

National Park Service
U.S. Department of the Interior

Mammoth Cave National Park



Comprehensive Trail Management Plan 2007





Comprehensive Trail Management Plan

2007

Produced by the Office of the Superintendent
Mammoth Cave National Park
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National Park Service
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Draft

Opposite: The colorful and harmless almond-scented millipede, *Harpaphe haydeniana*, is often found along the park's trails.



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Introduction

This Comprehensive Trail Management Plan is as an overall framework for managing the surface frontcountry and backcountry trails within Mammoth Cave National Park (Park) over the next 10 years. The Green River bisects the 52,830 acres of the park; frontcountry trails are located south of Green River and backcountry trails are located north of Green River.

Beginning with establishment of the Park in 1941, there has been continued development, interest in, and use of park trails. A series of hiking and walking trails in the vicinity of the Historic Entrance to Mammoth Cave and the visitor center/hotel complex developed early in the history of the Park, and gradually expanded to more than five miles. Officially sanctioned backcountry use began in 1974 when the first trails, campsites, and parking areas north of Green River were developed, which soon exceeded 50 miles in length. Since inception, the trail system has become a popular destination for hikers, backpackers, horseback riders, and recently bicyclists.

The Park currently has a total of approximately 85 miles of trails (Figure 1). Park trails include some park administrative roads, which are open to hikers and bicyclists. (Administrative roads are generally gravel-based roads that are closed to public vehicular traffic; some are now used as trails as well as for various park management purposes). While all trails are open to hiking, approximately 50 miles are open to horses, and approximately 28 miles are open to bikes. (The length of backcountry campsite connector trails and some short spur trails are not included in this mileage count.)

From 2005 to 2007, the NPS constructed a 9-mile graveled hiking and biking trail on the south side, following the general route of a historic railroad bed leading from the Visitor Center to Park City. This trail, the Mammoth Cave Railroad Bike and Hike Trail, was constructed utilizing modern technology and sustainable design. It receives significant use by both hikers and bikers on a daily basis.

Increased trail use in the last 20 years, along with a decrease in the Park's ability to maintain trail conditions, have spurred Park management to greatly expand Mammoth Cave's volunteer program. Together, the Park and volunteers have

completed a number of major projects aimed at improving overall conditions of the frontcountry and backcountry trails, decreasing recreational impacts, and increasing user satisfaction on trails.

Park trail users are generally represented by three local organizations: the Mammoth Cave Equine Trail Riders Association; the Bowling Green League of Bicyclists; and the Mammoth Cave Chapter of the Sierra Club. In 2005, Park management invited these three groups to form a single coalition, the Mammoth Cave Backcountry Summit Council, to facilitate exchange of information directly with each other and the Park. This group has since met periodically, and has found common ground on a number of issues, including enhancing resource protection, and supporting the maintenance/sustainability of all trails in the Park.

In 2007, the Park received approximately 630,000 visitors; 379,098 of them toured Mammoth Cave. As for frontcountry trails, 27,062 people used these trails for hiking or bicycling. Backcountry trails received a total of 16,924 visitors, by way of foot, horse, and bicycle. In 2007, a total of 43,986 visitors used park trails, an increase of 23% over 2006.

Building upon this increased focus on the backcountry, the Park initiated creation of this Plan in the spring of 2006 to develop a strategy for the management of the trail system in the Park.

A draft Environmental Assessment (EA) was prepared in conjunction with this Plan. One of the primary purposes of an EA is to review all of the environmental impacts of the actions proposed in the Plan. Specific alternatives were evaluated based on how effectively they contribute to achievement of the mission requirements and strategic goals established for the Park through legislation and policy.



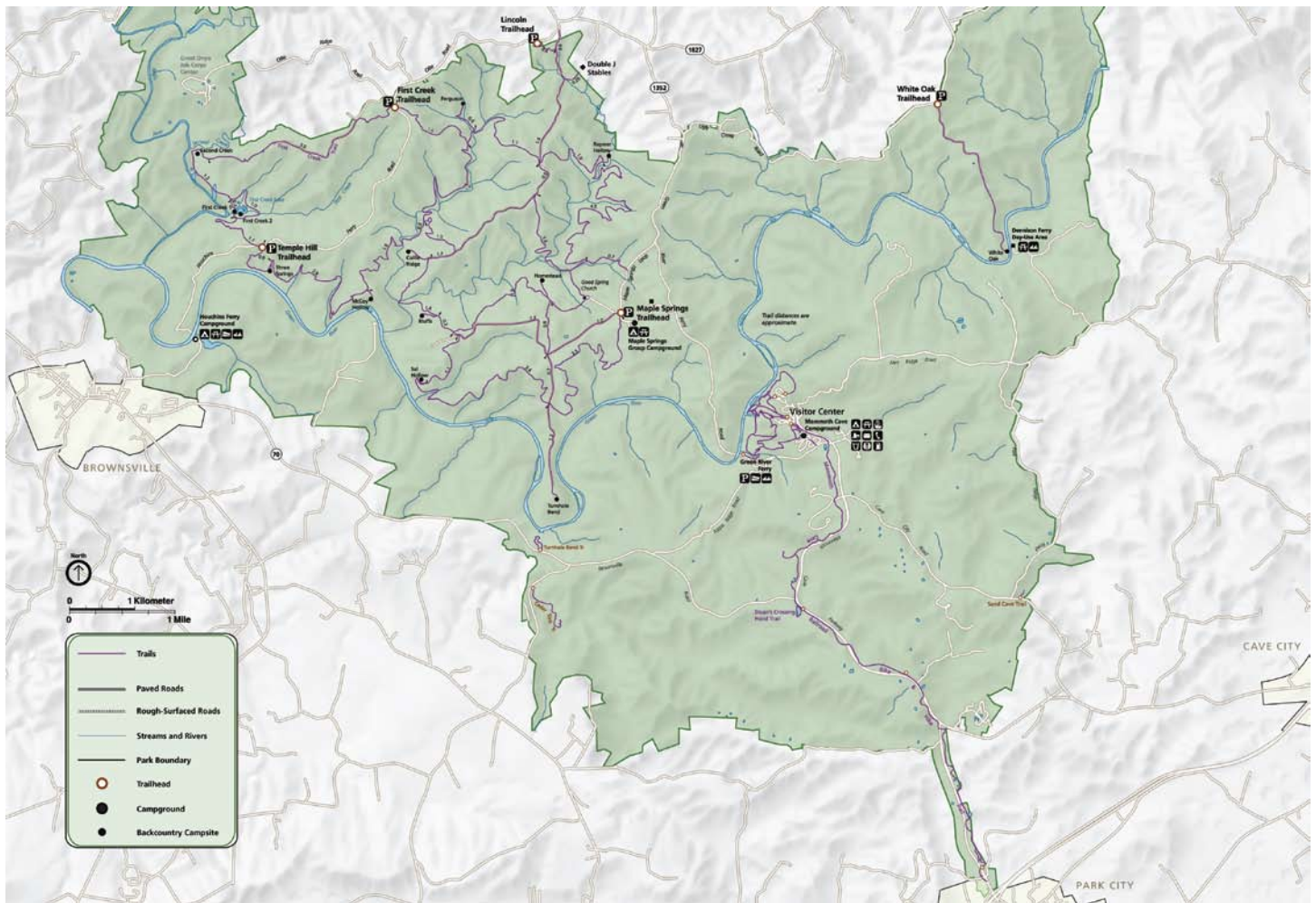


Figure 1. Existing Trails, Spring 2007

The draft Plan and accompanying EA were prepared after a public meeting on June 29, 2006, and after a public comment period regarding the scope of the Plan between June 29 and July 14, 2006. Public input and comments were considered in the development of the draft Plan and accompanying EA.

While comprehensive, this Plan is not all inclusive. The 31 river-miles (Green and Nolin) are not included as part of this Plan, nor are backcountry campsites. This Plan addresses most current trail management issues; however, Park management recognizes the need to review and update the Plan in out years.

Purpose and Need

The sustainability of Park trails is at a critical point. This Plan is needed as a strategic tool to plot the course of trail management in the coming years.

The broad purpose of the Plan is to identify management objectives and strategies to guide the protection, management, and use of the trails within Mammoth Cave National Park over the next 10 years, and to identify management objectives.

The Plan addresses four topics which were identified as the scope of primary issues regarding trails and related facilities at Mammoth Cave National Park. Questions related to the scope are listed here; the complete Project Scope Statement is attached to the Plan as Appendix 1. Note that mileages listed in this Plan are GPS-accurate and may vary slightly from those listed in the Scope, as some GPS work was done after the Scope was issued. Funding, labor, and trail design/management are major considerations for each issue.

“Visitor satisfaction is declining and safety concerns are growing as a result of problems with erosion, inadequate signage, and social trail development.”

Visitor Use Issues

- Do existing trails meet the needs and desires of the public?
- Which user group(s) should use which trails?

Facilities Issues (trails, parking lots, restrooms, etc.)

- Are existing trails adequate, in terms of length and type?
- What, if any, new trails would be desirable?
- Are existing trailhead parking lots adequate? What are future needs? Should new lots be considered; should existing lots be expanded/improved?
- Are other trail-related facilities adequate?
- How should the Maple Springs complex, and related parking lot and trailheads be connected by trails?

Maintenance Issues

- What is the best approach for maintaining existing park trails?
- If any new trails are recommended, what is the best approach for their maintenance?

Administrative Issues

- How do we keep track of numbers of visitors; what extent of accounting is adequate; what do we need and want?
- How can communications between the NPS and visitors regarding safety and resource protection be most efficiently achieved? How do we maximize compliance with regulations?
- Should we consider restricting trail use during extended periods of wet weather?

- To what extent, if any, should the park service address the possible future need and feasibility of implementing a fee and/or permit system regarding trail use?

The staffing levels of Mammoth Cave National Park are diminishing and the real buying power of the budget has not kept pace with inflation. As stated in the Park Business Plan (2003), trail upkeep is one of the areas of greatest concern regarding the Park’s annual funding shortfall: “Visitor satisfaction is declining and safety concerns are growing as a result of problems with erosion, inadequate signage, and social trail development.”

With the limited funds and manpower available, the Park must develop new and innovative ways to design and manage trails. Construction and maintenance of Park trails must conform to sustainable standards. Trail conditions correlate in part to their design; the time and cost of upkeep is dramatically less on trails built in a sustainable manner.

Volunteers will also play a key role in future trail management. The Mammoth Cave Backcountry Summit Council has provided volunteer labor for several backcountry trail workdays on a variety of trail projects. Other groups, including the American Hiking Society, the Student Conservation Association, Wilderness Volunteers, Target Store volunteers, Scouts, and high school/college organizations, have poured their sweat-equity into Mammoth Cave trail projects. Mammoth Cave staff will continue to aggressively pursue volunteer workers and groups.

Coneflower at Eagle Prairie, an native prairie restoration site in the park.





Top: A "sodastraw" stalactite, growing as water drops deposit calcite - a process that can take decades per inch.

Above: The cave crayfish *Orconectes*. Such creatures rely on special adaptations to survive in the perpetual darkness of the cave.

Overall, this Plan seeks to ensure that management of Mammoth Cave's surface trails aligns with the Organic Act which established the National Park Service in 1916:

"...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Park Significance

Mammoth Cave National Park, established as a national park in 1941, and designated as a World Heritage Site in 1981 and as an International Biosphere Reserve in 1990, is internationally renowned for the following.

- The many types of geologic features are the products of a unique set of conditions found nowhere else. Mammoth Cave is the core of one of the best-understood karst areas in the world.
- The Park provides an abundance of recreation opportunities, surface and subsurface.
- It contains a part of the longest known cave system in the world.
- The Park and the surrounding area are believed to support one of the most diverse cave biota in the world, with 138 species that use the cave on a regular basis, some of which are found nowhere else.
- The saltpeter works in Mammoth Cave are a good example of a technology that was important in the early history of the United States.
- The Park contains an unusual variety of ecological niches that provide habitat for an abundance of plants and animals, including protected and endangered species.
- The Park contains a rich diversity of flora reflected in remnant prairie and old growth communities.
- The Park contains a quantity of primary cultural resources, which have been valuable in the understanding of human interaction with the natural environment prehistorically from the paleo-Indians to the Mississippian period, and historically from early settlement (1774-1825) to the depression era (1929-1941).¹

Mission Statements

The following mission statements were created as broad statements of the mission requirements established by Congress in the Acts that created the National Park Service and Mammoth Cave National Park.

National Park Service Mission

The National Park Service preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration, of this and future generations. The Service cooperates with partners to extend the benefits of natural and cultural resources conservation and outdoor recreation throughout this country and the world.²

Mammoth Cave National Park Purpose

The purpose of Mammoth Cave National Park is to protect and preserve for the future the extensive limestone caverns and associated karst topography, scenic riverways, original forests, and other biological resources, evidence of past and contemporary lifeways; to provide for public education and enrichment through scientific study; and to provide for development and sustainable use of recreation resources and opportunities.³

Legislative History

The purpose of Mammoth Cave National Park was established by specific enabling legislation.⁴ It includes the text of the legislative acts as well as related reports and speeches that were prepared in support of the legislation. In one of these speeches, Congressman Maurice H. Thatcher summarized the purpose of the proposed park.

"The area called for in the Bill will insure a great recreational ground, most advantageously located, where, in spring, summer, and fall thousands of our people may find—in addition to the pleasure and interest derived from an inspection of the caves and their many features of interest—the most delightful outdoor recreation in boating and fishing on Green and Nolin Rivers, lovely, navigable streams flowing for miles through the proposed park, and in traversing the picturesque and rugged hills and valleys and great forests of the region included in the proposed park area."⁵

“... all parks are complex mixtures of values and resources, each with its own unique qualities and purposes, each requiring specific treatment”

Park Planning Requirements

The hierarchy of National Park Service required plans was modified in 1998, in part, to integrate the requirements of the Government Performance and Results Act of 1993.⁶ That hierarchy now includes four basic types of plans: general management plans, strategic plans, implementation plans, and annual performance plans including annual performance reports.

General management plans focus on why the park was established and what resource conditions and visitor experiences should be achieved and maintained over time. They cover a 15 to 20-year time frame. Strategic plans focus on understanding a park’s capability to set and meet mission-oriented, long-term goals over a period of five years taking into account its fiscal and human resources. Park level strategic plans must be based on the Servicewide Strategic Plan. Implementation plans focus on how to implement an activity or project in order to achieve a long-term goal, and usually include a level of detail and analysis that would be inappropriate for general management plans and strategic plans. Implementation plans often require formal analysis of alternatives in compliance with the National Environmental Policy Act and other legislative requirements. Annual performance plans consist primarily of annual goals and work plans followed by annual performance reports.⁷

This Comprehensive Trail Management Plan is an implementation plan. Specific requirements for backcountry recreation management and planning are contained in Chapter 3 of the National Park Service Guideline Natural Resources Management: Resource Manual-77 and in Chapter 8 of the National Park Service Management Policies. The basic function of planning in the National Park Service is to ensure that the mission of the agency and the park is carried out efficiently and effectively.

The National Park Service may permit commercial services that are not in derogation of park purposes or values and that provide recreational opportunities for visitors, contribute to visitor enjoyment of park resources, and support or achieve applicable management objectives.¹ Any restrictions [on visitor use] will be based on a determination by the superintendent that such measures are consistent with the park’s enabling legislation and are needed either to prevent derogation of the values and purposes for which

the park was established or to minimize visitor use conflicts.²

The NPS *Management Policies* recognize that all parks are complex mixtures of values and resources, each with its own unique qualities and purposes, each requiring specific treatment in the development and implementation of management strategies and operational plans.³ NPS policy recognizes that providing for visitor recreational use has been a fundamental purpose of NPS areas since the establishment of Yellowstone National Park in 1872.⁴

NPS Management Policies and Guidelines

NPS Management Policies (2006) provide additional guidance for backcountry management. Following are excerpts relevant to trail management.

The National Park Service will encourage recreational activities that are consistent with applicable legislation, that promote visitor enjoyment of park resources through a direct association or relation to those resources, that are also consistent with the protection of resources, and that are compatible with other visitor uses.⁸

Mission Goals

The mission goals for the Park were established in its strategic plan that was completed in 2006 in compliance with National Park Service policy and the Government Performance and Results Act of 1993.⁹ Mission goals are conceptual descriptions of desired future conditions. They are inclusive, and are intended to last indefinitely. The entire text of the mission goals is repeated below because they are all relevant to management and use of park recreation resources.

Preserve Park Resources

- The Park’s natural and cultural resources are managed as defined by legislation within the context of its status as a World Heritage Site and International Biosphere Reserve.
- Mammoth Cave National Park serves as the core of a broad scientific and scholarly research effort that is applied directly to management decisions and contributes to the general knowledge base of social and natural processes of karst ecosystems.

The Mammoth Cave Railroad Bike & Hike Trail has become popular with local families and groups.





Reflective blazes help guide trail users through the backcountry in all seasons.

Provide for the Public Enjoyment and Visitor Experience of Parks

- Visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.
- Through interpretive programs, educational programs, and publications, the value of Mammoth Cave National Park's cultural and natural resources will be conveyed to Park constituents in the context of World Heritage and International Biosphere Reserve status.

Strengthen and Preserve Natural and Cultural Resources and Enhance Recreational Opportunities Managed by Partners

- Heritage resources within the Mammoth Cave National Park sphere of influence are conserved through partnerships that increase support and understanding of their significance.
- Mammoth Cave National Park will strive to strengthen the relationship between the park and its stakeholders through the promotion and involvement in formally sponsored external programs.
- Recreation opportunities in the region will be enhanced through the promotion of Heritage Tourism in cooperation with state and local officials, individuals, and organizations.

Ensure Organizational Effectiveness

- Mammoth Cave National Park will become more productive utilizing the best available

technology, management systems, and practices.

- Mammoth Cave National Park will increase its capabilities through initiatives and support from other agencies, organizations, and individuals.

Management Objectives

Visitor Use Issues

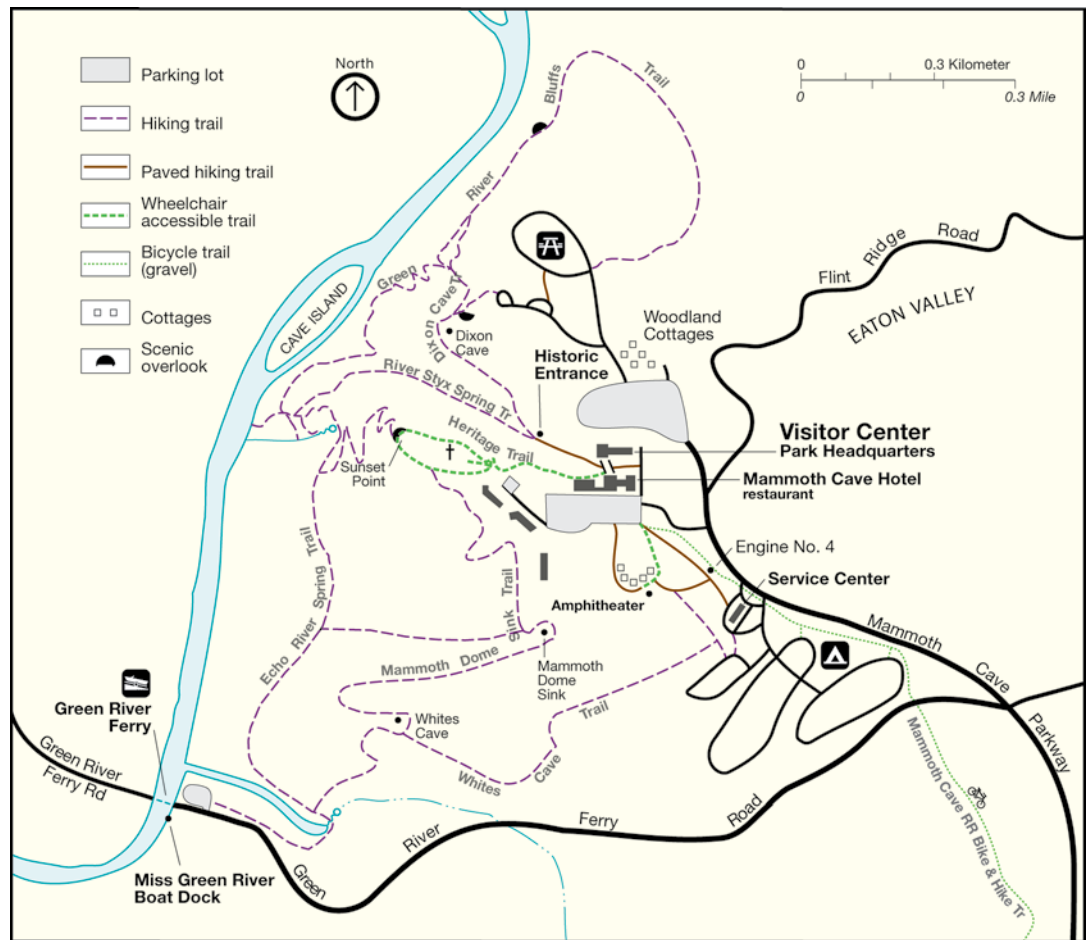
- Implement the decisions made in this Plan on the appropriate and permitted types of use for all trails.
- Promulgate a special regulation to legally define the parameters of bicycle use.

Facilities Issues

- Develop design proposals for improving the Maple Springs Trailhead and parking area.
- Establish a connector trail within the Maple Springs complex.
- Eliminate the trailhead and trail access from the Good Spring United Baptist Church yard.
- Widen and improve the connector trail between the Lincoln Trailhead and the Collie Ridge Road.
- Develop design proposals for improving the Lincoln Trailhead and parking area.
- Complete modest parking area improvements at the First Creek Trailhead.



Figure 2 –Trails South of the Green River near the Visitor Center complex



- Complete modest parking area improvements at the Temple Hill Trailhead.
- Develop small pull-off parking areas on Flint Ridge Road to facilitate biking and hiking use on Great Onyx and Crystal Cave Roads. Develop a small pull-off parking area at White Oak Trailhead.
- Study the potential of other trail proposals such as the extension of the Mammoth Cave Railroad Bike & Hike Trail; such proposals would balance visitor use interests with resource protection, and would be in accordance with the park's enabling legislation.
- Continue with installation of horse hitch-posts at key areas along trails.
- Continue improving and installing trail signage.
- Encourage and support continued volunteer participation in trail maintenance activities by all user groups, and continue to support and work with the Mammoth Cave Backcountry Summit Council as an umbrella organization to coordinate and promote trail-related volunteer activities.
- Seek funding to re-establish a park trail maintenance crew.
- Develop and document (in NPS Facilities Maintenance Management System) a maintenance program on all trails, and implement the program in the field by targeting and requesting appropriate funding through appropriate channels.

Maintenance Issues

- Integrate sustainability into design, construction, and maintenance of trails, trailheads, and related facilities.



Trails North of the Green River	
Trail Name	Approximate length (miles)
Blair Springs Branch	1.2
Buffalo Trail	2.8
Collie Ridge Trail	5.0
First Creek Trail	6.8
Good Spring Trail (North)	2.1
Good Spring Trail (South)	4.8
McCoy Hollow Trail	6.1
Raymer Hollow Trail	6.9
Sal Hollow Trail	8.1
Turnhole Bend Trail	2.7
Wet Prong/McCoy Hollow (spur trail)	0.5
Wet Prong Trail	5.7
White Oak Trail	2.4
Mill Branch Trail	0.7
Total	55.8
<i>(Campground access trails and some short spurs not listed).</i>	

Trails South of the Green River	
Trail Name	Approximate length (miles)
Cedar Sink Trail	0.9
Sand Cave Trail	0.1
Sloans Crossing Walk	0.4
Turnhole Bend Trail	0.5
Dixon Cave Trail	0.4
Echo River Spring Trail	1.1
Green River Bluffs Trail	1.4
Mammoth Dome Sink Trail	1.4
River Styx Spring Trail	0.6
Heritage Trail	0.6
Mammoth Cave Railroad Bike and Hike Trail	9.0
Campground Trail	0.6
Old Guide's Trail	0.1
Sunset Point Trail	0.3
Crystal Cave Road	2.0
Great Onyx Cave Road	1.5
Licklog Road	1.0
Doyle Valley Road	1.0
Total	23.0
<i>(Some short connector trails not listed).</i>	

Administrative Issues

- Provide current and consistent trail information to visitors at all trailheads, in appropriate publications, and at the Visitor Center.
- Develop and implement a program to monitor visitor satisfaction of park trails.
- Implement a recurring trail resource monitoring program.
- Continue to utilize an accurate system for measuring visitor use.
- Using Comprehensive Condition Assessment data, continue to create project descriptions and cost estimates and submit requests for trail-related program funding needs through the NPS Project Management Information System.
- Review this Plan and update management objectives periodically.

Appropriate Uses of Trails and Facilities

Possible uses were evaluated on their intrinsic impacts on park resources and visitor safety, potential for unacceptable conflicts with other users, the Park's ability to provide and maintain facilities and services, and what types of uses, services, and facilities are permitted under applicable laws and policies. The service and convenience facilities that would be more appropriately located outside the Park are also listed.

Appropriate Trail Uses

- Foot travel
- Horseback riding and pack stock (includes all equines, and other pack animals)
- Bicycling (recreational and mountain biking)
- Cross-country skiing, snow-shoeing, etc. on the rare occasions when there is enough snow to support these activities
- Motorized wheelchairs and similar devices allowing reasonable access for the mobility impaired
- Horse-drawn devices allowing reasonable access for the mobility impaired

Inappropriate Trail Uses

- Motorized vehicles
- Skateboards, roller skates, roller blades
- Horse-drawn wagons, carts



Miles of trails on the South Side lead to cave entrances, overlooks, springs, and ponds.



Park staff install horse ties and other facilities for backcountry users.

Trail-Related Services/Facilities More Appropriately Located Outside the Park

- Horse liveryes
- Any other services and facilities that support appropriate park uses other than primary park concessions

Commercial Services

Commercial services must be both necessary and appropriate and are provided either through concessions contracts or through Commercial Use Authorizations.

Commercial Use Authorizations permit the NPS to authorize private individuals and entities to provide some commercial services to park areas. There are two types of Commercial Use Authorizations: 1) in-park services originate and are provided solely within a park area, and do not generate annual gross receipts of more than \$25,000 for the concessioner; and 2) out-of-park services, originate and terminate outside of park areas, regardless of annual receipts for the concessioner, and the use of park areas is incidental to the services. In either circumstance, construction of structures, fixtures, and improvements on park land is not permitted. The role of the National Park Service is to insure that competent services are provided to park visitors, and authorizations may be revoked when there is a failure to provide adequate services.

In 2006-07, there was one business providing trail-related commercial services in the park. This business provides guided horseback rides into the park and has afforded access to the backcountry to visitors who otherwise may not have been able to visit the backcountry by horseback, and/or visitors who are seeking a horseback riding experience, but do not have access to a horse and trailer. This commercial service is considered an appropriate service. A similar service considered appropriate under this Plan is a bicycle-rental service for use on approved bicycle trails.

While not under a Commercial Use Authorization, a private business, D-Bar-K Horse Camp, opened adjacent to the park in fall of 2006, providing camping and equestrian services. Users of this camp access the park via the Lincoln Trailhead.

Appropriate Trail-Related Facilities

- Trailheads, parking areas
- Hitch posts
- Picnic tables/trash cans/restrooms (trailheads only)
- Bicycle rentals

Inappropriate Trail-Related Facilities (Includes unnecessary facilities)

- Permanent structures other than restrooms
- Any other facilities not specifically listed as appropriate



Existing Trails

The Park has approximately 85 miles of trails open to hikers. Some of these trails are also administrative roads. While all trails are open to hiking, approximately 50 miles of trail are open to horses, and approximately 28 miles of trail are open to bicycles. (The length of backcountry campsite connector trails and some short spur trails are not included in this mileage count.)

Frontcountry Trails South of Green River

The frontcountry of the park holds approximately 23 miles of above ground trails, including administrative roads.

The area south of Green River is the primary visitor use area of the Park. Several trails are in the proximity of the Visitor Center complex, adjoining the hotel, campground, and picnic area (Figure 2). Southside trail use includes hikers and bicyclists, and several trails are wheelchair-accessible. No horse use is permitted south of Green River.

Frontcountry trails are each two miles in length or less (with the exception of the nine-mile Mammoth Cave RR Bike and Hike Trail), and provide access to natural and historic features of the park, such as Cedar Sink and Sand Cave. All southside trails are tied to interpretive themes and feature wayside exhibits that complement

and enhance the story of Mammoth Cave National Park.

Hiking is allowed on all southside trails. Hiking and biking are permitted on four Administrative roads south of Green River, including Crystal Cave Road, Great Onyx Cave Road, Licklog Road, and Doyle Valley Road; each road is one to two miles in length.

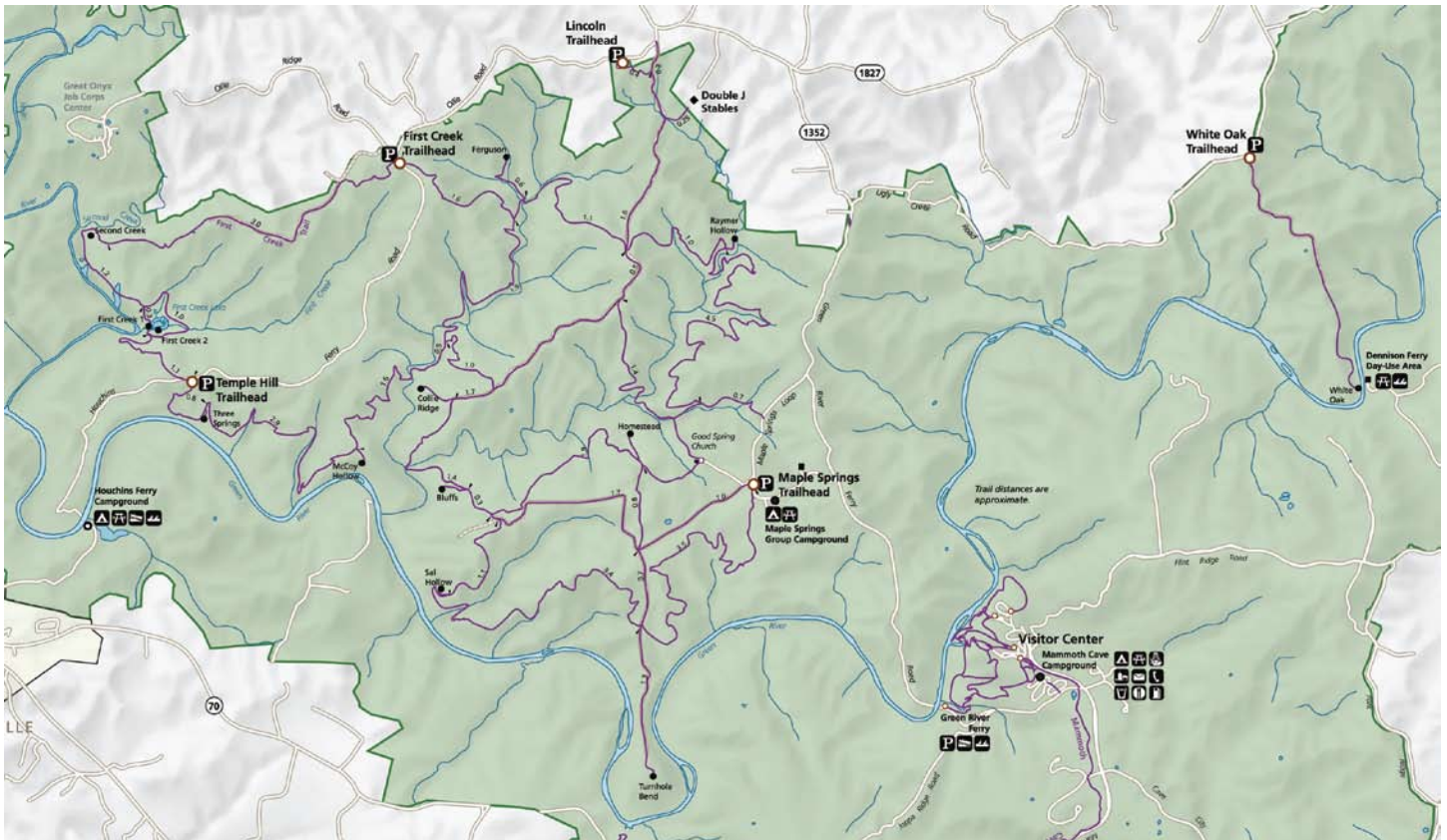
In late 2007, the nine-mile Mammoth Cave Railroad Bike and Hike Trail(a wide, graveled trail) was completed. This trail will connect to historic Bell's Tavern upon completion of Park City's bike trail. There is interest from the communities of Cave City and Brownsville to construct similar bike trails that may connect with the Mammoth Cave Railroad Bike and Hike Trail.

Backcountry Trails North of Green River

Over 55 miles of trails are located north of the Green River (Figure 3). Currently seven trailheads provide access to these trails. Existing trailheads include: First Creek, Temple Hill, Lincoln, Double J, Maple Springs, Good Spring, and White Oak.

All trails on the north side of the river are currently open to hiking and horseback riding, except Sal Hollow Trail which was temporarily closed to horses in 2004. In 1999, approximately 13 miles of trails were opened to mountain biking on an experimen-

Figure 3. Existing trails north of Green River



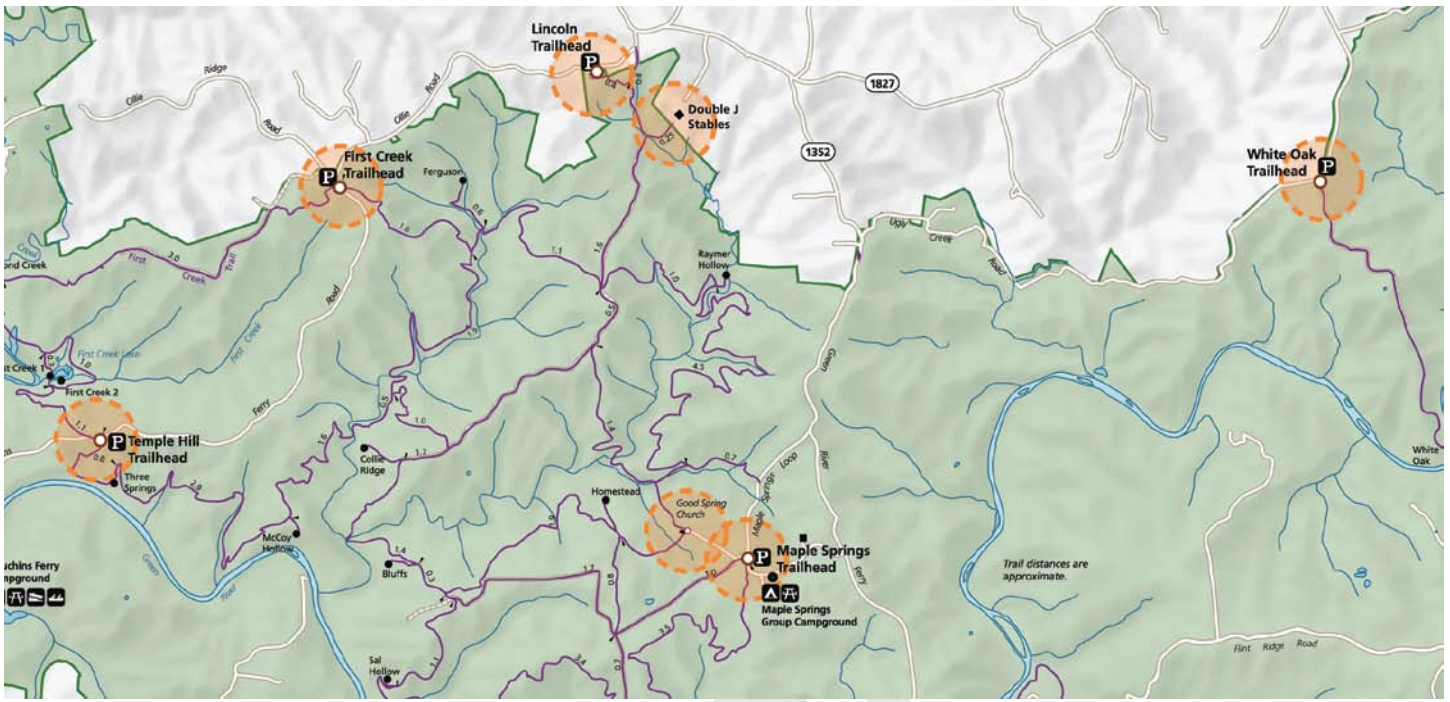


Figure 4. Northside trailheads.

tal basis, while continuing to allow the traditional hiking and horseback riding on the same trails. These trails included all of Sal Hollow and Buffalo Trails, and part of Turnhole Bend Trail.

Cross-country or off-trail travel using horses or other pack stock or bicycles is not permitted. Cross-country hiking is permitted anywhere in the park, but is not encouraged due to the rugged conditions off-trail, karst terrain, and the complex geography of the hilly country.

Trailheads North of Green River

During the scoping process for this Plan, parking areas and trailheads were identified as one of the primary facility issues in need of assessment, particularly north of the Green River. Specifically, a number of public comments expressed a need to increase trailhead parking.

Presently, there are seven trailheads located on the northside of the park. (Figure 4) The status and capacity of each trailhead were evaluated based on field visits to assess visitor use patterns in 2006 (see Appendix 3). This assessment indicated that the parking lots at some of existing trailheads filled up to capacity on a few days out of the year, and even on these days, parking was available at other trailhead parking locations.

One trailhead access location is on private property owned by Double J Stables. Double J Stables provides guided trail rides for a fee inside the park under the terms of a Commercial Use Authorization, and also offers camping, refreshments, and day-use parking on their own premises.

Administrative Roads

Numerous administrative roads are located within Mammoth Cave National Park. Administrative roads are closed to public vehicular traffic, but are not generally otherwise closed to visitors. Such roads provide government access to undeveloped areas for official activities such as maintenance, firefighting, research, and search/rescue. The following administrative roads have been designated for inclusion in the Park's trail system:

- **Northside:** Collie Ridge, First Creek, Buffalo, Turnhole Bend, and White Oak
- **Southside:** Crystal Cave, Great Onyx, Licklog, and Doyle Valley

In March 2005, the National Park Service entered into a General Agreement with the International Mountain Bicycling Association which allows biking on such roads where indi-



vidual parks have determined it is acceptable.¹⁰ The definition herein of an administrative road is as stated in the NPS Memorandum dated May 5, 2005, notifying parks of the above mentioned Agreement,¹¹ (“...and administrative roads [those closed to public motorized use] outside of developed zones...”). The goal of this action was to provide high quality bicycling opportunities for visitors to enjoy the National Park System in appropriate areas and in a manner consistent with NPS stewardship responsibilities. Under this agreement, Mammoth Cave National Park opened four southside administrative roads to bicycle use: Crystal Cave Road, Great Onyx Road, Licklog Road, and Doyle Valley Road. Administrative roads on the north side of Green River were not opened to bicycle use under the IMBA agreement, pending the preparation and finalization of a Trail Plan. However, Buffalo Road and a portion of Turnhole Bend Road remained open to bicycles on a temporary basis, again, pending the preparation and finalization of a Trail Plan.

Current Visitor Use

In 2006, the NPS implemented a new counting system to obtain and record official numbers of visitors by types on Park trails. This system includes utilizing electronic recording technology at trailheads, and numbers officially reported by Double J Stables, who operates a horseback riding program in the Park under a Commercial Use Authorization. In 2006, a total of 35,617 trail users were reported Parkwide, which included 24,004 hikers, 9,459 horseback riders, and 2,154 bicyclists. In 2007, visitor use increased by over 23%, to 43,986 trail users parkwide, which included 31,170 hikers, 9,088 horseback riders, and 3,728 bicyclists.

Alternatives Proposed Under This Plan

During the scoping phase of the development of this Plan, four key issues were identified as primary areas to be addressed. As described in Appendix 1, the four key issues in the Plan are: 1) Visitor Use Issues; 2) Facility Issues; 3) Maintenance Issues; and 4) Administrative Issues.

The goal of this action was to provide high quality bicycling opportunities for visitors to enjoy the National Park System in appropriate areas and in a manner consistent with NPS stewardship responsibilities.

2007 Visitor Use Reported, Trails North of Green River

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Sal Hollow Trail (Hike)	31	32	72	65	69	161	372	93	108	265	132	102	1,502
Sal Hollow Trail (Bike)	37	41	79	61	77	139	75	39	252	211	140	94	1,245
Temple Hill Trailhead (Horse)	18	26	69	55	130	149	106	27	89	105	26	31	831
Temple Hill Trailhead (Hike)	9	24	51	94	47	61	75	33	109	62	61	41	667
Good Spring Trailhead (Horse)	7	4	10	40	28	6	23	5	36	41	10	11	221
Good Spring Trailhead(Hike)	58	42	157	671	141	203	298	86	421	257	155	111	2,600
First Creek Trailhead (Horse)	36	31	68	68	179	257	247	49	301	212	112	87	1,647
First Creek Trailhead(Hike)	14	33	42	105	66	142	120	49	79	213	55	49	957
Lincoln Trailhead (Horse)	98	88	164	198	302	754	513	356	678	533	168	144	3,818
Lincoln Trailhead (Hike)	12	31	33	90	151	169	135	28	66	89	39	22	865
Double J Stables Horse Rentals	0	0	0	372	137	196	306	165	65	58	0	0	1,299
Double J Stables Day Use (Horses)	0	0	0	145	427	131	91	153	138	277	0	0	982
Total Hikers	124	162	355	1025	474	736	1000	289	783	886	442	325	6,591
Total Bikes	37	41	79	61	77	139	75	39	252	211	140	94	1,245
Total Horses	159	149	311	878	1203	1493	1196	755	1307	226	316	273	9,088
Grand Total	320	352	745	1964	1754	2368	2271	1083	2342	323	898	692	16,924



2007 Visitor Use Reported, Trails South of Green River

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Turnhole Bend Nature Trail	39	39	41	101	62	143	190	41	50	76	32	35	849
Cedar Sink	42	41	49	206	96	120	239	51	56	79	40	69	1,088
HQ Area Trails	240	222	1,110	1,476	1,162	1,835	2,959	1,820	942	1,116	576	307	13,765
Sand Cave Trail	57	41	97	144	179	235	402	225	588	313	196	149	2,626
Sloans Crossing Walk	72	110	272	462	338	316	521	212	252	213	87	76	3,249
Mammoth Cave Railroad Bike & Hike Trail(Hike)	77	124	121	162	380	372	465	279	336	301	252	133	3,002
Mammoth Cave Railroad Bike & Hike Trail (Bike)	124	124	124	124	290	301	190	190	286	433	110	110	2,406
Total Hikers	527	577	1,690	2,551	2,217	3,021	4,776	2,628	2,224	2,098	1,183	769	24,579
Total Bikes	124	124	124	124	290	301	190	190	286	433	110	110	2,483
Grand Total	651	701	1,814	2,675	2,507	3,322	4,966	2,818	2,510	2,531	1,293	879	27,062

Visitor use numbers for the trails in the Headquarters Area were estimated by taking the total number of cave tour visitors and surface activities participants each month and multiplying by 3%. The 3% multiplier has been field-checked to estimate the number of visitors using Headquarters area surface trails.

Alternatives were identified to determine how to best address these four primary scoping issues along with providing a wide range of potential actions. As a result of this process, five distinct alternatives emerged and are described below in detail.

Regarding the scoping issues of "Visitor Use Issues" and "Facility Issues," each of the five alternatives has significant differences which are outlined in the narratives under each alternative. While differences exist, there are a number of proposed actions relating to "Visitor Use Issues" and "Facility Issues" that are common to all

alternatives (except the No Action Alternative). These proposed actions are noted as being common to Alternatives 2, 3, 4, and/or 5.

Regarding the scoping issues relating to "Maintenance Issues" and "Administrative Issues," this Plan proposes a number of actions that are common to all alternatives (except the No Action Alternative). All of these proposed actions are identified in the "Trail Management Program Implementation" section of this document on page 29.



Alternative Number 1

No Action

Under the No Action Alternative, the trails, authorized uses, and facilities addressed in this Plan would remain as they currently exist.

Visitor Use Issues:

- Under this alternative, **visitor uses of the Sal Hollow Trail, the Buffalo Trail, and portions of Turnhole Bend Trail would remain as they are currently authorized.** The Sal Hollow Trail would be open only to hikers and bicycles year-round. Horse use would continue to be disallowed on the Sal Hollow Trail, but would continue to be allowed on the Buffalo Trail and the Turnhole Bend Trail.
- **No additional administrative roads**, such as the White Oak Trail, would be authorized for bicycle use.
- **All other visitor uses** of the park trail system would remain the same -- as they are currently authorized.
- **Existing parking and trailhead facilities at Maple Springs Trailhead** would remain as is and with no alterations. (Maple Springs currently has parking for six passenger vehicles and eight horse trailers.)
- **No connector trail in the Maple Springs complex would be constructed.** Horse use would continue on a portion of the Maple Springs Loop Road and the Good Spring Church Road.
- **Existing trailhead and parking facilities at the Good Spring United Baptist Church** would remain as is with no alterations. Trail access would continue from the church yard. Good Spring Trailhead currently has parking for 6 passenger vehicles. This trailhead does not have parking for vehicles with horse trailers.
- **The short connector trail between Lincoln Trailhead and Collie Ridge Trail** would remain as is. Presently, this trail is too narrow to accommodate the level of traffic it now receives. This connector trail is deeply rutted and eroded, and is in need of improvement.
- **No improvements would be made to the existing trailhead parking area at Lincoln**, which presently has 10 parking stalls both for horse trailers and passenger vehicles.
- **No improvements would be made to the existing trailhead parking area at the First Creek Trailhead**, which presently has 10 parking stalls used both for horse trailers and passenger vehicles.
- **No improvements would be made to the existing trailhead parking area at the Temple Hill Trailhead**, which is used both for horse trailers and passenger vehicles.
- **Small parking areas would not be constructed** at three locations: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead.
- Under this alternative, **the Park will not study the potential of other trail proposals** such as the extension of the Mammoth Cave Railroad Bike and Hike Trail to adjacent communities.



Draft



Alternative 1

NO ACTION

The short connector trail between Lincoln Trailhead and Collie Ridge Trail would remain as is.

Presently, this trail is too narrow to accommodate the level of traffic it now receives. This connector trail is deeply rutted and eroded, and is in need of improvement.

Existing trailhead and parking facilities at the Good Spring United Baptist Church would remain as is, with no alterations.

Trail access would continue from the church yard. Good Spring Trailhead currently has parking for 6 passenger vehicles. This trailhead does not have parking for vehicles with horse trailers.

No connector trail in the Maple Springs Complex would be constructed.

Horse use would continue on a portion of the Maple Springs Loop Road and the Good Spring Church Road.

No additional administrative roads, such as the White Oak Trail, would be authorized for bicycle use.

No improvements would be made to existing trailhead/parking area at Lincoln, First Creek, or Temple Hill Trailheads.

Each trailhead presently has only 10 parking stalls both for horse trailers and passenger vehicles.

Small parking areas would not be constructed at three locations which lack parking: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead.

Visitor uses of Sal Hollow Trail, Buffalo Trail, and portions of Turnhole Bend Trail would remain as they are currently authorized.

Sal Hollow Trail would be open only to hikers and bicycles year-round. Horse use would continue to be disallowed on Sal Hollow Trail, but would continue to be allowed on Buffalo Trail and Turnhole Bend Trail.

Existing parking and trailhead facilities at Maple Springs Trailhead would remain as is, with no alterations.

The trailhead is currently limited to parking for six passenger vehicles and eight horse trailers.

The Park will not study other trail proposals, such as the extension of the Mammoth Cave Railroad Bike and Hike Trail to adjacent communities.

All other visitor uses of the park trail system would remain the same – as they are currently authorized.



Trail Use	
—	All Uses
—	Hiking Only
—	Hiking & Horseback Only
—	Hiking & Bicycling Only
	Paved Roads
	Rough-Surfaced Roads
—	Streams and Rivers
	Park Boundary
	Trailhead
	Campground
●	Backcountry Campsite

Alternative Number 2

Estimated Cost: \$225,150 (See Appendix IV)

Visitor Use Issues – Proposed Actions:

- **Allow horseback riders, bicyclists, and hikers to use Sal Hollow Trail, Buffalo Trail, and a portion of Turnhole Bend Trail all year.** Under this alternative, Sal Hollow, Buffalo, and portions of Turnhole Bend trail would be open to bicycle use year-round; these trails and all other northside trails would be open to horse use and hikers year-round. Bicycle use would also be authorized on the proposed connector trail from the Maple Springs Trailhead to the Maple Springs Group Campground and to the Mammoth Cave International Center for Science and Learning. A special regulation would be developed to authorize bicycle use on these trails. ■
 - **Authorize mountain bike use on the White Oak Trail.** The White Oak Trail consists of an administrative road located in the northeast section of the park and separate from the main trail system. This 2.4 mile road/trail is currently open to hiking and horseback riding, but receives comparatively little traffic by any users. The road ends at a backcountry campsite on the Green River. This road is wide, reasonably level, and is appropriate for multiple use. White Oak Trail would remain open to hikers and horseback use, and would also be opened to bicycles under this proposed action. ■
 - **All other visitor uses** of the park trail system would remain the same, as they are currently authorized. ■
- for six passenger vehicles and eight horse trailers.) Under this alternative, the trailhead parking area at Maple Springs would be increased to provide parking for 15 passenger vehicles and 15 horse trailers. ■
 - **Construct a connector trail** (approximately 1.5 miles) in the Maple Springs complex (Figure 5). This connector trail would improve access to the trail system and provide needed trail linkages among four existing facilities: the Maple Springs Trailhead, the Raymer Hollow trail, the Maple Springs Group Campground, and the Mammoth Cave International Center for Science and Learning. In addition to providing improved trail linkages, this connector trail would eliminate the safety issue related to the current use of the Maple Springs Loop Road to access the Raymer Hollow trail. This connector trail would be designed as a hardened-gravel trail to facilitate heavy use and two-way traffic. ■
 - **Eliminate trailhead and trail access from the Good Spring United Baptist Church yard.** Under this alternative the trailhead and trails access leaving from the church will be eliminated. This alternative would include the development of connector trails that would replace the trail access eliminated at the church. Road access to the church and cemetery would remain. Trail access to Raymer Hollow Trail would be continued by use of a new connector trail from the Maple Springs Trailhead. Trail access to the Good Spring Trail would continue by use of the Buffalo Trail from the Maple Springs Trailhead. Good Spring United Baptist Church and Cemetery are a cultural resource of the Park's heritage; existing conditions (trail user impacts, vehicles parking in the church yard, and horses, bikes and hikers traveling through the church yard to access the trail system) do not adequately protect this valuable Park resource. ■

Facility Issues – Proposed Actions:

- **Expand the footprint of trailhead parking area at Maple Springs Trailhead** and implement additional improvements to the existing parking area to better accommodate public use. Recent parking area improvements at Maple Springs resulted in fewer parking spaces, and additional spaces are needed to accommodate the expected increase in public use. (Maple Springs currently has parking



Turnhole Bend Campsite.

- *Proposal is unique to this alternative.*
- *Proposal is common to alternatives 2, 3, and 5.*
- *Proposal is common to alternatives 2, 4, and 5.*
- *Proposal is common to alternatives 2, 3, 4 and 5.*

- **Improve the short connector trail between Lincoln Trailhead and Collie Ridge Trail.** The existing short connector trail is narrow, deeply rutted, and eroded. Therefore, it is proposed that this trail be widened to sustainable standards to accommodate the level of traffic it now receives. ■
- **Implement modest improvements to the existing trailhead parking area at Lincoln** within the existing footprint. Currently, there are ten horse trailer parking spaces at the Lincoln Trailhead. These parking spaces are used primarily by horse users, but occasionally are used by hikers. Under this alternative, the existing parking area/trailhead at Lincoln would be improved on its existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Implement modest improvements to the existing trailhead parking area at the First Creek Trailhead** within the existing footprint. Currently, there are ten horse trailer parking spaces at the First Creek Trailhead. Under this alternative, the parking area for this trailhead would be redesigned on the existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Implement modest improvements to the existing trailhead parking area at the Temple Hill Trailhead** within the existing footprint. Currently, there are ten horse trailer parking spaces at the Temple Hill Trailhead. Under this alternative, the parking area for this trailhead would be redesigned on the existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Construct small parking areas** at three locations: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead. Under this alternative, simple, crushed aggregate parking areas would be built to provide parking for two to three cars at each site. This alternative would involve a minimal amount of clearing/leveling to prepare the sites. ■
- **Study the potential of other trail proposals** such as the extension of the Mammoth Cave Railroad Bike and Hike Trail that balance visitor use interests with resource protection, and are in accordance with the park's enabling legislation. There is interest from the communities of Cave City and Brownsville in constructing similar bike trails that may connect with the Mammoth Cave Railroad Bike and Hike Trail. ■

■ *Proposal is unique to this alternative.*

■ *Proposal is common to alternatives 2, 3, and 5.*

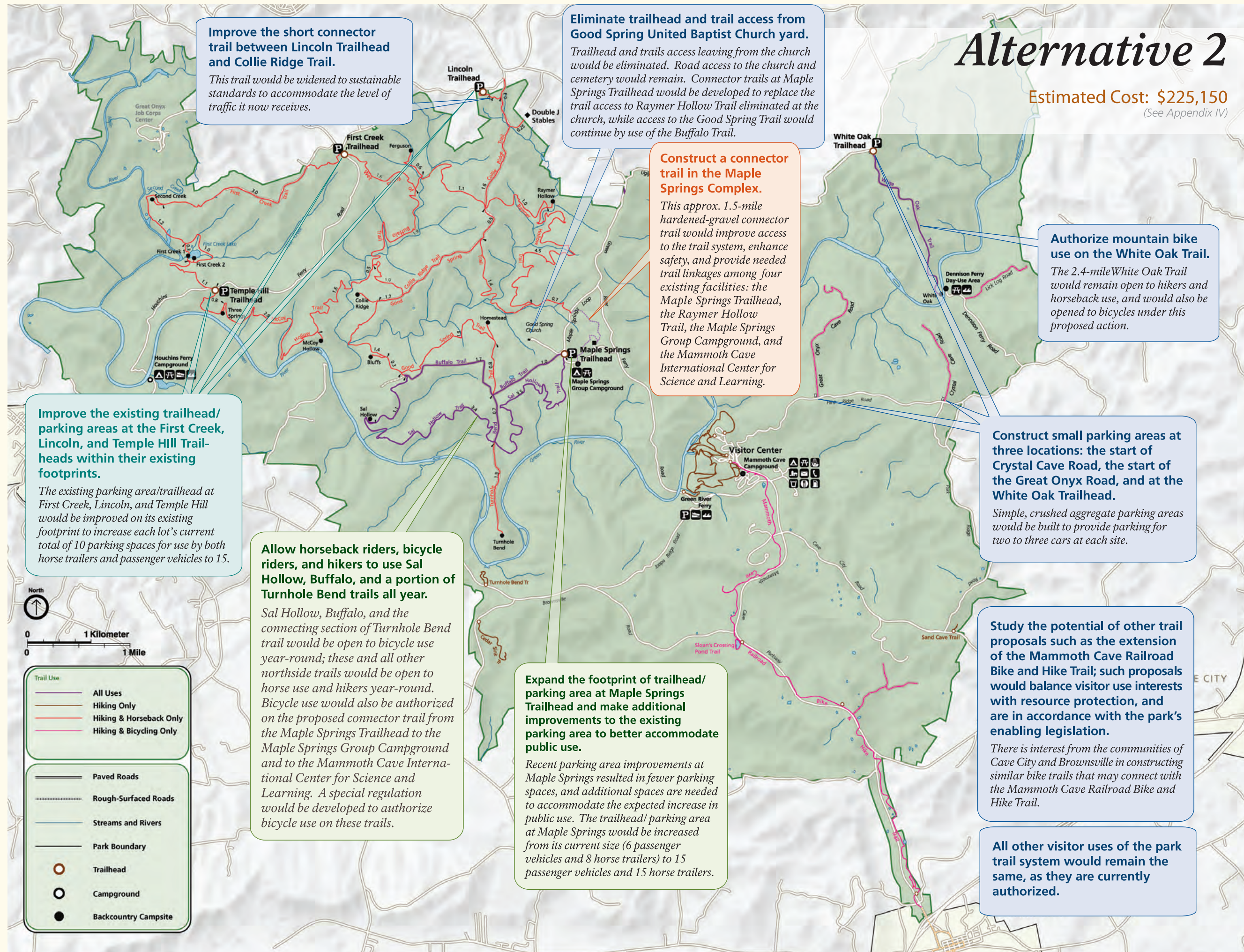
■ *Proposal is common to alternatives 2, 4, and 5.*

■ *Proposal is common to alternatives 2, 3, 4 and 5.*



Alternative 2

Estimated Cost: \$225,150
(See Appendix IV)



Alternative Number 3

Estimated Cost: \$255,750 (See Appendix IV)

Visitor Use Issues – Proposed Actions:

- **Permit horse use on Sal Hollow Trail from June through October.** Under this alternative, horse use on the Sal Hollow Trail would be permitted from June 1 through October 31 (during the driest months of the year); except for this restriction, horses are allowed on all other northside trails. Sal Hollow, Buffalo, and portions of Turnhole Bend trails would be open to bicycle use and hikers year round. Bicycle use would be authorized on the proposed connector trail from the Maple Springs Trailhead to the Maple Springs Group Campground and to the Mammoth Cave International Center for Science and Learning. A special regulation would be developed to authorize bicycle use on these trails. ■
- **Authorize mountain bike use on the White Oak Trail.** The White Oak Trail consists of an administrative road located in the northeast section of the park and separate from the main trail system. This 2.4 mile road/trail is currently open to hiking and horseback riding, but gets comparatively little traffic by any users. The road ends at a backcountry campsite on the Green River. This road is wide, comparatively level, and is appropriate for multiple use. White Oak Trail would remain open to hikers and horseback use, and would also be opened to bicycles under this proposed action. ■
- **All other visitor uses** of the park trail system would remain the same -- as they are currently authorized. ■
- **limited restroom facilities** at the site, similar to those at the Maple Springs Trailhead. ■
- **Increase parking at Maple Springs Trailhead** within the existing footprint. When road improvements were made to the Maple Springs Road in 2003, the parking area was improved, but overall parking spaces were reduced. (Maple Springs currently has parking for six passenger vehicles and eight horse-trailers.) Adequate space is available between existing spaces to accommodate this expansion. Under this alternative, the existing parking area/trailhead would be improved on its existing footprint to provide 12 parking spaces for horse trailers and 10 parking spaces for passenger vehicles. ■
- **Construct a connector trail** (approximately 1.5 miles) in the Maple Springs complex (Figure 5.) This connector trail would improve access to the trail system and provide needed trail linkages among four existing facilities: the Maple Springs Trailhead, the Raymer Hollow trail, the Maple Springs Group Campground, and the Mammoth Cave International Center for Science and Learning. In addition to providing improved trail linkages, this connector trail would eliminate the safety issue related to the current use of the Maple Springs Loop Road to access the Raymer Hollow trail. This connector trail would be designed as a hardened-gravel trail to facilitate heavy use and two-way traffic. ■
- **Eliminate trailhead and trail access from the Good Spring United Baptist Church yard.** Under this alternative the trailhead and trails access leaving from the church will be eliminated. This alternative would include the development of connector trails that would replace the trail access eliminated at the church. Road access to the church and cemetery would remain. Trail access to Raymer Hollow Trail would be continued by use of a new connector trail from the Maple Springs Trailhead. Trail access to the Good Spring Trail would continue by use of the



Maple Springs Group Camp.

- *Proposal is unique to this alternative.*
- *Proposal is common to alternatives 2, 3, and 5.*
- *Proposal is common to alternatives 3, 4, and 5.*
- *Proposal is common to alternatives 2, 3, 4 and 5.*

Facility Issues – Proposed Actions:

- **Expand and improve the trailhead parking area at Lincoln Trailhead.** Currently, there are ten horse trailer parking spaces at the Lincoln Trailhead. Under this alternative, the footprint of this trailhead parking area would be expanded to provide parking for a total of 20 horse trailers and five passenger vehicles. This alternative would also include

Buffalo Trail from the Maple Springs Trailhead. Good Spring United Baptist Church and Cemetery are a cultural resource of the Park's heritage; existing conditions (trail user impacts, vehicles parking in the church yard, and horses, bikes and hikers traveling through the church yard to access the trail system) do not adequately protect this valuable Park resource. ■

- **Improve the short connector trail between Lincoln Trailhead and Collie Ridge Trail.** The existing short connector trail is narrow, deeply rutted, and eroded. Therefore, it is proposed that this trail be widened to sustainable standards to accommodate the level of traffic it now receives. ■
- **Implement modest improvements to the existing trailhead parking area at the First Creek Trailhead** within the existing footprint. Currently, there are 10 horse trailer parking spaces at the First Creek Trailhead. Under this alternative, the parking area for this trailhead would be redesigned on the existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■

- **Implement modest improvements to the existing trailhead parking area at the Temple Hill Trailhead** within the existing footprint. Currently, there are 10 horse trailer parking spaces at the Temple Hill Trailhead. Under this alternative, the parking area for this trailhead would be redesigned on the existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Construct small parking areas** at three locations: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead. Under this alternative simple, basic crushed aggregate parking areas would be built to provide providing parking for 2-3 cars at each site. This alternative would involve a minimal amount of clearing/leveling to prepare the sites. ■
- **Study the potential of other trail proposals** such as the extension of the Mammoth Cave Railroad Bike and Hike Trail that balance visitor use interests with resource protection, and are in accordance with the park's enabling legislation. There is interest from the communities of Cave City and Brownsville in constructing similar bike trails that may connect with the Mammoth Cave Railroad Bike and Hike Trail. ■

■ *Proposal is unique to this alternative.*

■ *Proposal is common to alternatives 2, 3, and 5.*

■ *Proposal is common to alternatives 2, 4, and 5.*

■ *Proposal is common to alternatives 2, 3, 4 and 5.*



Alternative 3

Estimated Cost: \$255,750
(See Appendix IV)

Expand and improve the trailhead/parking area at Lincoln Trailhead.

The footprint of this area would be expanded to provide parking for a total of 20 horse trailers and five passenger vehicles. This would include limited restroom facilities at the site, similar to those at Maple Springs Trailhead.

Improve the short connector trail between Lincoln Trailhead and Collie Ridge Trail.

This trail would be widened to sustainable standards to accommodate the level of traffic it now receives.

Eliminate trailhead and trail access from Good Spring United Baptist Church yard.

Trailhead and trails access leaving from the church would be eliminated. Road access to the church and cemetery would remain. Connector trails at Maple Springs Trailhead would be developed to replace the trail access to Raymer Hollow Trail eliminated at the church, while access to the Good Spring Trail would continue by use of the Buffalo Trail.

Construct a connector trail in the Maple Springs Complex.

This approx. 1.5-mile hardened-gravel connector trail would improve access to the trail system, enhance safety, and provide needed trail linkages among four existing facilities: the Maple Springs Trailhead, the Raymer Hollow Trail, the Maple Springs Group Campground, and the Mammoth Cave International Center for Science and Learning.

Authorize mountain bike use on the White Oak Trail.

The 2.4-mile White Oak Trail would remain open to hikers and horseback use, and would also be opened to bicycles under this proposed action.

Improve the existing trailhead/parking areas at the First Creek and Temple Hill Trailheads within their existing footprints.

The existing parking areas/trailheads at First Creek and Temple Hill would be improved on their existing footprints to increase each lot's current total of 10 parking spaces for use by both horse trailers and passenger vehicles to 15.

Permit horse use on Sal Hollow Trail from June through October.

Horse use on the Sal Hollow Trail would be permitted from June 1 through October 31 (during the driest months of the year); except for this restriction, horses are allowed on all other northside trails. Sal Hollow, Buffalo, and portions of Turnhole Bend trails would be open to bicycle use year round. Bicycle use would be authorized on the proposed connector trail from the Maple Springs Trailhead to the Maple Springs Group Campground and to the Mammoth Cave International Center for Science and Learning. A special regulation would be developed to authorize bicycle use on these trails.

Increase parking at Maple Springs Trailhead within the existing footprint.

The existing parking area/trailhead at Maple Springs (six passenger vehicles and eight horse trailers) would be improved on its existing footprint to provide 12 parking spaces for horse trailers and 10 parking spaces for passenger vehicles.

Construct small parking areas at three locations: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead.

Simple, crushed aggregate parking areas would be built to provide parking for two to three cars at each site.

Study the potential of other trail proposals such as the extension of the Mammoth Cave Railroad Bike and Hike Trail; such proposals would balance visitor use interests with resource protection, and are in accordance with the park's enabling legislation.

There is interest from the communities of Cave City and Brownsville in constructing similar bike trails that may connect with the Mammoth Cave Railroad Bike and Hike Trail.

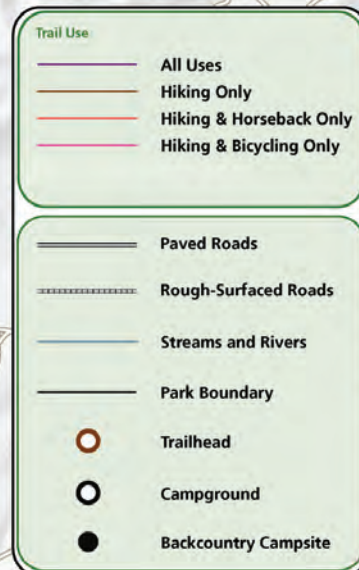
All other visitor uses of the park trail system would remain the same, as they are currently authorized.

Only in this Alternative

Alternatives 2, 3, & 5

Alternatives 3, 4 & 5

Alternatives 2, 3, 4 & 5



Alternative Number 4

Estimated Cost: \$832,750 (See Appendix IV)

Visitor Use Issues – Proposed Actions:

- **Permit bicycle use and hiking on a proposed new six-mile loop trail** beginning at a new parking area and trailhead with access off of Green River Ferry Road-North. Horses would not be permitted on this trail. Under this alternative, bicycles would not be permitted on the Sal Hollow Trail, the Buffalo Trail, or portions of the Turnhole Bend Trail. These trails would revert to hiking and horse use only. Bicycle use and hiking would be permitted on the new six-mile, single-track loop trail which would be constructed east of the Green River Ferry Road-North and on the ridge west of Big Hollow. Bicycle use would also be authorized on the proposed connector trail from this new trailhead to the Maple Springs Group Campground and to the Mammoth Cave International Center for Science and Learning. A special regulation would be developed to authorize bicycle use on these trails. ■
- **Authorize mountain bike use on the White Oak Trail.** The White Oak Trail consists of an Administrative Road located in the north-east section of the park and separate from the main trail system. This 2.4 mile road/trail is currently open to hiking and horseback riding, but gets comparatively little traffic by any users. The road ends at a backcountry campsite on the Green River. This road is wide, comparatively level, and is appropriate for multiple use. White Oak Trail would remain open to hikers and horseback use, and would also be opened to bicycles under this proposed action. ■
- **All other visitor uses** of the park trail system would remain the same – as they are currently authorized. ■

Facility Issues – Proposed Actions:

- **Construct a new multi-use trailhead parking area with access off of Green River Ferry Road-North.** Under this alternative, a new multi-use parking area would be constructed approximately halfway between the Maple Springs entrance roads, with direct access off of Green River Ferry Road-North. This lot would provide parking for 20 passenger vehicles as well as parking for 15 horse trailers. This proposed trailhead parking area could be located on either the east or west side of Green River Ferry Road-North; or it could be split into two lots, one on the west side for hiking and horse use and one on the east side for hiking and bicycle use. This alternative would include an option for developing limited restroom facilities, similar to those at the Maple Springs Trailhead. ■
- **Increase parking at Maple Springs Trailhead** within the existing footprint. When road improvements were made to the Maple Springs Road in 2003, the parking area was improved, but overall parking spaces were reduced. (Maple Springs currently has parking for six passenger vehicles and eight horse-trailers.) Adequate space is available between existing spaces to accommodate this expansion. Under this alternative, the existing parking area/trailhead would be improved on its existing footprint to provide 12 parking spaces for horse trailers and 10 parking spaces for passenger vehicles. ■
- **Construct a connector trail** (approximately 1.5 miles) in the Maple Springs complex (Figure 5.) This connector trail would improve access to the trail system and provide needed trail linkages among four existing facilities: the Maple Springs Trailhead; the Raymer Hollow



The Great Onyx Job Corps Trail Crew building new trail.

- *Proposal is unique to this alternative.*
- *Proposal is common to alternatives 2, 4, and 5.*
- *Proposal is common to alternatives 3, 4, and 5.*
- *Proposal is common to alternatives 2, 3, 4 and 5.*

trail; the Maple Springs Group Campground; and the Mammoth Cave International Center for Science and Learning, as well as the new trailhead on Green River Ferry Road-North. In addition to providing improved trail linkages, this connector trail would eliminate the safety issue related to the current use of the Maple Springs Loop Road to access the Raymer Hollow trail. This connector trail would be designed as a hardened-gravel trail to facilitate heavy use and two-way traffic. ■

- **Eliminate trailhead and trail access from the Good Spring United Baptist Church yard.** Under this alternative the trailhead and trails access leaving from the church will be eliminated. This alternative would include the development of connector trails that would replace the trail access eliminated at the church. Road access to the church and cemetery would remain. Trail access to Raymer Hollow Trail would be continued by use of a new connector trail from the Maple Springs Trailhead. Trail access to the Good Spring Trail would continue by use of the Buffalo Trail from the Maple Springs Trailhead. Good Spring United Baptist Church and Cemetery are a cultural resource of the Park's heritage; existing conditions (trail user impacts, vehicles parking in the church yard, and horses, bikes and hikers traveling through the church yard to access the trail system) do not adequately protect this valuable Park resource. ■
- **Improve the short connector trail between Lincoln Trailhead and Collie Ridge Trail.** The existing short connector trail is narrow, deeply rutted, and eroded. Therefore, it is proposed that this trail be widened to sustainable standards to accommodate the level of traffic it now receives. ■
- **Implement modest improvements to the existing trailhead parking area at Lincoln** within the existing footprint. Currently, there are ten horse trailer parking spaces at the Lincoln Trailhead. These parking spaces are used primarily by horse users, but occasionally are used by hikers. Under this alternative, the existing parking area/trailhead at Lincoln would be improved on its existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■

- **Implement modest improvements to the existing trailhead parking area at the First Creek Trailhead** within the existing footprint. Currently, there are ten horse trailer parking spaces at the First Creek Trailhead. Under this alternative, the parking area for this trailhead would be redesigned on the existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Implement modest improvements to the existing trailhead parking area at the Temple Hill Trailhead** within the existing footprint. Currently, there are ten horse trailer parking spaces at the Temple Hill Trailhead. Under this alternative, the parking area for this trailhead would be redesigned on the existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Construct small parking areas** at three locations: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead. Under this alternative, simple, crushed aggregate parking areas would be built to provide parking for two to three cars at each site. This alternative would involve a minimal amount of clearing/leveling to prepare the sites. ■
- **Study the potential of other trail proposals** such as the extension of the Mammoth Cave Railroad Bike and Hike Trail that balance visitor use interests with resource protection, and are in accordance with the park's enabling legislation. There is interest from the communities of Cave City and Brownsville in constructing similar bike trails that may connect with the Mammoth Cave Railroad Bike and Hike Trail. ■

■ Proposal is unique to this alternative.

■ Proposal is common to alternatives 2, 3, and 5.

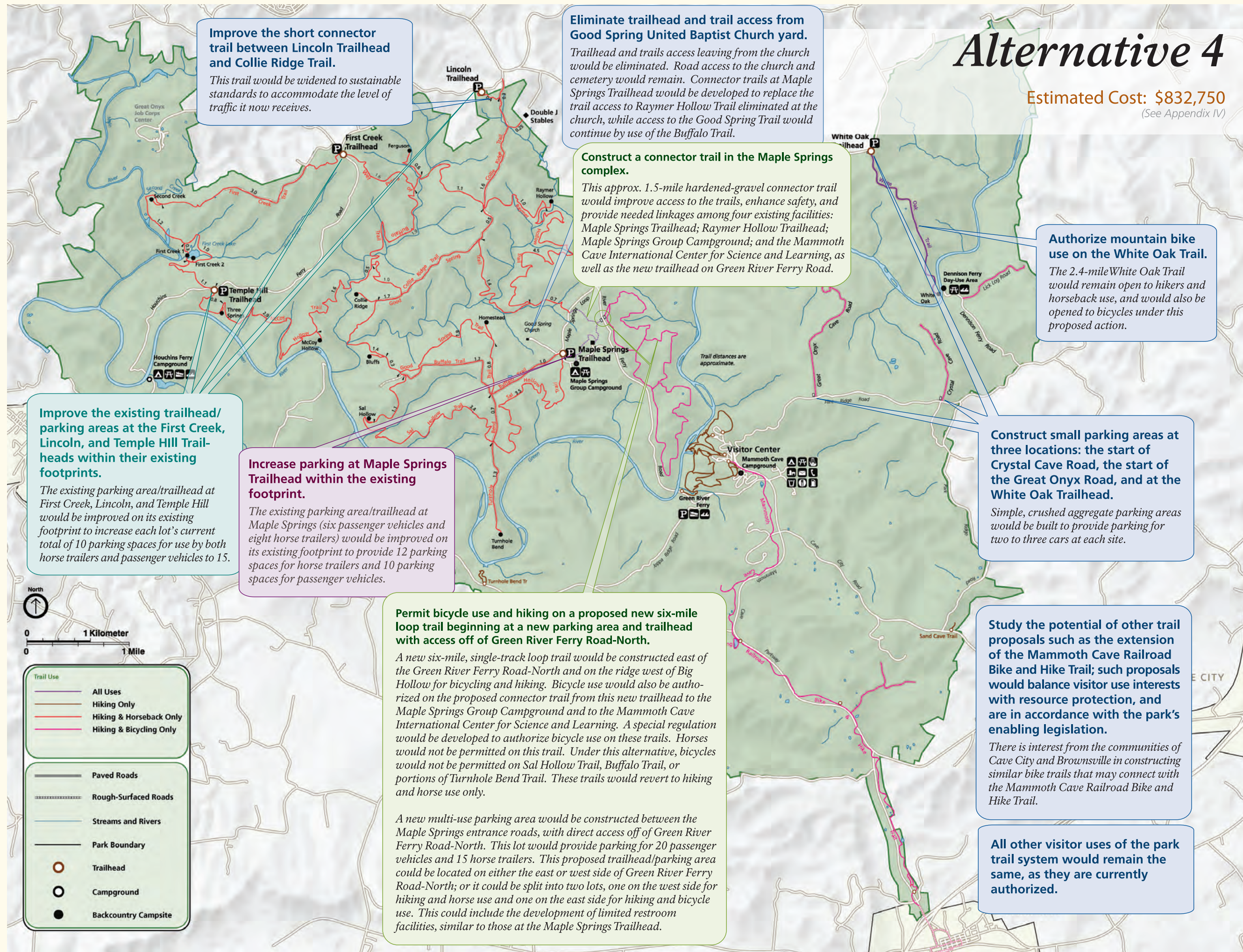
■ Proposal is common to alternatives 2, 4, and 5.

■ Proposal is common to alternatives 2, 3, 4 and 5.



Alternative 4

Estimated Cost: \$832,750
(See Appendix IV)



Improve the short connector trail between Lincoln Trailhead and Collie Ridge Trail.
This trail would be widened to sustainable standards to accommodate the level of traffic it now receives.

Eliminate trailhead and trail access from Good Spring United Baptist Church yard.
Trailhead and trails access leaving from the church would be eliminated. Road access to the church and cemetery would remain. Connector trails at Maple Springs Trailhead would be developed to replace the trail access to Raymer Hollow Trail eliminated at the church, while access to the Good Spring Trail would continue by use of the Buffalo Trail.

Construct a connector trail in the Maple Springs complex.
This approx. 1.5-mile hardened-gravel connector trail would improve access to the trails, enhance safety, and provide needed linkages among four existing facilities: Maple Springs Trailhead; Raymer Hollow Trailhead; Maple Springs Group Campground; and the Mammoth Cave International Center for Science and Learning, as well as the new trailhead on Green River Ferry Road.

Authorize mountain bike use on the White Oak Trail.
The 2.4-mile White Oak Trail would remain open to hikers and horseback use, and would also be opened to bicycles under this proposed action.

Improve the existing trailhead/parking areas at the First Creek, Lincoln, and Temple Hill Trailheads within their existing footprints.
The existing parking area/trailhead at First Creek, Lincoln, and Temple Hill would be improved on its existing footprint to increase each lot's current total of 10 parking spaces for use by both horse trailers and passenger vehicles to 15.

Increase parking at Maple Springs Trailhead within the existing footprint.
The existing parking area/trailhead at Maple Springs (six passenger vehicles and eight horse trailers) would be improved on its existing footprint to provide 12 parking spaces for horse trailers and 10 parking spaces for passenger vehicles.

Construct small parking areas at three locations: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead.
Simple, crushed aggregate parking areas would be built to provide parking for two to three cars at each site.

Permit bicycle use and hiking on a proposed new six-mile loop trail beginning at a new parking area and trailhead with access off of Green River Ferry Road-North.
A new six-mile, single-track loop trail would be constructed east of the Green River Ferry Road-North and on the ridge west of Big Hollow for bicycling and hiking. Bicycle use would also be authorized on the proposed connector trail from this new trailhead to the Maple Springs Group Campground and to the Mammoth Cave International Center for Science and Learning. A special regulation would be developed to authorize bicycle use on these trails. Horses would not be permitted on this trail. Under this alternative, bicycles would not be permitted on Sal Hollow Trail, Buffalo Trail, or portions of Turnhole Bend Trail. These trails would revert to hiking and horse use only.
A new multi-use parking area would be constructed between the Maple Springs entrance roads, with direct access off of Green River Ferry Road-North. This lot would provide parking for 20 passenger vehicles and 15 horse trailers. This proposed trailhead/parking area could be located on either the east or west side of Green River Ferry Road-North; or it could be split into two lots, one on the west side for hiking and horse use and one on the east side for hiking and bicycle use. This could include the development of limited restroom facilities, similar to those at the Maple Springs Trailhead.

Study the potential of other trail proposals such as the extension of the Mammoth Cave Railroad Bike and Hike Trail; such proposals would balance visitor use interests with resource protection, and are in accordance with the park's enabling legislation.
There is interest from the communities of Cave City and Brownsville in constructing similar bike trails that may connect with the Mammoth Cave Railroad Bike and Hike Trail.
All other visitor uses of the park trail system would remain the same, as they are currently authorized.

- Only in this Alternative
- Alternatives 2, 4, & 5
- Alternatives 3, 4 & 5
- Alternatives 2, 3, 4 & 5

Alternative Number 5

• Preferred Alternative

Estimated Cost: \$287,250 (See Appendix IV)

Visitor Use Issues – Proposed Actions:

- **Permit bicycle use on First Creek Trail, and close Sal Hollow, Turnhole Bend, and Buffalo Trails to bicycles** Under this alternative, First Creek Trail would be closed to horses, and the Sal Hollow Trail would be opened to horses. A special regulation would be developed to authorize bicycle use on First Creek Trail. ■
- **Authorize mountain bike use on the White Oak Trail.** The White Oak Trail consists of an administrative road located in the northeast section of the park and separate from the main trail system. This 2.4 mile road/trail is currently open to hiking and horseback riding, but receives comparatively little traffic by any users. The road ends at a backcountry campsite on the Green River. This road is wide, reasonably level, and is appropriate for multiple use. White Oak Trail would remain open to hikers and horseback use, and would also be opened to bicycles under this proposed action. ■
- **All other visitor uses** of the park trail system would remain the same, as they are currently authorized. ■

Facility Issues – Proposed Actions:

- **Construct approximately one mile of re-routed trail on the First Creek Trail** (from the Temple Hill Trailhead to First Creek Lake). This work would achieve a more gradual change in elevation for this trail segment. ■
- **Increase parking at Maple Springs Trailhead** within the existing footprint. When road improvements were made to the Maple Springs Road in 2003, the parking area was improved, but overall parking spaces were reduced. (Maple Springs currently has parking for six passenger vehicles and eight horse trailers.) Adequate space is available between existing

spaces to accommodate this expansion. Under this alternative, the existing parking area/trailhead would be improved on its existing footprint to provide 12 parking spaces for horse trailers and 10 parking spaces for passenger vehicles. ■

- **Construct a connector trail** (approximately 1.5 miles) in the Maple Springs complex (Figure 5.) This connector trail would improve access to the trail system and provide needed trail linkages among four existing facilities: the Maple Springs Trailhead, the Raymer Hollow trail, the Maple Springs Group Campground, and the Mammoth Cave International Center for Science and Learning. In addition to providing improved trail linkages, this connector trail would eliminate the safety issue related to the current use of the Maple Springs Loop Road to access the Raymer Hollow trail. This connector trail would be designed as a hardened-gravel trail to facilitate heavy use and two-way traffic. ■
- **Eliminate trailhead and trail access from the Good Spring United Baptist Church yard.** Under this alternative the trailhead and trails access leaving from the church will be eliminated. This alternative would include the development of connector trails that would replace the trail access eliminated at the church. Road access to the church and cemetery would remain. Trail access to Raymer Hollow Trail would be continued by use of a new connector trail from the Maple Springs Trailhead. Trail access to the Good Spring Trail would continue by use of the Buffalo Trail from the Maple Springs Trailhead. Good Spring United Baptist Church and Cemetery are a cultural resource of the Park's heritage; existing conditions (trail user impacts, vehicles parking in the church yard, and horses, bikes and hikers traveling through the church yard to access the trail system) do not adequately protect this valuable Park resource. ■



First Creek Lake.

- Proposal is unique to this alternative.
- Proposal is common to alternatives 2, 3, and 5.
- Proposal is common to alternatives 2, 4, and 5.
- Proposal is common to alternatives 3, 4 and 5.
- Proposal is common to alternatives 2, 3, 4 and 5.

- **Improve the short connector trail** between Lincoln Trailhead and Collie Ridge Trail. The existing short connector trail is narrow, deeply rutted, and eroded. Therefore, it is proposed that this trail be widened to sustainable standards to accommodate the level of traffic it now receives. ■
- **Implement modest improvements to the existing trailhead parking area at Lincoln** within the existing footprint. Currently, there are 10 horse trailer parking spaces at the Lincoln Trailhead. These parking spaces are used primarily by horse users, but occasionally are used by hikers. Under this alternative, the existing parking area/trailhead at Lincoln would be improved on its existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Implement modest improvements to the existing trailhead parking area at the First Creek Trailhead** within the existing footprint. Currently, there are ten horse trailer parking spaces at the First Creek Trailhead. Under this alternative, the parking area for this trailhead would be redesigned on the existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Implement modest improvements to the existing trailhead parking area at the Temple Hill Trailhead** within the existing footprint. Currently, there are ten horse trailer parking spaces at the Temple Hill Trailhead. Under this alternative, the parking area for this trailhead would be redesigned on the existing footprint to provide a total of 15 parking spaces for use by both horse trailers and passenger vehicles. ■
- **Construct small parking areas** at three locations: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead. Under this alternative, simple, crushed aggregate parking areas would be built to provide parking for two to three cars at each site. This alternative would involve a minimal amount of clearing/leveling to prepare the sites. ■
- **Study the potential of other trail proposals** such as the extension of the Mammoth Cave Railroad Bike and Hike Trail that balance visitor use interests with resource protection, and are in accordance with the park's enabling legislation. There is interest from the communities of Cave City and Brownsville in constructing similar bike trails that may connect with the Mammoth Cave Railroad Bike and Hike Trail. ■

■ *Proposal is unique to this alternative.*

■ *Proposal is common to alternatives 2, 3 and 5.*

■ *Proposal is common to alternatives 2, 4 and 5.*

■ *Proposal is common to alternatives 3, 4 and 5.*

■ *Proposal is common to alternatives 2, 3, 4 and 5.*



Alternative 5

Estimated Cost: \$287,250

(See Appendix IV)

Preferred Alternative

Construct approximately one mile of rerouted trail on the First Creek Trail (from the Temple Hill Trailhead to First Creek Lake).
This work would achieve a more gradual change in elevation for this trail segment.

Improve the short connector trail between Lincoln Trailhead and Collie Ridge Trail.
This trail would be widened to sustainable standards to accommodate the level of traffic it now receives.

Eliminate trailhead and trail access from Good Spring United Baptist Church yard.
Trailhead and trails access leaving from the church would be eliminated. Road access to the church and cemetery would remain. Connector trails at Maple Springs Trailhead would be developed to replace the trail access to Raymer Hollow Trail eliminated at the church, while access to the Good Spring Trail would continue by use of the Buffalo Trail.

Construct a connector trail in the Maple Springs Complex.
This approx. 1.5-mile hardened-gravel connector trail would improve access to the trail system, enhance safety, and provide needed trail linkages among four existing facilities: the Maple Springs Trailhead, the Raymer Hollow Trail, the Maple Springs Group Campground, and the Mammoth Cave International Center for Science and Learning.

Authorize mountain bike use on the White Oak Trail.
The 2.4-mile White Oak Trail would remain open to hikers and horseback use, and would also be opened to bicycles under this proposed action.

Improve the existing trailhead/parking areas at the First Creek, Lincoln, and Temple Hill Trailheads within their existing footprints.
The existing parking area/trailhead at First Creek, Lincoln, and Temple Hill would be improved on its existing footprint to increase each lot's current total of 10 parking spaces for use by both horse trailers and passenger vehicles to 15.

Dedicate First Creek Trail for bicycle use and hiking; all trails between Houchins Ferry Road and Green River Ferry Road North would be opened to horse use and closed to bicycle use.
First Creek Trail would be closed to horses, and Sal Hollow Trail would be opened to horses. A special regulation would be developed to authorize bicycle use on First Creek Trail.

Increase parking at Maple Springs Trailhead within the existing footprint.
The existing parking area/trailhead at Maple Springs (six passenger vehicles and eight horse trailers) would be improved on its existing footprint to provide 12 parking spaces for horse trailers and 10 parking spaces for passenger vehicles.

Construct small parking areas at three locations: the start of Crystal Cave Road, the start of the Great Onyx Road, and at the White Oak Trailhead.
Simple, crushed aggregate parking areas would be built to provide parking for two to three cars at each site.

Study the potential of other trail proposals such as the extension of the Mammoth Cave Railroad Bike and Hike Trail; such proposals would balance visitor use interests with resource protection, and are in accordance with the park's enabling legislation.
There is interest from the communities of Cave City and Brownsville in constructing similar bike trails that may connect with the Mammoth Cave Railroad Bike and Hike Trail.

All other visitor uses of the park trail system would remain the same, as they are currently authorized.

- Only in this Alternative
- Alternatives 2, 3, & 5
- Alternatives 2, 4, & 5
- Alternatives 3, 4 & 5
- Alternatives 2, 3, 4 & 5

Trail Use

- All Uses
- Hiking Only
- Hiking & Horseback Only
- Hiking & Bicycling Only

Paved Roads

Rough-Surfaced Roads

Streams and Rivers

Park Boundary

Trailhead

Campground

Backcountry Campsite

Preferred Alternative

The Preferred Alternative was chosen by Park staff through a mini-Value Analysis, a decision making process that allows evaluation of the relationship between impacts, results, and cost; it identifies the alternative with the greatest value in accomplishing NPS functional goals and objectives (see Appendix 2). The process was applied to Alternatives 2, 3, 4, and 5; Alternative 1, considered unacceptable, was not evaluated.

After studying and evaluating the four alternatives via the mini-Value Analysis, Alternative 5 received the highest “Advantage” score and was chosen as the Preferred Alternative:

Alternative 5 scored 345;

Alternative 4 scored 290;

Alternative 3 scored 175; and

Alternative 2 scored 125.

Alternative 5 had the highest score of “Advantages” for several reasons, including the following key factors:

Safety

Alternative 5 substantially reduces the shared trail use safety concerns.

Environmental Impacts

Alternative 5 requires only one mile of additional trail construction/re-routing work along the First Creek Trail and modest improvements of existing parking areas, almost exclusively on the footprint of existing parking areas. Alternative 5 removes potential impacts from horse and stock use (water quality, tread wear, and exotic species introduction) on the First Creek trail, the campsites along the trail, and on the First Creek watershed, including First Creek Lake and the Nolin River drainage within the Park. For these reasons, Alternative 5 is considered to be the environmentally-preferred option.

Visitor Use

Alternative 5 provides the clearest division of trail user groups (slightly better than Alternative 4 and significantly better than Alternatives 2 and 3).

Facilities

Alternative 5 provides for the construction of a 1.5-mile connector trail in the Maple Springs complex. This facility factored into the choice of the Preferred Alternative, but it is also a feature common to all of the alternatives except the No-Action alternative (Alternative 1).

Cost

In addition to having the greatest number of “Advantages,” the cost to implement Alternative 5 (\$287,250) is significantly less than Alternative 4 (\$832,750).

In addition to having the greatest number of “Advantages,” the cost to implement Alternative 5 (\$287,250) is significantly less than Alternative 4 (\$832,750).

Alternative 5 identifies a number of proposed actions for “Visitor Use” and “Facility Issues.” When this Plan is approved, all of the proposed construction and development activities will be prioritized for implementation as separate actions depending on the availability of funding and resources. Each proposed action will be subject to a site-specific decision process with the requisite level of project review and environmental compliance that is standard protocol for NPS project development and implementation. Final decisions on each proposed action will be made by the Park Superintendent.

After studying and evaluating all alternatives via the mini-Value Analysis, Alternative Number 5 was chosen as the preferred alternative.



...there was substantial concern expressed about the existing visitor use designations made on Sal Hollow Trail, Buffalo Trail, and portions of Turnhole Bend Trail. Similarly, it is unacceptable that various facility needs would remain unresolved.

Alternatives Identified But Removed From Consideration

A number of possible alternatives were considered by the Park during the early planning stages of this Plan, but were eliminated for various reasons and not considered further. These alternatives and the reasoning for their elimination are described below.

Constructing new multi-use trails south of Green River. This possible alternative was considered but rejected primarily for issues relating to the protection of the Mammoth Cave System and the associated cave resources. The Mammoth Cave System is located entirely on the south side of the Green River, and the hydrology and ecology of the cave is closely related to surface topography and drainage. Impacts arising from the use of horses and backcountry overnight camping are not considered appropriate south of the Green River and are currently limited to areas on the north side of the river. Also, from the visitor management, patrol, and administrative perspectives, it is more efficient to maintain this separation of uses.

No bicycle use on backcountry trails. This possible alternative was considered but rejected because of the public interest in backcountry bicycle use identified during the scoping process. Backcountry bicycle use has been ongoing in the park for eight years on an experimental basis with acceptable results. Since the opening of the Sal Hollow Trail to bike use, along with the

Buffalo Trail and portions of the Turnhole Bend Trail, there has been a consistent level of bicycle use. Bicyclists are one of the three user groups represented in the Mammoth Cave Backcountry Summit Council.

Permit bicycling, horseback riding, and hiking on all backcountry trails. This possibility was considered but rejected because of the strong response received during the Scoping process and in previous communications with all three user groups. Each of these groups have expressed a preference for separate trails, particularly between horse users and hikers, and between horse users and bicyclists. In addition, a perceived safety concern has been expressed by the horseback-riding community regarding sharing trails with bicyclists.

Leaving the trail system “as is,” with no changes to current trails, related facilities, and current designated uses. This alternative (Alternative 1) is the “No Action” alternative and was considered unacceptable for several reasons. Mainly, public comments received during the Scoping process were emphatic in their dissatisfaction with the current status of permitted visitor uses on some park trails. In particular, there was substantial concern expressed about the existing visitor use designations made on the Sal Hollow Trail, the Buffalo Trail, and portions of the Turnhole Bend Trail. Similarly, it is unacceptable that various facility needs would remain unresolved.

Public participation in the scoping and development of this plan has been strong.



Trail Management Program Implementation

The Scope of this plan also includes “Maintenance” and “Administrative” issues. All proposed actions related to “Maintenance” and “Administrative” issues are programmatic in nature and are common to all alternatives considered in the previous section. These proposed actions are more appropriately described in relation to the park’s ongoing implementation efforts relating to trail program management. Recommended actions relating to “Maintenance” and “Administrative” issues are described below.

Maintenance Issues

Sustainable Design

One of the management objectives of this Plan is to update project descriptions and cost estimates for all trail-related project funding requests. Funding for trail-related project work becomes available intermittently as prioritized by the Southeast Regional Office of the National Park Service. In short, Mammoth Cave National Park competes with other parks in the Southeast Region to obtain project funding for trail work.

As funding for trail work is approved, there is an ongoing need to incorporate sustainable design, methods, and materials. Most of the trails in Mammoth Cave National Park were established prior to the advent of modern sustainable trail design techniques. As a result, there is a substantial backlog of deferred trail maintenance in the park. Under this Plan, sustainable construction and trail maintenance practices would be utilized on all future trail management activities (including both trail-related project work and regular trail maintenance). The use of sustainable design will create important long-term benefits, principally a reduced need for regular maintenance and repairs in the future.

Some common components of Sustainable Design include: designing trail grades within certain limits, using drainage structures such as waterbars and drainage dips, and following natural contours. Old roadbeds should be avoided except where they meet these design goals. Trail treads should be built up to cross perennially

wet areas (i.e., seeps), using materials and techniques that permit the continued seepage of water underneath the tread such as interlocking trail-block and filter fabric structures. Bridges are an appropriate option when improvements are needed for crossing water courses. The desirable tread width in most areas is approximately 48 inches. Trail design should avoid obvious switchbacks in order to limit the opportunity for shortcutting and chronically wet areas such as seeps, bogs, and entrenched roadbeds.

Some segments of the existing park trails do not yet meet the standards described above. Where this is the case, a higher level of maintenance is required to keep the trail tread in reasonably good condition while minimizing impacts on park resources. Several techniques described in the guidelines above are appropriate options for these areas, including installation of water bars, grade reversals, drainage dips, bridges, and hardened treads using gravel, interlocking blocks, and geotextile materials.

Water bars, grade reversals, and drainage dips are used to channel stormwater runoff out of the tread. At many locations, the existing trail grades will require the installation of several of these structures to prevent erosion. Landscape timbers are typically used for water bars, which are anchored with steel rebar pins; other designs can be utilized if approved. At some locations, gravel is also used to improve stability. A built up tread, consisting of layers of stone and geotextiles can be used to traverse boggy areas. Bridges may be constructed to cross stream courses, including wet weather streams.

In the process of reconfiguring existing trails to sustainable standards, some locations may be abandoned. The primary objective for abandonment is to ensure that erosion does not continue. Allowing the tread to be covered by leaf litter in the fall season would prevent further erosion, and it has proven to be an effective treatment in the Park.

The level at which to improve individual administrative roads should be decided on a case by case basis, but all should be regularly maintained. Administrative roads are the roads that have been retained to provide vehicular access for a number of management purposes including wildland fire management, trail and campsite



An IC30 crosses Wet Prong carrying trail materials.

maintenance, and emergency operations including search and rescue activities. These roads would be rehabilitated in place to mitigate existing erosion problems. A comprehensive rehabilitation of Collie Ridge Road was completed in 2005, including graveling.

Signs

Trail signs must provide adequate and accurate information and way-finding assistance to visitors. Many users do not possess adequate map reading and way-finding skills to proceed without some level of guidance and reinforcement provided by signs. In 2005, the NPS entered and cataloged every sign associated with Park trails into its database system to be maintained on a cyclic basis. These signs will continue to be the primary signage on the trail system. A variety of materials and designs may be used for signs, but all should meet the following minimum requirements:

- Signs are located at each trailhead and campsite to identify that location by name.
- Directional signs direct users to destinations such as campsites, specific features, and trailheads.
- All trails are marked with reflective trail markers.

Administrative Issues

User Education

The physical condition of trails can be improved by sustainable trail design and proper maintenance, but changing user behaviors is essential to resolving some of the persistent problems associated with many types of resource impacts, such as shortcutting, tying horses to trees, littering, and creating new unauthorized trails. Communicating effectively with users can reduce these impacts significantly. Many of the existing common practices that produce damaging impacts are produced by lack of understanding rather than negative intent. The park utilizes several forms of communication to convey messages that promote sustainable practices, and this Plan recommends continuing these efforts. These include:

- Printed information distributed in response to inquiries and backcountry camping permits.
- Informational signs and brochures at trailheads.
- Inclusion of information about sustainable practices such as “Leave No Trace” in appropriate park publications and web pages.

These efforts will be enhanced with continuing support from park user groups, volunteer groups, and other organizations that are encouraged to keep incorporating these messages into their own websites, newsletters, and other communications.

Permits and Fees

The only trail-related permits Mammoth Cave National Park currently requires are free permits for backcountry camping. This requirement is primarily used to regulate and assign backcountry campsites. This Plan does not recommend any additions or changes to the current permit system at this time.

The use of permits and fees as a management option for a variety of activities is a common and accepted practice on federal lands. A permit system allows agencies to determine a highly accurate record of the numbers of individuals engaging in a particular activity, or utilizing a particular facility or area. Issuance of permits also allows an opportunity to provide direct contact with permittees in regard to regulatory requirements, safety, and conservation. The public is not generally opposed to paying nominal fees for engaging in special activities on federal lands, particularly if proceeds are used to improve or maintain those special uses. However, implementation of either system requires an ability to efficiently manage and operate the programs in such a manner that is practical, economical, and enforceable. There is no such program feasible for implementation in the Park at this time.



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U.S. Department of the Interior

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