Surface (A12)	Redox Depressions (F8)							
Sandy Mucky Mineral (S1)	Iron-Manganese Masses (F12)							
Sandy Gleyed Matrix (S4)	Umbric Surface (F13)							
Sandy Redox (S5)	Piedmont Floodplain Soils (F19)							
Stripped Matrix (S6)	Red Parent Material (F21)							
Restrictive Layer (if observed):								
Type:				Hydric Soil Present?				NO
Depth (inches):								
Remarks: No hydric soil indicators present and soil does not meet NTCHS definition of hydric soil; parameter is not met.								

Tree Stratum	Absolute % Cover	Dom. Sp?	Indicator Status*	
(Plot size: 30' radius)				
1. _____	_____	_____	_____	Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>0</u> (A) # Dominants across all strata: <u>1</u> (B) % Dominants OBL, FACW, FAC: <u>0%</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
			= Total Cover	Prevalence Index Worksheet: Total % Cover of: _____ Multiply By: _____ OBL _____ x 1 = _____ FACW _____ x 2 = _____ FAC <u>15</u> x 3 = <u>45</u> FACU <u>88</u> x 4 = <u>352</u> UPL _____ x 5 = _____ Sum: <u>103</u> (A) <u>397</u> (B) Prevalence Index = B/A = <u>3.85</u>
Sapling Stratum	(Plot size: 30' radius)			
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
			= Total Cover	
Shrub Stratum	(Plot size: 15' radius)			Hydrophytic Vegetation Indicators: _____ Dominance Test is > 50% _____ Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
			= Total Cover	
Herb Stratum	(Plot size: 10' radius)			Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height.
1. Poa pratensis	85	X	FACU	
2. Paspalum laeve	15		FAC	
3. Trifolium repens	3		FACU	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
			103 = Total Cover	
Woody Vines	(Plot size: 30' radius)			Hydrophytic Vegetation Present? <u>NO</u>
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
			= Total Cover	

Remarks: (If observed, list morphological adaptations below).

No hydrophytic vegetation indicators present; parameter is not met.

* Indicator Status utilizes 2016 NWPL



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-8

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-8
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace	Local relief (concave, convex, none):	Concave	Slope (%):	5-7
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.18621	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	NO	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	NO		
Wetland Hydrology Present?	NO		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located in an upland swale created from erosion. Located within maintained lawn. Vegetation regularly maintained.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
Surface Water (A1)	Aquatic Fauna (B13)	Surface Soil Cracks (B6)	
High Water Table (A2)	True Aquatic Plants (B14)	Sparsely Vegetated Concave Surface (B8)	
Saturation (A3)	Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)	
Water Marks (B1)	Oxidized Rhizospheres on Living Roots (C3)	Moss Trim Lines (B16)	
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Dry-Season Water Table (C2)	
Drift Deposits (B3)	Recent Iron Reduction in Tilled Soils (C6)	Crayfish Burrows (C8)	
Algal Mat or Crust (B4)	Thin Muck Surface (C7)	Saturation Visible on Aerial Imagery (C9)	
Iron Deposits (B5)	Other (Explain in Remarks)	Stunted or Stressed Plants (D1)	
Inundation Visible on Aerial (B7)		Geomorphic Position (D2)	
Water-Stained Leaves (B9)		Microtopographic Relief (D4)	
		FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	NO	Depth (inches):	>18
Saturation Present?	NO	Depth (inches):	>18
		Wetland Hydrology Present?	NO
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No primary and only one secondary indicator of wetland hydrology present; parameter is not met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth	Matrix		Redox Features			Texture	Remarks
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	
0-4	10YR 4/3	100					loam
4-6	10YR 4/3	70	7.5YR 4/3	30	c	m	loam
6+							bedrock
							Auger refusal
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.							
² Location: PL=Pore Lining, M=Matrix.							
Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :					
Histosol (A1)	Dark Surface (S7)	2 cm Muck (A10)					
Histic Epipedon (A2)	Polyvalue Below Surface (S8)	Coast Prairie Redox (A16)					
Black Histic (A3)	Thin Dark Surface (S9)	Piedmont Floodplain Soils (F19)					
Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Very Shallow Dark Surface (TF12)					
Stratified Layers (A5)	Depleted Matrix (F3)	Other (Explain in Remarks)					
2cm Muck (A10)	Redox Dark Surface (F6)						
Depleted Below Dark Surface (A11)	Depleted Dark Surface (F7)						
Thick Dark Surface (A12)	Redox Depressions (F8)						
Sandy Mucky Mineral (S1)	Iron-Manganese Masses (F12)						
Sandy Gleyed Matrix (S4)	Umbric Surface (F13)						
Sandy Redox (S5)	Piedmont Floodplain Soils (F19)						
Stripped Matrix (S6)	Red Parent Material (F21)						
³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.							
Restrictive Layer (if observed):		Hydric Soil Present?					
Type:	bedrock	NO					
Depth (inches):	6						
Remarks: No hydric soil indicators present and soil does not meet NTCHS definition of hydric soil; parameter is not met.							

Remarks: (If observed, list morphological adaptations below).
No hydrophytic vegetation indicators present; parameter is not met.
* Indicator Status utilizes 2016 NWPL

Project Site:	<u>Mammoth Caves NP</u>	City/County:	<u>Edmonson County</u>	Samp. Date:	<u>10/1/2018</u>
Applicant/Owner:	<u>National Park Service</u>	State:	<u>Kentucky</u>	Sampling Point:	<u>DP-9</u>
Investigator(s):	<u>Sean Murray</u>	Section, Township, Range:	<u>NA</u>		
Landform (hillslope, terrace, etc.):	<u>Terrace</u>	Local relief (concave, convex, none):	<u>Concave</u>	Slope (%):	<u>3-5</u>
Subregion (LRR or MLRA):	<u>LRR N; MLRA 120A</u>	Lat:	<u>37.186325</u>	Datum:	<u>WGS84</u>
Soil Map Unit:	<u>Clarkrange silt loam, 2 to 6 percent slopes</u>	Long:	<u>-77.373135</u>	NWI Classif.:	<u>Upland</u>
Are climatic/hydrologic conditions on the site typical for this time of year?	<u>Yes</u>	(If no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed?	<u>No</u>	Normal Circumstances?			
Are Vegetation, Soil, or Hydrology naturally problematic?	<u>No</u>	(If needed, explain any answers in Remarks.)			

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	<u>NO</u>	Is This Sample Area Within a Wetland? <u>NO</u>
Hydric Soil Present?	<u>NO</u>	
Wetland Hydrology Present?	<u>NO</u>	
Remarks:	One or more parameters lacking. Area is not a wetland. Data point located in a shallow depression within an unmaintained field.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)			Secondary Indicators (minimum of two required)		
☐ Surface Water (A1)	☐ Aquatic Fauna (B13)		☐ Surface Soil Cracks (B6)		
☐ High Water Table (A2)	☐ True Aquatic Plants (B14)		☐ Sparsely Vegetated Concave Surface (B8)		
☐ Saturation (A3)	☐ Hydrogen Sulfide Odor (C1)		☐ Drainage Patterns (B10)		
☐ Water Marks (B1)	☐ Oxidized Rhizospheres on Living Roots (C3)		☐ Moss Trim Lines (B16)		
☐ Sediment Deposits (B2)	☐ Presence of Reduced Iron (C4)		☐ Dry-Season Water Table (C2)		
☐ Drift Deposits (B3)	☐ Recent Iron Reduction in Tilled Soils (C6)		☐ Crayfish Burrows (C8)		
☐ Algal Mat or Crust (B4)	☐ Thin Muck Surface (C7)		☐ Saturation Visible on Aerial Imagery (C9)		
☐ Iron Deposits (B5)	☐ Other (Explain in Remarks)		☐ Stunted or Stressed Plants (D1)		
☐ Inundation Visible on Aerial (B7)			☐ Geomorphic Position (D2)		
☐ Water-Stained Leaves (B9)			☐ Microtopographic Relief (D4)		
			☐ FAC-Neutral Test (D5)		
Field Observations: Surface Water Present? <u>NO</u> Depth (inches): <u>0</u> Water Table Present? <u>NO</u> Depth (inches): <u>>18</u> Saturation Present? <u>NO</u> Depth (inches): <u>>18</u>			Wetland Hydrology Present? <u>NO</u>		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks: No primary and only one secondary indicator of wetland hydrology present; parameter is not met.					

SOIL

[illegible]

Remarks: (If observed, list morphological adaptations below).
No hydrophytic vegetation indicators present; parameter is not met.
* Indicator Status utilizes 2016 NWPL



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-10

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-10
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace	Local relief (concave, convex, none):	Concave	Slope (%):	0-2
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.185895	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	Is This Sample Area Within a Wetland?	YES
Hydric Soil Present?	YES		
Wetland Hydrology Present?	YES		
Remarks: All parameters are met. Area is classified as a palustrine emergent (PEM) wetland. Data point located in shallow depression at the edge of a maintained lawn.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☒ Surface Water (A1)	☐ Aquatic Fauna (B13)	☐ Surface Soil Cracks (B6)	
☒ High Water Table (A2)	☐ True Aquatic Plants (B14)	☒ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	☐ Hydrogen Sulfide Odor (C1)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Presence of Reduced Iron (C4)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Thin Muck Surface (C7)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)	☐ Other (Explain in Remarks)	☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial (B7)		☐ Geomorphic Position (D2)	
☒ Water-Stained Leaves (B9)		☒ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	YES	Depth (inches):	10
Saturation Present?	YES	Depth (inches):	surface
Wetland Hydrology Present?		YES	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: At least one primary or two secondary indicators of wetland hydrology present; parameter is met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-2	10YR 4/2	90	10YR 3/6	10	c	p	clay loam	
2-8	10YR 5/3	90	10YR 3/6	10	c	p	clay loam	
8-18	10YR 5/6	85	10YR 4/6	15	c	p	clay loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.								
² Location: PL=Pore Lining, M=Matrix.								
Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :						
☐ Histosol (A1)	☐ Dark Surface (S7)	☐ 2 cm Muck (A10)						
☐ Histic Epipedon (A2)	☐ Polyvalue Below Surface (S8)	☐ Coast Prairie Redox (A16)						
☐ Black Histic (A3)	☐ Thin Dark Surface (S9)	☐ Piedmont Floodplain Soils (F19)						
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Very Shallow Dark Surface (TF12)						
☐ Stratified Layers (A5)	☒ Depleted Matrix (F3)	☐ Other (Explain in Remarks)						
☐ 2cm Muck (A10)	☐ Redox Dark Surface (F6)							
☐ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)							
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)							
☐ Sandy Mucky Mineral (S1)	☐ Iron-Manganese Masses (F12)							
☐ Sandy Gleyed Matrix (S4)	☐ Umbric Surface (F13)							
☐ Sandy Redox (S5)	☐ Piedmont Floodplain Soils (F19)							
☐ Stripped Matrix (S6)	☐ Red Parent Material (F21)							
Restrictive Layer (if observed):								
Type:		Hydric Soil Present? YES						
Depth (inches):								
Remarks: Indicator F3 (Depleted Matrix) present and soil meets NTCHS definition of hydric soil; parameter is met.								

Eastern Mountains and Piedmont Region - Version 2.0
(Adapted By: Douglas A. DeBerry, PhD, PWS, PWD)



WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

DP-11

Project Site:	Mammoth Caves NP	City/County:	Edmonson County	Samp. Date:	10/1/2018
Applicant/Owner:	National Park Service	State:	Kentucky	Sampling Point:	DP-11
Investigator(s):	Sean Murray	Section, Township, Range:	NA		
Landform (hillslope, terrace, etc.):	Terrace	Local relief (concave, convex, none):	Concave	Slope (%):	3-5
Subregion (LRR or MLRA):	LRR N; MLRA 120A	Lat:	37.186047	Long:	-77.373135
Soil Map Unit:	Clarkrange silt loam, 2 to 6 percent slopes	Datum:	WGS84	NWI Classif.:	Upland
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	NO	Is This Sample Area Within a Wetland?	NO
Hydric Soil Present?	NO		
Wetland Hydrology Present?	NO		
Remarks: One or more parameters lacking. Area is not a wetland. Data point located in a shallow depression, slightly downhill from DP-10. Area is an open field which is not visibly maintained.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
Surface Water (A1)	Aquatic Fauna (B13)	Surface Soil Cracks (B6)	
High Water Table (A2)	True Aquatic Plants (B14)	Sparsely Vegetated Concave Surface (B8)	
Saturation (A3)	Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)	
Water Marks (B1)	Oxidized Rhizospheres on Living Roots (C3)	Moss Trim Lines (B16)	
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Dry-Season Water Table (C2)	
Drift Deposits (B3)	Recent Iron Reduction in Tilled Soils (C6)	Crayfish Burrows (C8)	
Algal Mat or Crust (B4)	Thin Muck Surface (C7)	Saturation Visible on Aerial Imagery (C9)	
Iron Deposits (B5)	Other (Explain in Remarks)	Stunted or Stressed Plants (D1)	
Inundation Visible on Aerial (B7)		Geomorphic Position (D2)	
Water-Stained Leaves (B9)		Microtopographic Relief (D4)	
		FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	NO	Depth (inches):	0
Water Table Present?	NO	Depth (inches):	>18
Saturation Present?	NO	Depth (inches):	>18
		Wetland Hydrology Present?	NO
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No primary or secondary indicators of wetland hydrology present; parameter is not met.			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix		Redox Features				Texture	Remarks
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR 4/2	100					loam	
4-18	2.5Y 5/3	85	10YR 3/6	15	c	p	clay loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.								
² Location: PL=Pore Lining, M=Matrix.								
Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :						
Histosol (A1)	Dark Surface (S7)	2 cm Muck (A10)						
Histic Epipedon (A2)	Polyvalue Below Surface (S8)	Coast Prairie Redox (A16)						
Black Histic (A3)	Thin Dark Surface (S9)	Piedmont Floodplain Soils (F19)						
Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Very Shallow Dark Surface (TF12)						
Stratified Layers (A5)	Depleted Matrix (F3)	Other (Explain in Remarks)						
2cm Muck (A10)	Redox Dark Surface (F6)							
Depleted Below Dark Surface (A11)	Depleted Dark Surface (F7)							
Thick Dark Surface (A12)	Redox Depressions (F8)							
Sandy Mucky Mineral (S1)	Iron-Manganese Masses (F12)							
Sandy Gleyed Matrix (S4)	Umbric Surface (F13)							
Sandy Redox (S5)	Piedmont Floodplain Soils (F19)							
Stripped Matrix (S6)	Red Parent Material (F21)							
³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.								
Restrictive Layer (if observed):		Hydric Soil Present?						
Type:		NO						
Depth (inches):								
Remarks: No hydric soil indicators present and soil does not meet NTCHS definition of hydric soil; parameter is not met.								

Eastern Mountains and Piedmont Region - Version 2.0
(Adapted By: Douglas A. DeBerry, PhD, PWS, PWD)

Project Site:	<u>Mammoth Caves NP</u>	City/County:	<u>Edmonson County</u>	Samp. Date:	<u>10/1/2018</u>
Applicant/Owner:	<u>National Park Service</u>	State:	<u>Kentucky</u>	Sampling Point:	<u>DP-12</u>
Investigator(s):	<u>Sean Murray</u>	Section, Township, Range:	<u>NA</u>		
Landform (hillslope, terrace, etc.):	<u>Terrace</u>	Local relief (concave, convex, none):	<u>Concave</u>	Slope (%):	<u>0 to 2</u>
Subregion (LRR or MLRA):	<u>LRR N; MLRA 120A</u>	Lat:	<u>37.18601</u>	Long:	<u>-77.373135</u>
Soil Map Unit:	<u>Clarkrange silt loam, 2 to 6 percent slopes</u>			Datum:	<u>WGS84</u>
				NWI Classif.:	<u>Upland</u>
Are climatic/hydrologic conditions on the site typical for this time of year?	<u>Yes</u>	(If no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed?	<u>No</u>	Normal Circumstances?			
Are Vegetation, Soil, or Hydrology naturally problematic?	<u>No</u>	(If needed, explain any answers in Remarks.)			

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	<u>YES</u>	Is This Sample Area Within a Wetland? <u>NO</u>
Hydric Soil Present?	<u>NO</u>	
Wetland Hydrology Present?	<u>YES</u>	
Remarks: One or more parameters lacking. Area is not a wetland. Data point is located at the upper edge of a shallow depression.		

HYDROLOGY

Wetland Hydrology Indicators:			Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)				
☐ Surface Water (A1)	☐ Aquatic Fauna (B13)		☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ True Aquatic Plants (B14)		☐ Sparsely Vegetated Concave Surface (B8)	
☐ Saturation (A3)	☐ Hydrogen Sulfide Odor (C1)		☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Oxidized Rhizospheres on Living Roots (C3)		☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Presence of Reduced Iron (C4)		☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Recent Iron Reduction in Tilled Soils (C6)		☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Thin Muck Surface (C7)		☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)	☐ Other (Explain in Remarks)		☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial (B7)			☐ Geomorphic Position (D2)	
☒ Water-Stained Leaves (B9)			☐ Microtopographic Relief (D4)	
			☐ FAC-Neutral Test (D5)	
Field Observations:				
Surface Water Present?	<u>NO</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? <u>YES</u>	
Water Table Present?	<u>NO</u>	Depth (inches): <u>>12</u>		
Saturation Present?	<u>NO</u>	Depth (inches): <u>>12</u>		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:				
Remarks: At least one primary or two secondary indicators of wetland hydrology present; parameter is met.				

SOIL

[illegible]

Tree Stratum	(Plot size: <u>30' radius</u>)	Absolute % Cover	Dom. Sp?	Indicator Status*		
1.					Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>1</u> (A) # Dominants across all strata: <u>2</u> (B) % Dominants OBL, FACW, FAC: <u>50%</u> (A/B)	
2.						
3.						
4.						
5.						
6.						
7.						
			= Total Cover		Prevalence Index Worksheet: Total % Cover of: OBL <u>63</u> FACW <u>15</u> FAC <u> </u> FACU <u>41</u> UPL <u> </u> Sum: <u>119</u> (A) Multiply By: x 1 = <u>63</u> x 2 = <u>30</u> x 3 = <u> </u> x 4 = <u>164</u> x 5 = <u> </u> Sum: <u>257</u> (B) Prevalence Index = B/A = <u>2.16</u>	
			= Total Cover		Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is > 50% <u>X</u> Prevalence Index is <= 3.0 <u> </u> Problematic Hydrophytic Vegetation ¹ (explain) <u> </u> Rapid Test for Hydrophytic Vegetation <u> </u> Morphological Adaptations ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
			= Total Cover		Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height. Hydrophytic Vegetation Present? <u>YES</u>	
Herb Stratum		(Plot size: <u>10' radius</u>)				
1.	Persicaria punctata	63	X	OBL		
2.	Poa pratensis	38	X	FACU		
3.	Coleataenia rigidula	15		FACW		
4.	Fragaria virginiana	3		FACU		
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
		119	= Total Cover			
Woody Vines		(Plot size: <u>30' radius</u>)				
1.						
2.						
3.						
4.						
5.						
			= Total Cover			

Remarks: (If observed, list morphological adaptations below).

Indicator 3 (Prevalence Index) present with a Prevalence Index value of 3.0 or less.

** Indicator Status utilizes 2016 NWPL*

Attachment 3

2018 Representative Photographs



Photograph 1: View of Data Point DP-1 showing maintained lawn.



Photograph 2: View of Data Point DP-2 showing maintained lawn.



Photograph 3: View of Data Point DP-3 showing maintained lawn.



Photograph 4: View of Data Point DP-4 showing maintained lawn.



Photograph 5: View of Data Point DP-5 showing maintained lawn.



Photograph 6: View of Data Point DP-6 showing upland forest community.



Photograph 7: View of Data Point DP-7 showing maintained lawn.



Photograph 8: View of Data Point DP-8 with a drainage feature in maintained lawn.



Photograph 9: View of Data Point DP-9 in unmaintained early successional community.



Photograph 10: View of Data Point DP-10 in herbaceous wetland adjacent to lawn.



Photograph 11: View of Data Point DP-11 in early successional community.



Photograph 12: View of Data Point DP-12 in early successional community.

Attachment 4

USFWS IPaC Species List

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Edmonson County, Kentucky



Local office

Kentucky Ecological Services Field Office

☎ (502) 695-0468

📠 (502) 695-1024

J C Watts Federal Building, Room 265

330 West Broadway

Frankfort, KY 40601-8670

<http://www.fws.gov/frankfort/>

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species

¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

-
1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
 2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Gray Bat <i>Myotis grisescens</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat <i>Myotis sodalis</i> This species only needs to be considered if any of the following conditions apply: • All activities in this location should consider possible effects to this species. The project area includes sensitive areas in close proximity to a hibernaculum. • All activities in this location should consider possible effects to this species. The project area includes known "swarming 1" habitat. • All activities in this location should consider possible effects to this species. The project area includes known "summer 1" habitat. • All activities in this location should consider possible effects to this species. The project area includes known "summer 2" habitat. • All activities in this location should consider possible effects to this species. The project area includes known "swarming 2" habitat. There is final critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> This species only needs to be considered if the following condition applies: • Contact the KFO to discuss possible impacts to the species. The specified area includes or is in the vicinity of a known hibernaculum and/or maternity roost tree. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Clams

NAME	STATUS
Clubshell <i>Pleurobema clava</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3789	Endangered
Fanshell <i>Cyprogenia stegaria</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4822	Endangered

Northern Riffleshell <i>Epioblasma torulosa rangiana</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/527	Endangered
Orangefoot Pimpleback (pearlymussel) <i>Plethobasus cooperianus</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1132	Endangered
Pink Mucket (pearlymussel) <i>Lampsilis abrupta</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7829	Endangered
Purple Cat's Paw (=purple Cat's Paw Pearlymussel) <i>Epioblasma obliquata obliquata</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5602	Endangered
Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5165	Threatened
Ring Pink (mussel) <i>Obovaria retusa</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4128	Endangered
Rough Pigtoe <i>Pleurobema plenum</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6894	Endangered
Sheepnose Mussel <i>Plethobasus cyphus</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6903	Endangered
Snuffbox Mussel <i>Epioblasma triquetra</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4135	Endangered
Spectaclecase (mussel) <i>Cumberlandia monodonta</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7867	Endangered

Crustaceans

NAME

STATUS

Kentucky Cave Shrimp *Palaemonias ganteri*

Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/5008>

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME

TYPE

Indiana Bat *Myotis sodalis*

Final

<https://ecos.fws.gov/ecp/species/5949#crithab>

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general

public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Breeds Sep 1 to Jul 31

Blue-winged Warbler *Vermivora pinus*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Breeds May 1 to Jun 30

Cerulean Warbler *Dendroica cerulea*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/2974>

Breeds Apr 23 to Jul 20

Eastern Whip-poor-will *Antrostomus vociferus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 1 to Aug 20

Kentucky Warbler *Oporornis formosus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Apr 20 to Aug 20

Prairie Warbler *Dendroica discolor*

Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker *Melanerpes erythrocephalus*

Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush *Hylocichla mustelina*

Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [E-bird Explore Data Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to

confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

APPENDIX B: RELEVANT CORRESPONDENCE

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United States Department of the Interior

NATIONAL PARK SERVICE

Mammoth Cave National Park

P.O. Box 7

Mammoth Cave, KY 42259

(270) 758-2180



May 17, 2019

Governor Scott Miller
Absentee-Shawnee Tribe of Indians of Oklahoma
2025 South Gordon Cooper Drive
Shawnee, OK 74801

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Governor Miller:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

The National Park Service (NPS) proposes to construct family cabins and improve the access and parking at the lodge parking area at Mammoth Cave National Park, Kentucky (see attached Area of Potential Effects map). This proposed project would provide a lodging option that can accommodate larger families and gatherings such as family reunions and would provide parking and intuitive circulation routes to the lodge parking area that create a sense of arrival, reestablish the cultural landscape, reduce congestion, increase the number of parking spaces, and improve visitor interaction and safety. This project is needed because lodging options for larger families and groups are currently unavailable at the park and are limited within the nearby communities. Additionally, the current configuration of entrance road and lodge parking area provides no sense of arrival, is not intuitive, and the current approach to the lodge is visually dominated by the service area of the lodge. Furthermore, the site does not meet current accessibility standards and there are issues related to pedestrian connectivity to the lodge and surrounding areas.

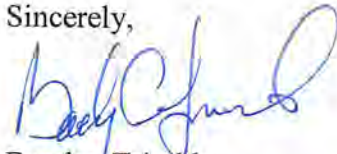
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The purpose of this letter is to inform you of the proposed project and initiate communication with your office regarding our federal obligation under Section 106 of the NHPA. The NPS is preparing an environmental assessment, in accordance with the National Environmental Policy Act (NEPA), to identify and evaluate potential impacts to park resources and to incorporate public comment. The NPS intends to use the NEPA process to comply with Section 106 of the NHPA. We would like to request any data or information you may have on cultural resources located within the APE. We look forward to continuing the NHPA Section 106 consultation process with you as we concurrently work through our NEPA process.

Your response within 30 days from the date of receipt of this letter would be greatly appreciated. Please forward written comments to Edward Jakaitis, Cultural Resource Program Manager, at the address listed above. Thank you for your assistance with this project. If you have any questions, please contact Edward Jakaitis by telephone at (270)758-2143 or by email at edward_jakaitis@nps.gov.

Sincerely,



Barclay Trimble
Superintendent



Construct Family Cabins and Improve Site Access
Environmental Assessment/Assessment of Effect

FIGURE 1
Project Area and Area of Potential Effect



United States Department of the Interior
NATIONAL PARK SERVICE

Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, KY 42259
(270) 758-2180



May 17, 2019

Reid Nelson
Advisory Council on Historic Preservation
Office of Federal Agency Programs
401 F Street NW
Suite 308
Washington, DC 20001

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Mr. Nelson:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

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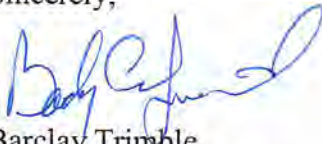
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Please forward written comments to Edward Jakaitis, Cultural Resource Program Manager, at the address listed above. Thank you for your assistance with this project. If you have any questions, please contact Edward Jakaitis by telephone at (270)758-2143 or by email at edward_jakaitis@nps.gov.

Sincerely,



Barclay Trimble
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE

Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, KY 42259
(270) 758-2180



May 17, 2019

Principal Chief Bill John Baker
Cherokee Nation
P.O. Box 948
Tahlequah, OK 74464

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Principal Chief Baker:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

The National Park Service (NPS) proposes to construct family cabins and improve the access and parking at the lodge parking area at Mammoth Cave National Park, Kentucky (see attached Area of Potential Effects map). This proposed project would provide a lodging option that can accommodate larger families and gatherings such as family reunions and would provide parking and intuitive circulation routes to the lodge parking area that create a sense of arrival, reestablish the cultural landscape, reduce congestion, increase the number of parking spaces, and improve visitor interaction and safety. This project is needed because lodging options for larger families and groups are currently unavailable at the park and are limited within the nearby communities. Additionally, the current configuration of entrance road and lodge parking area provides no sense of arrival, is not intuitive, and the current approach to the lodge is visually dominated by the service area of the lodge. Furthermore, the site does not meet current accessibility standards and there are issues related to pedestrian connectivity to the lodge and surrounding areas.

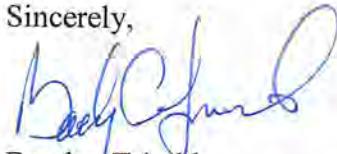
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Your response within 30 days from the date of receipt of this letter would be greatly appreciated. Please forward written comments to Edward Jakaitis, Cultural Resource Program Manager, at the address listed above. Thank you for your assistance with this project. If you have any questions, please contact Edward Jakaitis by telephone at (270)758-2143 or by email at edward_jakaitis@nps.gov.

Sincerely,



Barclay Trimble
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE

Mammoth Cave National Park

P.O. Box 7

Mammoth Cave, KY 42259

(270) 758-2180



May 17, 2019

Karen Bunso
Chickasaw Nation
P.O. Box 1548
Ada, OK 74812

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Ms. Bunso:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

The National Park Service (NPS) proposes to construct family cabins and improve the access and parking at the lodge parking area at Mammoth Cave National Park, Kentucky (see attached Area of Potential Effects map). This proposed project would provide a lodging option that can accommodate larger families and gatherings such as family reunions and would provide parking and intuitive circulation routes to the lodge parking area that create a sense of arrival, reestablish the cultural landscape, reduce congestion, increase the number of parking spaces, and improve visitor interaction and safety. This project is needed because lodging options for larger families and groups are currently unavailable at the park and are limited within the nearby communities. Additionally, the current configuration of entrance road and lodge parking area provides no sense of arrival, is not intuitive, and the current approach to the lodge is visually dominated by the service area of the lodge. Furthermore, the site does not meet current accessibility standards and there are issues related to pedestrian connectivity to the lodge and surrounding areas.

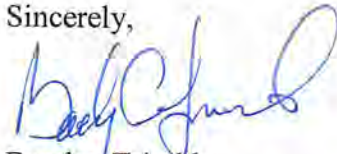
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Your response within 30 days from the date of receipt of this letter would be greatly appreciated. Please forward written comments to Edward Jakaitis, Cultural Resource Program Manager, at the address listed above. Thank you for your assistance with this project. If you have any questions, please contact Edward Jakaitis by telephone at (270)758-2143 or by email at edward_jakaitis@nps.gov.

Sincerely,



Barclay Trimble
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE

Mammoth Cave National Park

P.O. Box 7

Mammoth Cave, KY 42259

(270) 758-2180



May 17, 2019

Stephen Yerka
Eastern Band of Cherokee Indians
P.O. Box 455
Cherokee, NC 28719

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Mr. Yerka:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

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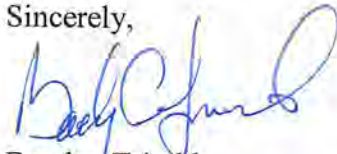
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Sincerely,



Barclay Trimble
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE

Mammoth Cave National Park

P.O. Box 7

Mammoth Cave, KY 42259

(270) 758-2180



May 17, 2019

Chief Glenna J. Wallace
Eastern Shawnee Tribe of Oklahoma
7500 E. 128 Rd.
Wyandotte, OK 74370

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Chief Wallace:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

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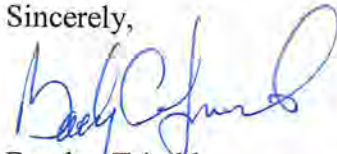
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Sincerely,



Barclay Trimble
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE

Mammoth Cave National Park

P.O. Box 7

Mammoth Cave, KY 42259

(270) 758-2180



May 17, 2019

Chairman Ron Sparkman
Shawnee Tribe
P.O. Box 189
Miami, OK 74355

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Chairman Sparkman:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

The National Park Service (NPS) proposes to construct family cabins and improve the access and parking at the lodge parking area at Mammoth Cave National Park, Kentucky (see attached Area of Potential Effects map). This proposed project would provide a lodging option that can accommodate larger families and gatherings such as family reunions and would provide parking and intuitive circulation routes to the lodge parking area that create a sense of arrival, reestablish the cultural landscape, reduce congestion, increase the number of parking spaces, and improve visitor interaction and safety. This project is needed because lodging options for larger families and groups are currently unavailable at the park and are limited within the nearby communities. Additionally, the current configuration of entrance road and lodge parking area provides no sense of arrival, is not intuitive, and the current approach to the lodge is visually dominated by the service area of the lodge. Furthermore, the site does not meet current accessibility standards and there are issues related to pedestrian connectivity to the lodge and surrounding areas.

The area of potential effect (APE) for the proposed project is defined by activities that would include constructing a total of eight family cabins in a combination of duplexes and single cabins to meet the anticipated need for larger groups. The cabins would be constructed adjacent to Mammoth Cave Lodge and to the north of the proposed visitor parking lot. The project would

also consist of consolidating the parking from the front of the lodge to the west to create a contiguous green space and natural character setting for the lodge. The NPS would relocate the access road away from the front of the lodge to reduce congestion and improve the view of the lodge and visitor center from the access road and the viewshed from the lodge. The existing parking lot in front (south) of the lodge would be converted into green space and new pedestrian connections between the lodge, new parking lot, and existing pedestrian walkways would be added. Trees would be planted throughout the project area to complement the cultural landscape. A bus drop-off and bus shelter would be constructed near the front entrance of the lodge. The reconfigured parking lot would be located to the southwest of the lodge and would extend south of the edge of the existing parking lot. The existing tennis courts and some trees would be removed to accommodate the larger parking lot.

The purpose of this letter is to inform you of the proposed project and initiate communication with your office regarding our federal obligation under Section 106 of the NHPA. The NPS is preparing an environmental assessment, in accordance with the National Environmental Policy Act (NEPA), to identify and evaluate potential impacts to park resources and to incorporate public comment. The NPS intends to use the NEPA process to comply with Section 106 of the NHPA. We would like to request any data or information you may have on cultural resources located within the APE. We look forward to continuing the NHPA Section 106 consultation process with you as we concurrently work through our NEPA process.

Your response within 30 days from the date of receipt of this letter would be greatly appreciated. Please forward written comments to Edward Jakaitis, Cultural Resource Program Manager, at the address listed above. Thank you for your assistance with this project. If you have any questions, please contact Edward Jakaitis by telephone at (270)758-2143 or by email at edward_jakaitis@nps.gov.

Sincerely,

Barclay Trimble
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE

Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, KY 42259
(270) 758-2180



May 17, 2019

Craig Potts
Executive Director and SHPO
Kentucky Heritage Council
Barstow House
410 High Street
Frankfort, KY 40601

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Mr. Potts:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

The National Park Service (NPS) proposes to construct family cabins and improve the access and parking at the lodge parking area at Mammoth Cave National Park, Kentucky (see attached Area of Potential Effects map). This proposed project would provide a lodging option that can accommodate larger families and gatherings such as family reunions and would provide parking and intuitive circulation routes to the lodge parking area that create a sense of arrival, reestablish the cultural landscape, reduce congestion, increase the number of parking spaces, and improve visitor interaction and safety. This project is needed because lodging options for larger families and groups are currently unavailable at the park and are limited within the nearby communities. Additionally, the current configuration of entrance road and lodge parking area provides no sense of arrival, is not intuitive, and the current approach to the lodge is visually dominated by the service area of the lodge. Furthermore, the site does not meet current accessibility standards and there are issues related to pedestrian connectivity to the lodge and surrounding areas.

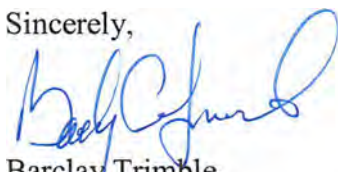
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Please forward written comments to Edward Jakaitis, Cultural Resource Program Manager, at the address listed above. Thank you for your assistance with this project. If you have any questions, please contact Edward Jakaitis by telephone at (270)758-2143 or by email at edward_jakaitis@nps.gov.

Sincerely,



Barclay Trimble
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE

Mammoth Cave National Park

P.O. Box 7

Mammoth Cave, KY 42259

(270) 758-2180



May 17, 2019

Chief George Wickliffe
United Keetoowah Band of Cherokee Indians
P.O. Box 746
Tahlequah, OK 74465

RE: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Dear Chief Wickliffe:

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 300101, et seq.) and its implementing regulation 36 CFR 800.3(a), please accept this letter as notification of a proposed project and its initiation of consultation.

The National Park Service (NPS) proposes to construct family cabins and improve the access and parking at the lodge parking area at Mammoth Cave National Park, Kentucky (see attached Area of Potential Effects map). This proposed project would provide a lodging option that can accommodate larger families and gatherings such as family reunions and would provide parking and intuitive circulation routes to the lodge parking area that create a sense of arrival, reestablish the cultural landscape, reduce congestion, increase the number of parking spaces, and improve visitor interaction and safety. This project is needed because lodging options for larger families and groups are currently unavailable at the park and are limited within the nearby communities. Additionally, the current configuration of entrance road and lodge parking area provides no sense of arrival, is not intuitive, and the current approach to the lodge is visually dominated by the service area of the lodge. Furthermore, the site does not meet current accessibility standards and there are issues related to pedestrian connectivity to the lodge and surrounding areas.

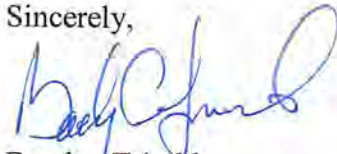
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Your response within 30 days from the date of receipt of this letter would be greatly appreciated. Please forward written comments to Edward Jakaitis, Cultural Resource Program Manager, at the address listed above. Thank you for your assistance with this project. If you have any questions, please contact Edward Jakaitis by telephone at (270)758-2143 or by email at edward_jakaitis@nps.gov.

Sincerely,



Barclay Trimble
Superintendent



Jakaitis, Edward <edward_jakaitis@nps.gov>

Mammoth Cave National Park, review of Section 106 undertaking

3 messages

Jakaitis, Edward <edward_jakaitis@nps.gov>

Tue, May 21, 2019 at 9:45 AM

To: syerka@nc-cherokee.com

Cc: Timothy Pinion <timothy_pinion@nps.gov>

Dear Mr. Yerka,

Please see the attached correspondence regarding a proposed Section 106 undertaking, to construct family cabins and improve site access at Mammoth Cave National Park. Should a request for consultation with Mammoth Cave National Park be made, please contact me at your earliest convenience.

Sincerely,
Ed Jakaitis

--

Edward Jakaitis
Cultural Resource Program Manager
Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, KY 42259
(o)270-758-2143
(c)270-597-6349
edward_jakaitis@nps.gov

**FIND YOUR
PARK****MACA_Family Cabins_Section 106 Initiation Letter_Eastern Band of Cherokee.pdf**
2044K**Stephen Yerka** <syerka@nc-cherokee.com>

Tue, May 21, 2019 at 6:01 PM

To: "Jakaitis, Edward" <edward_jakaitis@nps.gov>

Cc: Timothy Pinion <timothy_pinion@nps.gov>

Thank you Mr. Jakaitis,

For inviting the EBCI THPO to be a consulting party for the proposed 106 project to construct family cabins and improve access to Mammoth Cave National Park. The EBCI THPO accepts your invitation and looks forward to engaging with you on this project.

I am in the field right now and responding from my phone. Should you need a more formal letter response, I can provide it to you when I am back in the office.

Thank you,
Stephen

Stephen Yerka
Historic Preservation Specialist
THPO, EBCI
(828) 359-6852

[Quoted text hidden]

<MACA_Family Cabins_Section 106 Initiation Letter_Eastern Band of Cherokee.pdf>

Jakaitis, Edward <edward_jakaitis@nps.gov>
To: Stephen Yerka <syerka@nc-chokeee.com>

Fri, May 31, 2019 at 5:55 PM

Dear Stephen,

I wanted to touch base with you and acknowledge our receipt of your acceptance for consultation. Seeing as this is the end of the week, I would like for us to arrange a discussion some time in the next week or so and I can provide you with some general information on the project, but also learn from you what topics of interest the tribe may have with the family cabins project. I can then gather some specific information that will be most beneficial to the EBCI's interests.

I should also note, I will be participating in a field studies course here at the park, running through all of next week. I will continue to have access to my email, but will be out of phone contact for much of my days next week. But, I would be happy to speak with you to kick start our discussions, during most evenings next week between 6pm-7pm CST. Thursday, I will be available from 5pm-6pm. If this will not work, just let me know and we can speak that following Monday (6/10), any time you like.

Thanks for your interest on behalf of the Eastern Band of Cherokee and if I can offer any information sooner than next week, let me know or feel free to call my cell, listed in my signature.

Kind Regards,
Ed Jakaitis

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GWYJ DBP
CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948 • 918-453-5000 • cherokee.org

Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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June 18, 2019

Edward Jakaitis
National Park Service
Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, KY 42259

Re: Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park

Mr. Edward Jakaitis:

The Cherokee Nation (Nation) is in receipt of your correspondence about **Proposed Project to Construct Family Cabins and Improve Site Access at Mammoth Cave National Park**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this proposed project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the National Park Service (NPS) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the Nation requests that the NPS conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389



Jakaitis, Edward <edward_jakaitis@nps.gov>

[EXTERNAL] Family Cabins Letter: Can You Clarify?

5 messages

Ryall, Jennifer (Heritage Council) <Jennifer.Ryall@ky.gov>
To: "Jakaitis, Edward" <edward_jakaitis@nps.gov>

Mon, Jun 17, 2019 at 9:36 AM

Hey Ed,

I reached the point in your letter regarding the family cabins where you state that, "The NPS intends to use the NEPA process to comply with Section 106 of the NHPA." Just to be sure we understand completely, is NPS actually proposing substitution (this might be our office's first project where true substitution is proposed) or are you proposing parallel Section 106 and NEPA consultation (the latter being more standard)? We'll be fine either way, but substitution isn't used often and we want to be sure everyone understands what we're getting into.

Thanks,

~Jenn

Jennifer Ryall

Environmental Review Coordinator

Kentucky Heritage Council

410 High Street

Frankfort, Kentucky 40601

Phone: (502) 892-3619

Jakaitis, Edward <edward_jakaitis@nps.gov>
To: "Ryall, Jennifer (Heritage Council)" <Jennifer.Ryall@ky.gov>

Tue, Jun 18, 2019 at 3:29 PM

Jenn,

Yes, that is correct. We do intend to consult under the NEPA process, with the identification, evaluation of significance, and finding of effect included in the EA document and review process. We would be sending this document to your office at the same time that the US Fish and Wildlife Service will be receiving their own copy. We will take all comments as they come and your office will still be afforded the thirty day review period. If you have any questions or concerns regarding this process for us, please let me know. I do not anticipate any divergence from the previous review and comment process that we have gone through with other projects, to this point.

Thank you,

Ed

[Quoted text hidden]

--

Edward Jakaitis
Cultural Resource Program Manager
Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, KY 42259
(o)270-758-2143
(c)270-597-6349

edward_jakaitis@nps.gov**FIND YOUR
PARK**

Mail Delivery System <Mailer-Daemon@smtp6.smgr.doi.gov>
To: edward_jakaitis@nps.gov

Tue, Jun 18, 2019 at 3:29 PM

I'm sorry to have to inform you that your message could not be delivered to one or more recipients. It's attached below.

For further assistance, please send mail to [<postmaster@doi.gov>](mailto:postmaster@doi.gov).

If you do so, please include this problem report. You can delete your own text from the attached returned message.

<Jennifer.Ryall@ky.gov>: 502 4.4.2 Error: Connection lost to forwarding agent.
451 4.4.2 Error: Connection lost to forwarding agent.

Final-Recipient: rfc822; Jennifer.Ryall@ky.gov
Status: 5.4.2
Action: failed
Last-Attempt-Date: Tue, 18 Jun 2019 16:29:40 -0400
Diagnostic-Code: smtp; 502 4.4.2 Error: Connection lost to forwarding agent.
451 4.4.2 Error: Connection lost to forwarding agent.

----- Forwarded message -----

From: "Jakaitis, Edward" <edward_jakaitis@nps.gov>
To: "Ryall, Jennifer (Heritage Council)" <Jennifer.Ryall@ky.gov>
Cc:
Bcc:
Date: Tue, 18 Jun 2019 15:29:27 -0500
Subject: Re: [EXTERNAL] Family Cabins Letter: Can You Clarify?
Jenn,

Yes, that is correct. We do intend to consult under the NEPA process, with the identification, evaluation of significance, and finding of effect included in the EA document and review process. We would be sending this document to your office at the same time that the US Fish and Wildlife Service will be receiving their own copy. We will take all comments as they come and your office will still be afforded the thirty day review period. If you have any questions or concerns regarding this process for us, please let me know. I do not anticipate any divergence from the previous review and comment process that we have gone through with other projects, to this point.

Thank you,
Ed

On Mon, Jun 17, 2019 at 9:36 AM Ryall, Jennifer (Heritage Council) <Jennifer.Ryall@ky.gov> wrote:

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Thanks,

~Jenn

Jennifer Ryall

Environmental Review Coordinator

Kentucky Heritage Council

410 High Street

Frankfort, Kentucky 40601

Phone: (502) 892-3619

--

Edward Jakaitis
Cultural Resource Program Manager
Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, KY 42259
(o)270-758-2143
(c)270-597-6349
edward_jakaitis@nps.gov

**FIND YOUR
PARK**



 **Re [EXTERNAL] Family Cabins Letter Can You Clarify**
11K

Jakaitis, Edward <edward_jakaitis@nps.gov>
To: "Ryall, Jennifer (Heritage Council)" <jennifer.ryall@ky.gov>

Tue, Jun 18, 2019 at 3:30 PM

[Quoted text hidden]

Ryall, Jennifer (Heritage Council) <Jennifer.Ryall@ky.gov>
To: "Jakaitis, Edward" <edward_jakaitis@nps.gov>

Tue, Jun 18, 2019 at 3:34 PM

Sounds good! This will just be a bit of a new one for us so I wanted to make sure we're on the same page. It sounds like we are and that you're handling substitution as it's laid out in the Regs (informing us in advance, giving us the chance to comment, having the consultation reflected in the EA). I always look forward to working through a different type of consultation process.

~Jenn

Jennifer Ryall

Environmental Review Coordinator

Kentucky Heritage Council

410 High Street

Frankfort, Kentucky 40601

Phone: (502) 892-3619

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As the nation's principal conservation agency, the Department of the Interior has responsibilities for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for American Indian reservation communities and for people who live in island territories under US administration.