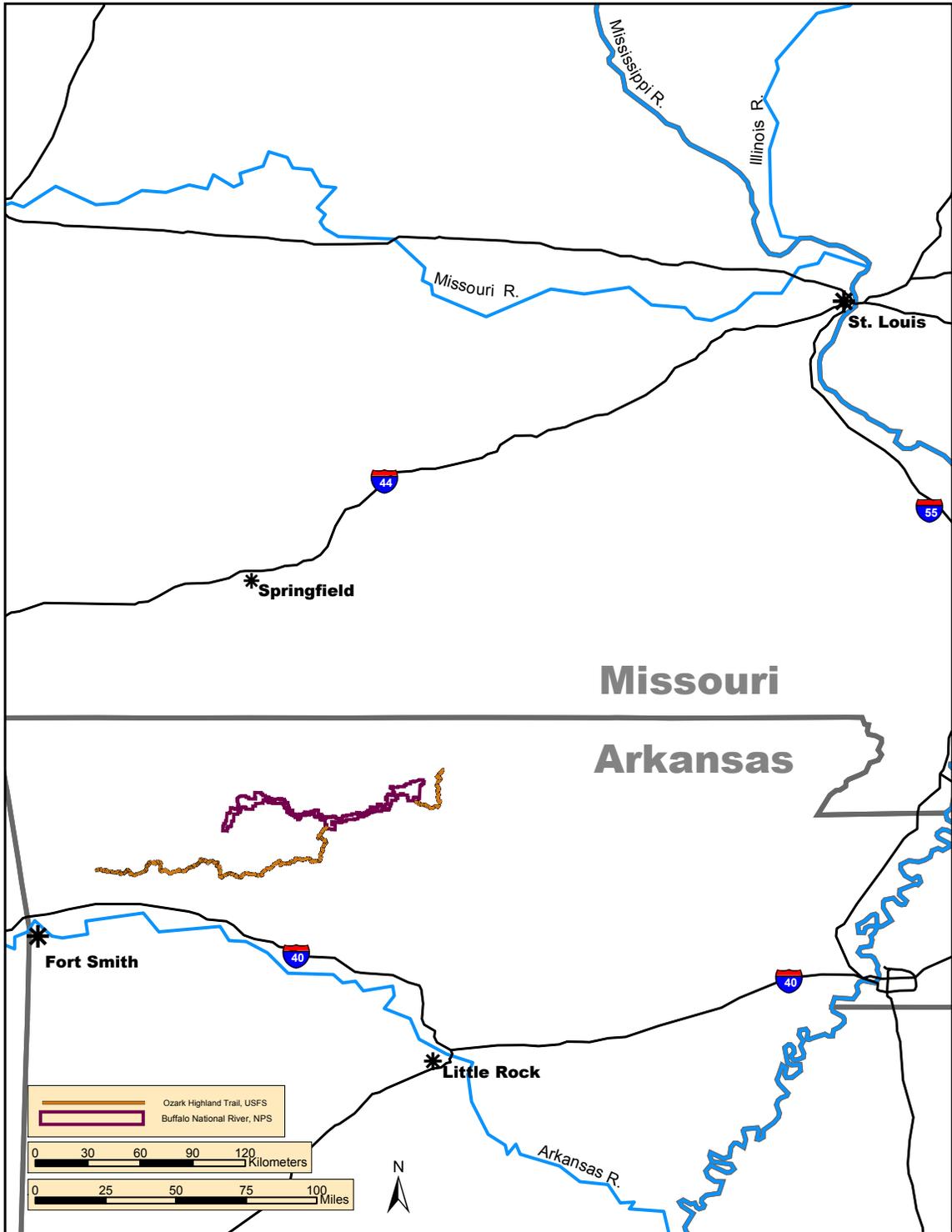


ENVIRONMENTAL ASSESSMENT: OZARK HIGHLANDS TRAIL/BUFFALO RIVER TRAIL EXTENSION PROJECT



**National Park Service
Buffalo National River, Arkansas**

TABLE OF CONTENTS

SUMMARY	3
1.0 PURPOSE AND NEED	4
2.0 ALTERNATIVES	7
2.1 Limitations and Constraints to Alternative Development	7
2.2 Tread Selection through Resource Surveys and Trail Standards.....	7
2.3 Definition of Acceptable Use for Extension of the OHT/BRT.....	8
2.4 Development of Alternatives	8
2.5 Alternatives Considered and Rejected	8
2.6 Alternatives.....	9
2.7 Preferred Alternative.....	19
FIGURE 1: IMPACT SUMMARY	21
3.0 AFFECTED ENVIRONMENT	22
3.1.0 Natural Resources	22
3.2.0 Wilderness	26
3.3.0 Cultural Resources	26
3.4.0 Public Health and Safety.....	30
4.0 ENVIRONMENTAL CONSEQUENCES.....	30
4.1.0 Safety	30
4.2.0 Park Operations.....	32
4.3.0 Natural Resources	34
4.4.0 Historic/Archeological Resources.....	39
4.5.0 Wilderness Values.....	42
5.0 CONSULTATION AND COORDINATION.....	44
6.0 PREPARERS AND REVIEWERS	45
7.0 REFERENCES	46
APPENDIX A:.....	48
APPENDIX B: UNITED STATES FISH AND WILDLIFE SERVICE COMMENTS.....	53

SUMMARY

The Ozark Highlands Trail has been developed by volunteer trail organizers as a long-distance trail that provides the opportunity to hike through the heart of the Ozarks. Construction of the long-distance trail on public lands began in the late 1970s. When completed it will be approximately 1,000 miles long, beginning in St. Louis, Missouri and ending in Fort Smith, Arkansas. Currently, the trail in the vicinity of Buffalo National River has been completed; terminating at the Buffalo River Trail in Woolum to the northwest, and at Spring Creek within the adjacent Ozark National Forest to the southeast.

The Ozark Highlands Trail/Buffalo River Trail Environmental Assessment presents and analyzes five alternatives. The National Park Service has identified ¹Alternative B, Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14, as the Preferred Alternative based on its support of the project purposes and impact information. The alternatives are described in detail in Chapter 2, Alternatives. Chapter 3, Affected Environment, describes the setting and resources potentially affected by the Ozark Highlands Trail/Buffalo River Trail project. Chapter 4, Environmental Consequences, analyzes the environmental impacts associated with each of the alternatives.

¹ Note: Alternative B differs from the Draft Alternative B presented to the public in the Fall of 2001. The change simply represents a re-organization of the alternatives.

1.0 PURPOSE AND NEED

The goal of this Environmental Assessment (EA) is to guide planning and decision-making for the proposed extension of the Ozark Highlands Trail, portions of which coincide with the current Buffalo River Trail (OHT/BRT) through Buffalo National River. To achieve this goal, the EA has provided for public input in the planning process, developed a full range of alternatives, and provided park decision-makers with the potential environmental consequences of each alternative proposed. The need for the proposed OHT/BRT extension project is based on the Trail Plan- Buffalo National River/Arkansas (USDI-NPS, 1987) and its Wilderness and Backcountry Management Plan (USDI-NPS, 1994). Both documents identify the need to address the eventual connection of the Ozark Highlands Trail through or adjacent to Buffalo National River while minimizing trail construction in the Lower Buffalo Wilderness (LBW). Planning for the OHT through the national river is needed at this time because the portions of the OHT surrounding the park are already installed. The availability of funding to pursue planning efforts has also prompted national river staff to address this issue at this time.

The purpose of the proposed trail extension project is to:

- address the request for a trail extension in support of the OHT;
- minimizes new trail mileage through the Lower Buffalo Wilderness Unit;
- provide visitors with the added recreational opportunity of a long-distance trail, and;
- protect park resources from degradation caused by social and/or formal trails.

The first purpose of the project is to provide for the extension of the OHT through the national river. The existence of the OHT on public lands surrounding the national river has driven the need for some action by the park. When completed, the OHT will be approximately 1000 miles long beginning in St. Louis, Missouri and ending in Fort Smith, Arkansas.

The second purpose of the proposed project is to provide visitors with an additional recreational opportunity. No long-distance trail currently exists within Buffalo National River. Previous park planning documents reflect the need to provide a long distance trail through the park as part of the OHT or as a park project. Documents that address the OHT specifically include: the Trail Plan- Buffalo National River/Arkansas (USDI-NPS, 1987), which states:

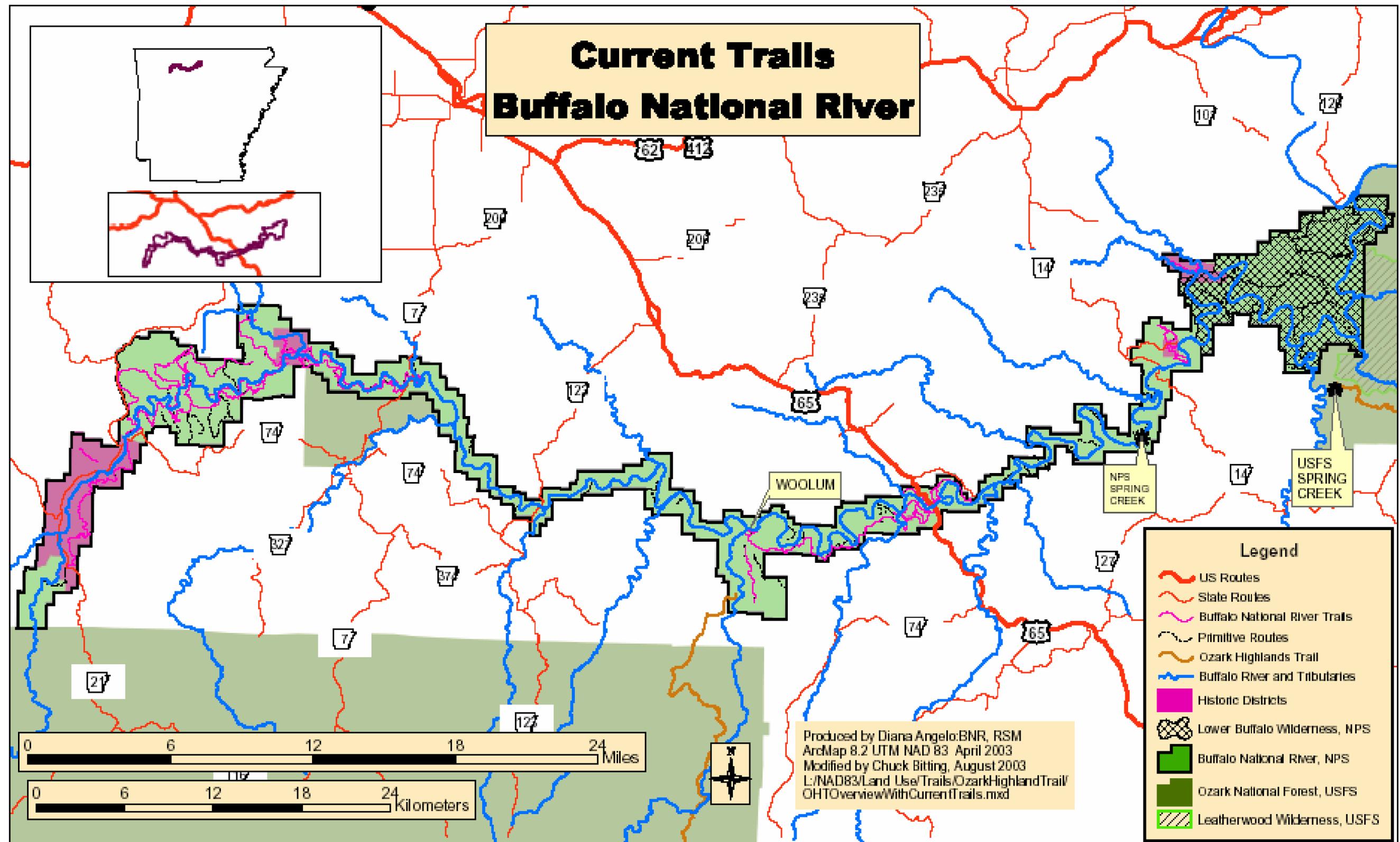
“The Buffalo River Trail will provide a major long-distance hiking opportunity and will also connect with the Ozark [Highlands] Trail, linking the park with a planned, 700-mile long hiking trail being developed in Arkansas and Missouri.”

The Wilderness and Backcountry Management Plan (USDI-NPS, 1994) superseded the Trail Plan and states (under the heading of Proposed Additions to the Maintained Backcountry Trail System):

“Ozark Highlands Trail Extension (OHT)- The OHT will be extended from its current terminus at Highway 65 to the Sylamore District of the Ozark National Forest. The OHT would be developed as a trail for hikers (stock use would be prohibited). The actual route will be determined following the preparation of an Environmental Assessment (EA). The EA will assess alternatives, environmental impacts, and provide public involvement. A major objective is to select a route which minimizes new trail mileage through the Lower Buffalo Wilderness Unit.”

The third purpose of the proposed trail extension is to designate and construct a trail where none exists so that the sensitive cultural and natural resources of the national river are not degraded by social trails. *Social trails* are trails without formal designation that form where repeated use leads to the eventual development of a trail. Social trail development is a serious threat to the rare species, fragile environments, and archeological resources of the national river. By formally designating a trail, the national river may minimize the occurrence of social trails that could develop in the absence of a formally designated trail, thereby protecting sensitive resources from erosion and fragmentation. The development of social trails in the absence of a formal trail is a real threat for the OHT through the national river. When the OHT is complete between St. Louis and Fort Smith, travelers on the trail would be forced to make their way through the national river by some means in the absence of a designated trail. Further, the proposed project will protect resources through targeted surveys within the selected corridor to avoid sensitive

resources that will not be possible if social trails are developed in the absence of a designated OHT connection through the national river.



Map 2: Overview of Current Buffalo National River Trails

2.0 ALTERNATIVES

2.1 Limitations and Constraints to Alternative Development

The alternatives developed within this Environmental Assessment represent a full range of reasonable actions to address the OHT connection at Buffalo National River. The alternatives are limited by factors beyond the control of Buffalo National River and include: the current location of the US Forest Service (USFS) OHT terminus at the USFS Spring Creek; the current northwestern OHT terminus at Woolum; limitations imposed by the Wilderness and Backcountry Management Plan (USDI-NPS, 1994); and steep bluffs and ledges within the national river between these two points.

Several other constraints exist for the development and selection of alternatives for this assessment including, provision of recreational opportunities to the maximum number of visitors without causing resource damage. NPS Management Policies (USDI-NPS, 2001; 9.2) directs each park to consider trails as management tools in controlling the distribution and intensity of use and should be designed to reduce safety concerns, provide access to the greatest number of individuals, and to protect park resources. The policies are relevant to the development of a new trail at Buffalo National River, particularly concerning allowable use (access) and resource protection. The need to strike a balance between providing the development needed for optimum visitor access and enjoyment of the national river and the protection of the resources within it are reflected within this document. It is possible to both provide access to the public for recreational pursuits while protecting the unique and valuable resources of the park by adequate planning and resource surveys.

The park is committed to preserving its resources intact through its enabling legislation (Public Law 92-237, 86 STAT. 44) which established the Buffalo National River:

“...for the purpose of conserving and interpreting and area containing unique scenic and scientific features, and preserving as a free-flowing stream, an important segment of the Buffalo River in Arkansas for the benefit and enjoyment of present and future generations,...”

The enabling legislation charges the national river to conserve its scientific features which include its natural and cultural resources and their scenic values.

The protection of the wilderness values of the LBW including; natural quiet, opportunities for solitude, and the aesthetic value of undisturbed natural landscapes must also be met by the alternatives. Minimizing the construction of new trails within the Lower Buffalo Wilderness would support the preservation of these values as described in the Wilderness and Backcountry Management Plan (USDI-NPS, 1994).

2.2 Tread Selection through Resource Surveys and Trail Standards

Selection of an alternative in this EA will be as a corridor and will not provide an exact trail location on the ground. The features of the national river that make it an outstanding resource; rare species, habitats, caves, rugged terrain, and wide variety of cultural resources, both historic and pre-historic, give rise to unique challenges in assessing the potential consequences of human disturbances and developments. A complete archeological survey has not been completed for the national river and while some information is available on the values of historic structures and districts, much work remains to complete full surveys of historic resources. While natural resources are better known, formal surveys are incomplete. The park has some data on the location of rare species although park-wide surveys have not been completed. Therefore, in order to protect unknown resources, the following survey method was adopted for the proposed project.

Under Alternative A, the park would undertake no actions in support of the extension of the OHT. The other four alternatives would include the completion of detailed surveys for trail construction concerns and natural and cultural resources to define the trail tread within the selected Alternative corridor. Completing the surveys on all the proposed Alternatives before completing this EA was deemed impossible due to the high costs of the surveys. Therefore, the Alternatives are presented as broadly defined corridors rather than exact tread lines on the ground. Unless Alternative A is adopted, completion

of surveys by park staff and/or contractors once an Alternative is adopted will ensure that no adverse effects to cultural resources or sensitive natural resources would occur within the tread or right-of-way of any new trail built within Buffalo National River.

Natural resource surveys will consist of botanical surveys to determine if any rare plants or habitats are in the vicinity or in the path of a new trail. If rare species or habitats were found, the trail would be shifted to avoid them.

Cultural resource surveys would be completed to detect the presence of any visible or below ground resources such as historic or prehistoric objects. If sites are found adjacent to or within the path of the trail, several options exist for trail installation and preservation of the site once formal consultation with the State Historic Preservation Officer (SHPO) is completed. First, the trail could simply be re-routed if the site is small. Second, if the site is well buried, trail construction may not affect the site. If the site is near the surface of the ground and the trail cannot be re-routed, it is possible to simply mow the trail rather than disturbing the earth for the extent of the site. Finally, if resources would be adversely affected by the trail and no other options exist, the site can be excavated and the data from the site documented to provide a formal and detailed record of it.

Another requirement for any new trails developed within Buffalo National River is a strict adherence to NPS Trail Standards (1998). The standards describe all aspects of trail construction and maintenance including the construction of structures to decrease erosion and provide acceptable grades on trails. All trails within Buffalo National River currently comply with these standards.

Construction of any new trail would be accomplished using hand tools such as brush hogs and chain saws in non-Wilderness. In designated Wilderness areas, parks are not permitted to use powered equipment of any kind, all trail work would be accomplished using hand saws and other hand tool such as hoes, rakes and shovels.

2.3 Definition of Acceptable Use for Extension of the OHT/BRT

Equestrian use of the national river is a very popular and long-standing use within the park. Maintaining the current level of multi-use trails would provide the most visitor benefit while protecting resources. Should any of the alternatives other than the “no action” alternative be adopted, the *new* segment of trail (referred to as OHT/BRT) would become part of the BRT and designated as “hiking only.” However, current multiple use sections of the BRT would remain multiple use. The eastern terminus of the Buffalo River Trail currently coincides with the beginning of a primitive trail used primarily by horseback riders; equestrian use of this section could continue under any of the alternatives.

2.4 Development of Alternatives

The Buffalo National River developed draft alternatives that were presented at a series of public meetings and direct mailings to interest groups and individuals who had expressed an interest in the OHT at Buffalo National River (Draft Alternatives are found in Appendix A). Based on public comments to the draft alternatives, final alternatives were developed for analysis within this Environmental Assessment. The alternatives presented reflect only minor changes from the Draft Alternatives. A summary of, and response to, public comments received are found in Appendix A.

2.5 Alternatives Considered and Rejected

Construction of a new trail between Woolum and Hwy 65 was considered and rejected. The existing Buffalo River Trail is already connected to the existing OHT and a new trail specifically for OHT use within this area would offer no additional visitor benefit.

A trail north of the Buffalo River within the LBW could be built. However, it would require the construction of nearly double the miles of new trail when compared with the other alternatives for this segment, adding substantially to both impacts and construction/maintenance costs. Further, it would require a river crossing to link with the US Forest Service terminus at Spring Creek, a safety and a cost issue. An alternative that includes a north of the river trail through the Lower Buffalo Wilderness was rejected based on the complexity and cost of building the additional miles of trail and providing a means to cross the river.

2.6 Alternatives

The following represent the alternatives developed to meet the purposes of the proposed project within the constraints and limitations defined.

Table 1. Summary of Alternatives

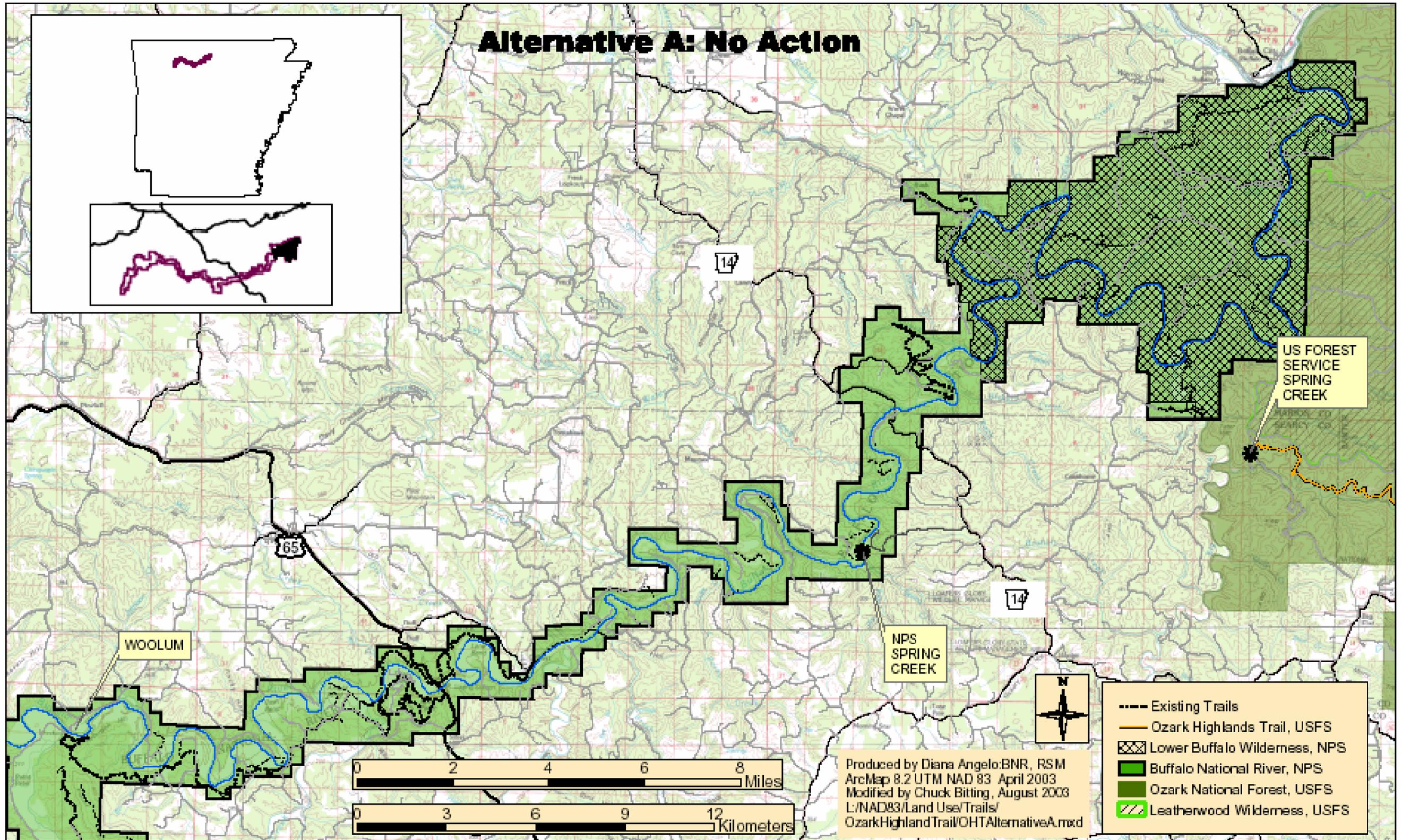
Alternative	Title	Location Relative to River	New Trail Miles Total	New Trail Miles in LBW	Highway Crossing	New Trail Within LBW
A	No Action	Not Applicable	0	0	0	No
B Preferred and Environmentally Preferred Alternative	Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14	South	20	0	0	No
C	Full Trail South of Buffalo River to USFS Spring Creek	South	45	21	0	Yes
D	Trail North of Buffalo River to Highway 14	North	20	0	Highway 14 (or river crossing)	No
E	Full Trail to USFS Spring Creek	North and South	45	21	Highway 14 (or river crossing)	Yes

Alternative A: No Action

No additional trails would be constructed within Buffalo National River to accommodate OHT traffic under this alternative. The existing Buffalo River Trail (BRT) could be used by OHT users between Woolum and Highway 65; this section of BRT is continuous between these two points. It is approximately 16 miles long and open to equestrian and hiking use. Trails are maintained in accordance with the Wilderness and Backcountry Management Plan (USDI-NPS, 1994):

“ 24 to 36-inch tread width, 1-7% (10% grade over short distances), and has a maximum right-of-way clearing of 10 feet high and 6 feet wide. Signs and markers are minimal and rustic and include only blazes and directions with no distances.”

Annual trail maintenance is conducted on the BRT to remove hazards, repair tread and/or water bars, and ensure trail standards are in place.



Map 3: Alternative A Overview

Alternative B: Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14-Preferred Alternative

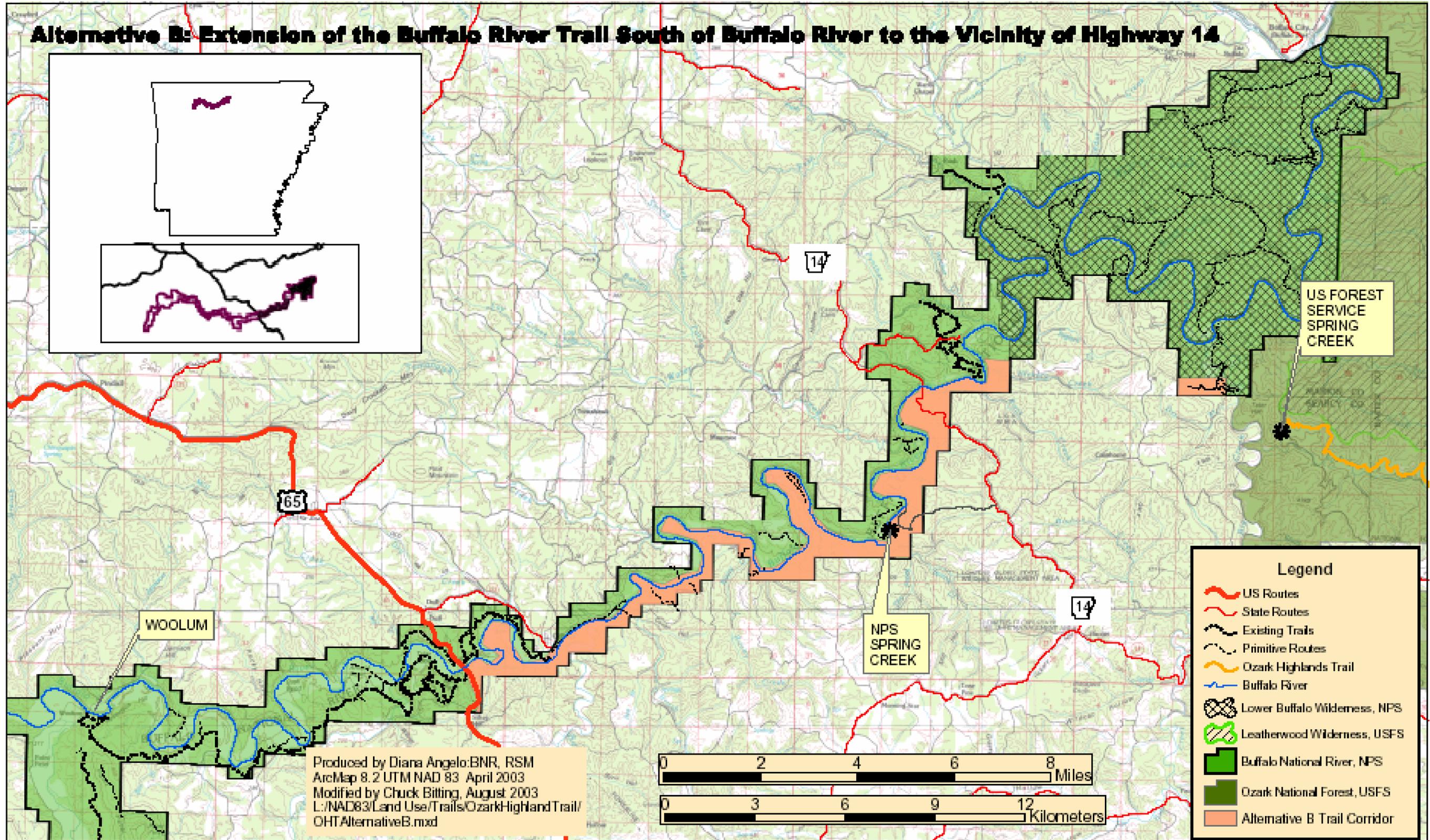
Draft Alternative B would utilize the existing Buffalo River Trail between Woolum and Highway 65. This trail is continuous between these two points, and open to both hiking and equestrian use. An extension of the Buffalo River Trail would be built south of the river from Highway 65 to the vicinity of Highway 14. No formal trail would be built through the Lower Buffalo Wilderness.

Implementation of Draft Alternative B would require the construction of approximately 20 miles of new trail within Buffalo National River from Highway 65 to the vicinity of Highway 14 along the corridor of park lands south of the Buffalo River. The exact location of the new trail would be determined by natural and cultural resource surveys prior to the installation of the trail.

Under this alternative, trails would be built to Zone 3&4 Hiking Backcountry Trail standards (DOI-NPS Buffalo National River Wilderness and Backcountry Management Plan, 1994). Briefly, the standards include: grades between 1-10% and up to 15% over short distances; tread widths of 18-24 inches; right-of-way clearings of a maximum of 8 feet high and 5 feet wide and; rustic signs and blazes. Trail maintenance would be accomplished annually by Buffalo National River trail crews and/or volunteer trail groups, the same as existing park trails. Volunteer trail groups under the supervision of Buffalo National River Trails Coordinator would accomplish the physical construction of the proposed OHT/BRT to the vicinity of Highway 14, once flagged by surveys. Connecting the OHT between the Ozark National Forest and Highway 14 on public land, such as state and county road right-of-ways, is possible without using the property of the national river.

Alternative B includes the potential to build an OHT/BRT trail within the section of non-wilderness park property south of the LBW to connect to other segments of the OHT following adequate natural and cultural resource surveys and trail surveys. The parcel includes an existing parking lot and is defined by the boundary between Searcy and Marion Counties to the south, LBW to the north and east, and follows the park boundary to the west. The parcel has existing primitive trails and old roads within it that could be adapted for OHT use with a minimum of construction. The parcel is included in this alternative to provide options for connecting the OHT from outside of park property. The Wilderness and Backcountry Management Plan defines this small parcel as a Special Use Zone and any new trails would be installed and maintained in the same manner described above.

Alternative B: Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14



Map 4: Alternative B Overview

Alternative C: Full Trail South of Buffalo River to USFS Spring Creek

Draft Alternative C would use the existing BRT between Woolum and Highway 65 to accommodate OHT users. An extension of the BRT would be constructed south of the river between Highway 65 and Highway 14. Within the LBW, between Highway 14 and the US Forest Service OHT terminus at Spring Creek, east of Tater Hill, near Big Creek, the BRT extension would utilize existing roads and new trail construction where needed.

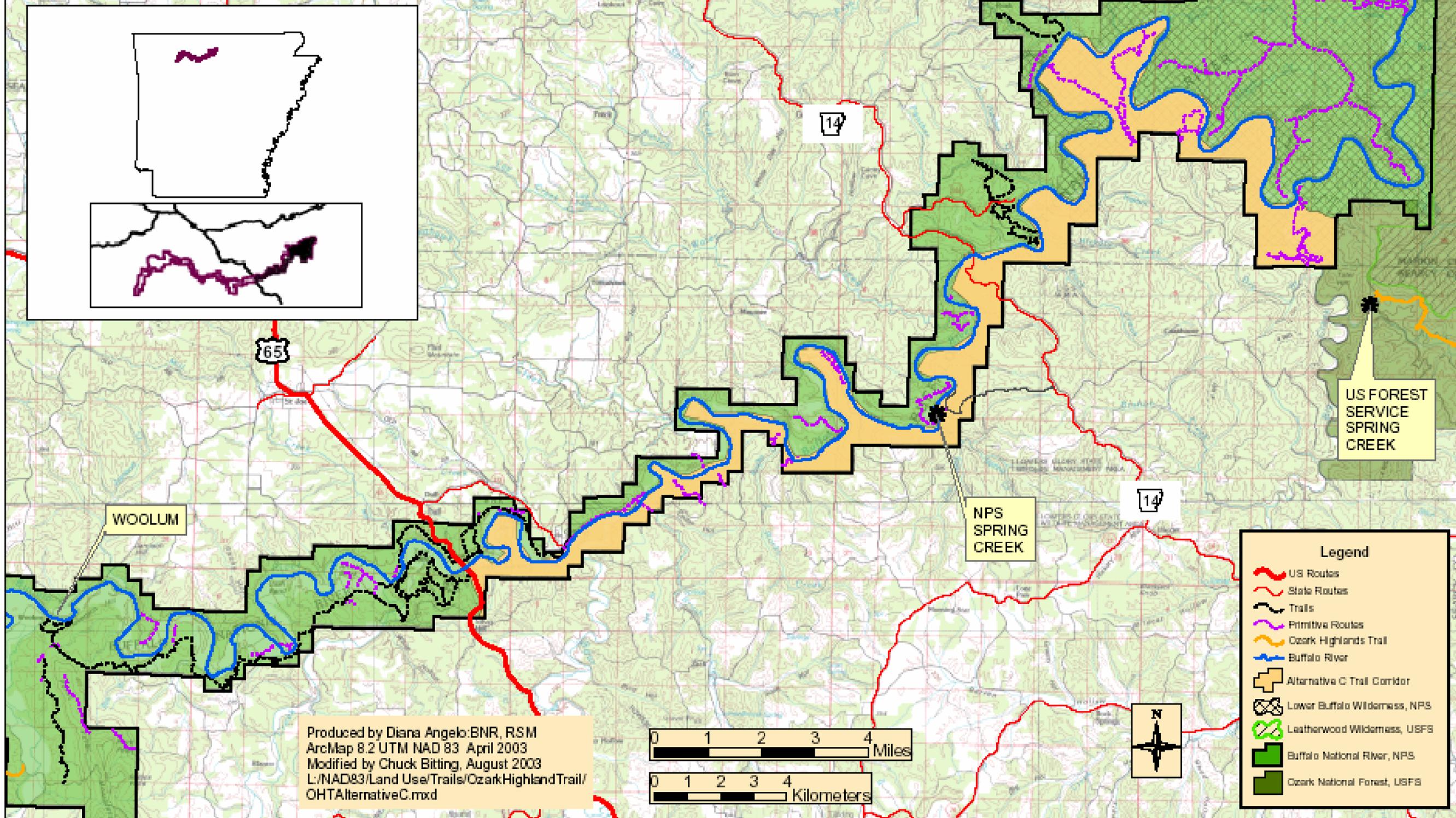
The exact location of new BRT trail would be determined by cultural and natural resource surveys within the proposed route shown on the map. National Park Service Trail Guidelines for hiking trails would be used in the planning, construction and maintenance of the OHT/BRT extension.

Implementation of Draft Alternative C would require the construction of roughly 45 miles of new trail within Buffalo National River; 24 miles across the middle of the park and 21 miles within the LBW.

Trail standards defined by the Wilderness and Backcountry Management Plan for these areas of the park would be employed in the establishment of new trail under this alternative.

Under this alternative, trails would be built to Zone 3&4 Hiking Backcountry Trail standards (DOI-NPS Buffalo National River Wilderness and Backcountry Management Plan, 1994). Briefly, the standards include: grades between 1-10% and up to 15% over short distances; tread widths of 18-24 inches; right-of-way clearings of a maximum of 8 feet high and 5 feet wide and; rustic signs and blazes. Trail maintenance would be accomplished annually by Buffalo National River trail crews and/or volunteer trail groups, the same as existing park trails. Volunteer trail groups under the supervision of Buffalo National River Trails Coordinator would accomplish the physical construction of the proposed OHT/BRT to the Spring Creek/Big Creek area and yearly trail maintenance, once flagged by surveys.

Alternative C: Full Trail South of Buffalo River to Spring Creek



Map 4: Alternative C Overview

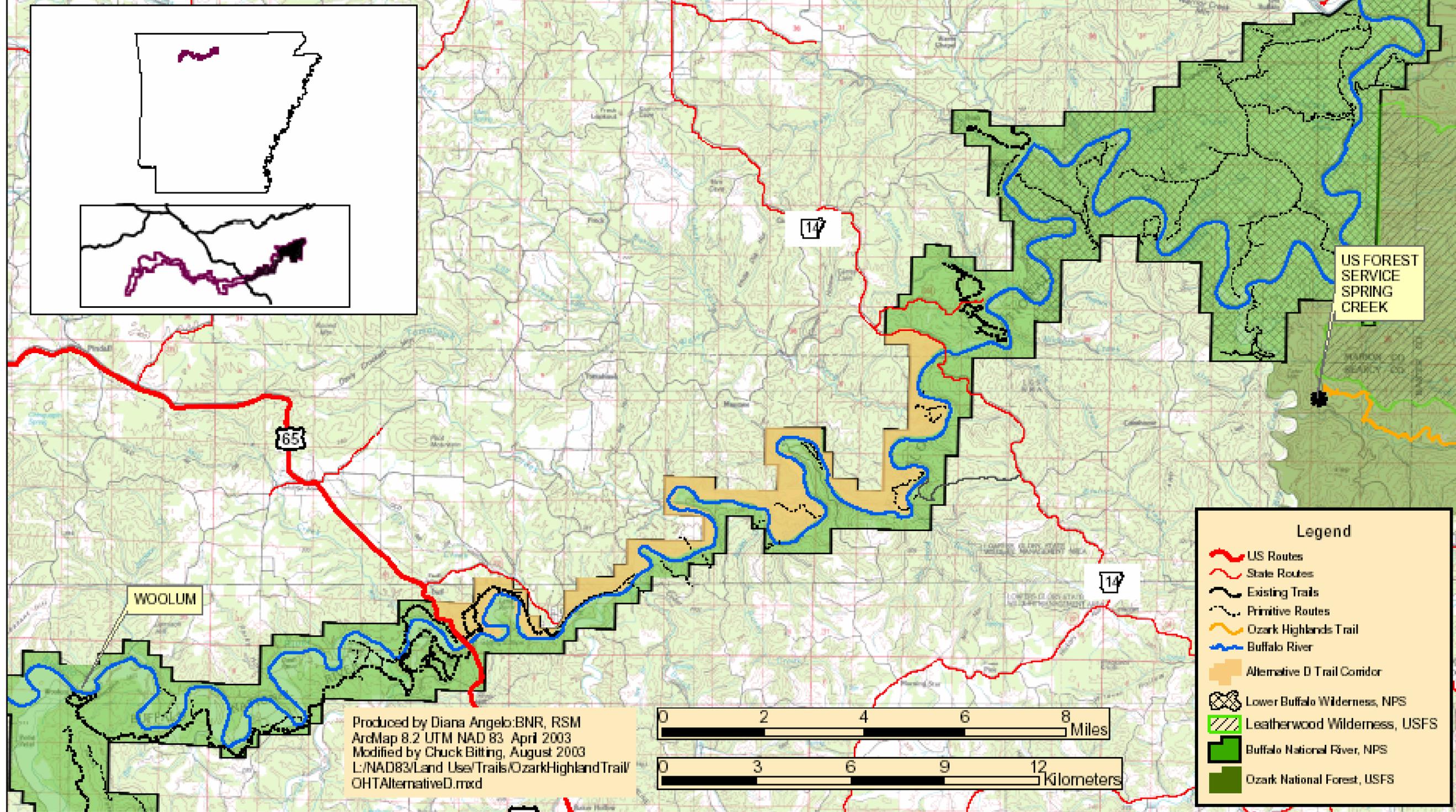
Alternative D: Trail North of Buffalo River to Highway 14

Alternative D would use the existing BRT between Woolum and Highway 65. An extension of the OHT/BRT north of the river to Highway 14 would be constructed. At Highway 14, the formal trail would end and no formal trail would be established within the Lower Buffalo Wilderness. Travel between Highway 14 to the US Forest Service OHT terminus at Spring Creek could occur via orienteering and/or floating. Adoption of Draft Alternative D would require the construction of roughly 20 miles of new trail within Buffalo National River.

Orienteering, the use of map compass or similar device for traveling between two points, would be possible between the proposed terminus at Highway 14 north of the river and the US Forest Service terminus at Big Creek within the Ozark National Forest. The recreational opportunity for orienteering within the LBW already exists but is not often done due, presumably, to the rugged terrain.

New trail between Highway 65 and Highway 14 would follow NPS Trail Standards (1994) and the Wilderness and Backcountry Management Plan (1994). Exact trail location would be determined following detailed natural and cultural resource surveys to avoid sensitive areas and resources. Under this alternative, trails would be built to Zone 3&4 Hiking Backcountry Trail Standards (DOI-NPS Buffalo National River Wilderness and Backcountry Management Plan, 1994). Briefly, the standards include: grades between 1-10% and up to 15% over short distances; tread widths of 18-24 inches; right-of-way clearings of a maximum of 8 feet high and 5 feet wide and; rustic signs and blazes. Trail maintenance would be accomplished annually by Buffalo National River trail crews and/or volunteer trail groups, the same as existing park trails

Alternative D: Trail North of Buffalo River to Highway 14



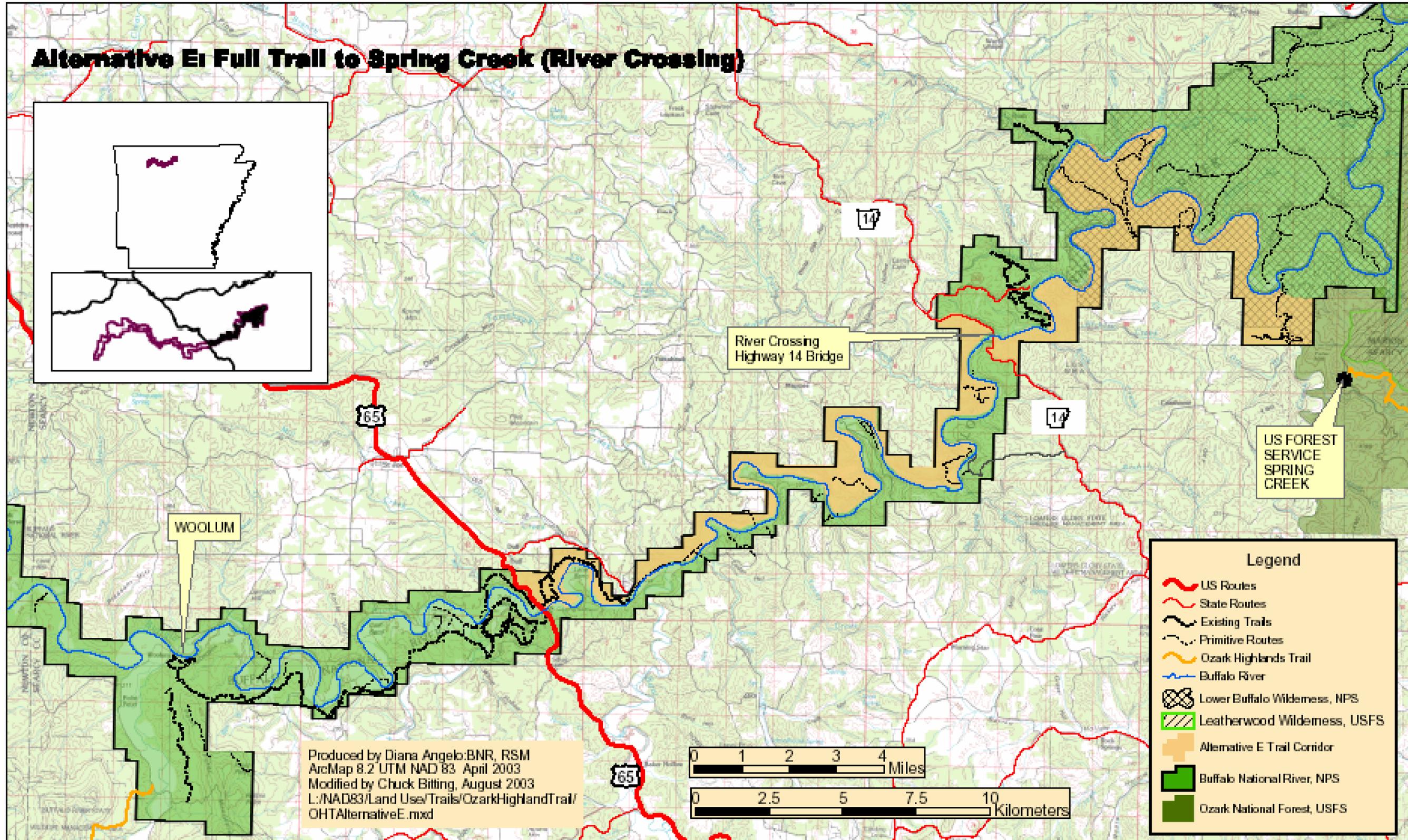
Map 5: Alternative D Overview

Alternative E: Full Trail to USFS Spring Creek (River Crossing)

Draft Alternative E would utilize the existing Buffalo River Trail between Woolum and Highway 65 for foot traffic. The existing horse trail crossing at Calf Creek would be utilized, and horse and pedestrian travel would be separated in the Tyler Bend area as it currently is. An extension of the Buffalo River Trail would be constructed north of the river between Highway 65 and Highway 14. The trail would cross the Highway 14 bridge, begin a route south of the Buffalo River through the LBW, and connect with the US Forest Service OHT at Spring Creek. Adoption of Draft Alternative E would require the construction of roughly 45 miles of new trails with Buffalo National River; 24 miles in the middle section of the park and 21 miles within the LBW.

Under this alternative, trails would be built to Zone 3&4 Hiking Backcountry Trail Standards (DOI-NPS Buffalo National River Wilderness and Backcountry Management Plan, 1994). Briefly, the standards include: grades between 1-10% and up to 15% over short distances; tread widths of 18-24 inches; right-of-way clearings of a maximum of 8 feet high and 5 feet wide and; rustic signs and blazes. Trail maintenance would be accomplished annually by Buffalo National River trail crews and/or volunteer trail groups, the same as existing park trails

Alternative E: Full Trail to Spring Creek (River Crossing)



Map 6: Alternative E Overview

2.7 Preferred Alternative

The purposes defined for this project and the impact information developed have led to the selection of **Alternative B- Extension of the Buffalo River Trail South of the Buffalo River to the Vicinity of Highway 14** as the Preferred Alternative. Alternative B provides additional recreational opportunities, fulfills the management guidelines to support the OHT, minimizes new trail mileage, and protects the wilderness values of the LBW and the resources of the park. A trail south of the Buffalo River can be safely constructed using NPS Trail Standards (1998) and can be maintained by volunteer trail groups at low cost to the national river. Alternative B is preferred over the other alternatives because:

- it provides for the possibility of connecting the OHT to the established portions of the trail;
- it can be installed in a manner that reduces impacts (via detailed survey and sensitive trail construction);
- it does not further impact the values of the LBW, where numerous trails already traverse the landscape;
- it provides an established trail where the probability of the establishment of social trails is high (between Highway 65 and Highway 14), and;
- it does not change the current level of multiple use trails within the national river.

Alternative A would have the least impact to safety, park operations, or natural and cultural resources. However, it does not address the purpose of providing a long-distance trail and connection with the Ozark Highlands Trail outside of park boundaries.

Alternatives C and E, full trails to USFS Spring Creek, would have the most impact to park operations; survey, construction, and maintenance cost would be higher than the other alternatives. The remoteness of the LBW, river and highway crossings, and the length of the trail are all safety concerns. While sensitive trail construction can minimize safety concerns, there will always be the risk of injury during hiking in rugged terrain. Crossing the river at Highway 14 is difficult and would be unsafe during high water conditions (Alternatives D and E). Under Alternatives C and E, the potential for impacts to resources is greater than that of Alternatives B and D, again due to 45 new trail miles rather than 20 miles. While detailed surveys of natural and cultural resources can be conducted to minimize any impacts, a small amount of damage to resources from trail clearing and development of side-trails is possible. The wilderness values of the LBW are most affected under Alternatives C and E. The existence of numerous primitive trails, well-developed social trails, and old roads pre-dating the establishment of the park already provide ample opportunities for visitors to experience the LBW, another trail would add to the disturbance of the property and is therefore not desirable. Providing a trail connection that excludes the LBW would also minimize the development of additional social trails within the LBW while providing access to the USFS OHT.

Alternative D is very similar to the preferred alternative although it does not provide a means to cross the river at Highway 14 to connect outside of the park with the US Forest Service, Ozark National Forest OHT. The geography of the land (rivers and mountainous terrain) between Highway 14 and the US Forest Service, Ozark National Forest would require OHT users to cross Highway 14 in order to connect to any OHT trails built outside of park property. Alternative D is therefore not as desirable an alternative as Alternative B.

2.8 Environmentally Preferred Alternative

Alternative B is also the Environmentally Preferred Alternative. Based upon the analysis of impacts in Chapter 4, Alternative B would have the least impact on safety, park operations, natural and cultural resources, or wilderness values overall. While Alternative A, “No Action” would have the least impact on park operations and safety, it does not support the purposes of the proposed project; providing visitors a long-distance hiking trail within the national river. Further, the potential impacts to natural and cultural resources from the development of social trails are highest under the “No Action” alternative.

Alternatives B and D both minimize the new miles of trail within the national river, reducing the safety risks, long and short-term costs to the park, and provide for the protection of cultural and natural

resources and wilderness values. However, Alternative D requires a road or river crossing and is therefore less safe than Alternative B.

The long and short-term costs associated with Alternatives C and E and the additional miles of trail to be built under those alternatives prevent either of them from being the Environmentally Preferred Alternative. Further, both Alternative C and E compromise the wilderness values of the LBW by allowing for a new 25 mile trail to be built within the LBW where numerous old roads and trails already exist. The cultural resources present in the LBW are not well documented. Both unknown and known resources are sensitive to theft and vandalism due to the remote nature of the LBW.

Alternative B protects the wilderness values of the LBW, reduces costs, provides for the protection of sensitive resources, and addresses safety issues. Further, Alternative B meets the needs defined for the project and fulfills the stated project purposes.

Figure 1: **IMPACT SUMMARY**

Definitions and full analysis is found in Chapter 4.

Alternatives	Impact Topics				
	Safety	Park Operations	Natural Resources	Historic/ Archeological Resources	Wilderness Values
A: No Action	No change	No impact	Potential for Moderate impacts possible through the development of social trails.	Moderate to Major impacts possible through the development of social trails.	Potential for Minimal to Moderate impacts based on anticipated development of social trails.
B: Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14	Hiking and trail installation/maintenance over 20 miles is a negligible concern. Potential for lost visitors is low.	<ul style="list-style-type: none"> \$14,800 initial surveys 740 hours additional trail maintenance yearly 	Potential for Minor impacts over 20 miles.	Potential for Minor impacts to archeological resources over 20 miles. Negligible impact to Collier Homestead.	No impact
C: Full Trail South of Buffalo River to USFS Spring Creek	Hiking and trail installation/maintenance over 45 miles is a negligible concern. Potential for lost visitors is minor to moderate.	<ul style="list-style-type: none"> \$ 33,000 initial surveys 1,665 hours additional trail maintenance yearly 	Potential for Minimal impacts over 45 miles.	Potential for Minimal to Moderate impacts to archeological sites over 45 miles. Potential for Minimal to Moderate impacts to historic structures/districts.	Potential for Moderate impacts to Wilderness values based on providing formal access and constructing another trail within the Wilderness.
D: Trail North of Buffalo River to Highway 14	Hiking and trail installation/maintenance over 20 miles is a negligible concern. Potential for lost visitors is low. River crossing at Hwy. 14 bridge.	<ul style="list-style-type: none"> \$14,800 initial surveys 740 hours additional trail maintenance yearly 	Potential for Minor impacts over 20 miles.	Potential for Minor impacts to archeological resources over 20 miles. Negligible impact to Collier Homestead.	No impact
E: Full Trail to USFS Spring Creek (River Crossing)	Hiking and trail installation/maintenance over 45 miles is a negligible concern. River crossing at Highway 14 bridge. Potential for lost visitors is minor to moderate.	<ul style="list-style-type: none"> \$ 33,000 initial surveys 1,665 hours additional trail maintenance yearly 	Potential for Minimal impacts over 45 miles.	Potential for Minimal to Moderate impacts to archeological sites over 45 miles. Potential for Minimal to Moderate impacts to historic structures/districts.	Potential for Moderate impacts to Wilderness values based on providing formal access and constructing another trail within the Wilderness.

3.0 AFFECTED ENVIRONMENT

The following descriptions represent the resources potentially affected in the course of the completion of the proposed project. The Interdisciplinary Team comprised of resource, administrative, interpretive and maintenance staff at the national river discussed possible topics and dismissed topics with no potential for impact. Water resources (quality and quantity), invertebrates, and fish were all dismissed because the trail will be built away from the river and no effects to those resources would occur under any of the proposed alternatives.

3.1.0 Natural Resources

3.1.1 Vegetation

Major vegetation types present within Buffalo National River are; upland oak-hickory forest, upland oak-pine forest, beech forest, riparian forest, glades, glade-forest transition areas, river cane thickets, post-oak barrens, and a variety of open fields. The open field areas are currently in a combination of old-field, agricultural, or planted native forb communities. Also of note are the plant communities associated with unique features of the park such as seeps, springs, and bluff faces; these unique habitats support a variety of rare plant species.

The location, condition, and extent of each plant community type combine to determine the viability of the plant and wildlife populations they support. Accordingly, management of vegetation is the focus of much attention at Buffalo National River in preserving and protecting native species and communities.

The extent of hardwood forests has decreased steadily in the Eastern and Midwestern United States since European settlement. The high value of hardwood trees for construction and other industries and the occurrence of most of the hardwood forests on land that is highly fertile and desirable for agriculture use have precipitated the declines (Preston, 1989). Estimates indicate that in the early 1800's about 1 million square miles of unbroken forest in the Southeastern states were present and by 1923 the forested land had been reduced to 260,000 square miles (Bryant et al, 1993). Past use of the Buffalo National River property is evident in the diverse and patchy distribution of ornamental and agricultural exotic vegetation. The control and management of exotic species within the park is a goal described in the park's Resource Management Plan.

The records of the General Land Office of the United States have been analyzed by Johnson and Schnell (1985). The analysis of tree data from the original land surveys indicates the distribution and composition of forests have not changed significantly since the surveys were completed between 1830 and 1845. One exception is the current presence of old-fields that were not present during the original surveys. The vegetative community types present in the Buffalo River watershed before settlement, with the exception of beech forests, developed due to periodic disturbances such as fire and severe weather as evidenced by the species noted and the written habitat descriptions provided in the land survey notes. Naturally-ignited fires occurred in Northern Arkansas on a frequent basis before European settlement. However, the presence of disturbance-dependent plant communities during the early surveys may also be the result of a long history of cultural practices by indigenous Americans. While not specifically investigated for the national river property, regional studies indicate that fire use for the establishment of hunting camps, hunting grounds, and agricultural purposes was a common and widespread occurrence along with naturally ignited lightning fires. Current evidence suggests that cultural fires tended to be small in extent and may not have equaled the extent of naturally-occurring fires in the Southeast (Fritz, 2000). The presence of early artifacts within the national river supports the theory that indigenous Americans had utilized the property for many years and were present in some density. No investigation into the extent of fire use by those peoples has been undertaken for property of Buffalo National River.

The national river contains at least seven rare plants and three rare community types (Table 2), although none have federal ranking. Population numbers and locations of plant species have been recorded in reports from botanical surveys of various project areas (Rebertus and Jenkins, 1994; Logan, 1992; Logan

1999; Hinterthuer, 1994; Rettig, 1996; Dechant, 1994). The locations of rare and listed species are only partially documented for the national river and a monitoring program has not been developed. Based on the limited botanical data, avoiding these species under any of the proposed alternatives can be readily accomplished through botanical surveys within the selected Alternative corridor. Performing natural resource surveys within the selected alternative corridor will ensure no impacts to individuals of these species occur.

Table 2: Vegetation Species and Communities Considered (None of the species or communities have federal ranking)

Species	Common Name	Occurrence in area of Consideration	Habitat Type	State Status	Global Rank	State Rank
Plants						
<i>Castanea pumila var. ozarkensis</i>	Ozark Chinquapin	Yes	Forest openings	Inv.	G5T3	S3S4
<i>Delphinium newtonianum</i>	Moore's larkspur	Yes	Hardwood forest	Inv.	G3	S3
<i>Delphinium treleasei</i>	Trelease's larkspur	Unknown	Glades Barrens Roadsides	Inv.	G3	S3
<i>Neviusia alabamensis</i>	Alabama Snow Wreath	Yes	Riparian forest and Canebrake	T	G2	S1S2
<i>Tradescantia ozarkana</i>	Ozark spiderwort	Yes	All	Inv.	G3	S3
<i>Trillium pusillum var. ozarkanum</i>	Ozark Wake-Robin	Yes	Savanna Open forest	Inv.	G3T3	S3
<i>Valerianella ozarkana</i>	Ozark cornsalad	Yes	Ozark glades	Inv.	G3	S3
Rare Community Types						
N/A	Post Oak Savanna community	Yes	N/A	N/A	N/A	N/A
N/A	Glade community	Yes	N/A	N/A	N/A	N/A
N/A	Canebrake community	No	N/A	N/A	N/A	N/A

Sources: USFWS, Natureserve.org, Arkansas Natural Heritage Commission

3.1.2 Wildlife

The park supports a variety of Midwestern and Southeastern forest wildlife. Hunting and fishing are permitted within BNR and reflect the historic use of the property.

In the early 1980's, Rocky Mountain elk were introduced to north central Arkansas and now inhabit Buffalo National River. Management of this species is the responsibility of the Arkansas Game and Fish Commission who work closely with Resource Managers at the national river to assess population size and health. Ruffed grouse and turkey were also re-introduced at the national river. The Arkansas Game and Fish Commission monitor all three species. The proposed management action is unlikely to have any affect on the introduced species of game. The species' actively avoid humans and the minimal and temporary disturbance caused by hikers is not considered an impact.

A variety of wildlife species has been documented at the national river. Thorough surveys have not been completed for terrestrial species at the park except for rare species. Table 3 summarizes the rare species of the national river. Several have federal ranking under the Endangered Species Act. Protection of these species and their critical habitats within the national river is a high priority. The locations of most rare species within the national river are well documented. Location data will not be provided to the public within this document in order to protect the individuals of these species and their critical habitats within the park.

Table 3: Rare Wildlife Species of Buffalo National River

Species	Common Name	Federal Ranking	Occurrence in area of Consideration	State Status	Global Rank	State Rank
Invertebrates						
<i>Cyprogenia aberti</i>	Western Fanshell mussel	N/A	No	Inv.	G2	S2?
<i>Rimulincola divalis</i>	Beetle	N/A	Unknown	Inv.	G1	S1
Mammals						
<i>Corynorhinus townsendii ingens</i>	Ozark Big-Ear bat	E	Yes	Inv.	G4T1	S1
<i>Myotis grisescens</i>	Gray bat	E	Yes	Inv.	G3	S2
<i>Myotis sodalis</i>	Indiana bat	E	Yes	Inv.	G2	S2
<i>Myotis leibii</i>	Eastern small-footed bat	N/A	Yes	Inv.	G3	S1
Birds						
<i>Limnothlypis swainsonii</i>	Swainson's warbler	N/A	No	Inv.	G4T1	S3B
<i>Haliaeetus leucocephalus</i>	Bald eagle	T	Yes	Inv.		
Fish						
<i>Notropis ozarcanus</i>	Ozark shiner	N/A	No	Inv.	G3	S2

The following is taken from the Ozark Highlands Trail Biological Evaluation (Bitting, 2003). It provides the justification for the analysis of the impacts to rare wildlife.

Birds

Swainson's Warbler (*Limnothlypis swainsonii*) has been found in small numbers utilizing canebrake and other riparian habitat along the river. It is a migrant bird that breeds in mid latitudes. One of its preferred breeding areas is canebrakes. It can be directly impacted by trail construction, maintenance and use by destruction of its habitat and disturbance during its nesting period. Because the proposed trail, for most of its length, would be on higher ground than cane generally grows, and not in heavy cover, none of the Alternatives is likely to have an adverse affect on this species.

The Bald Eagle (*Haliaeetus leucocephalus*) winters along larger streams and water bodies in the southern United States. This species relies on the rivers for most of its food. It typically roosts on large trees or snags on banks and hillsides overlooking water. In the early 1980's, eagle fledglings were hacked at a site adjacent to the Lower Buffalo unit of the Buffalo National River Wilderness. There have been no nesting pairs of this eagle since it has made its comeback. Each winter for most of the past twelve years, an eagle survey has been performed. The survey is performed for one day, covering as much of the river as possible. The lower sections of the river have a wintering population of approximately one eagle per two river miles. (NPS, unpublished records).

Mammals

The Ozark Big-Ear bat (*Corynorhinus townsendii ingens*) has been observed using three caves and one abandoned mine at Buffalo National River over the past 15 years. One member of the species has been found roosting in a cave in the summer. The others have been found in the fall, winter, and spring. The population for this species is currently four individuals in the park. This is a rather large bat which prefers

to forage in open forests or on forest edge (USFWS, 1995). Its summer roost requirements are variable. It may roost in caves proper, or in fractures in limestone or sandstone bluffs. In winter it requires a cave which will act as a cold trap and maintain a temperature between 0 and 13 degrees Celsius. The humidity must be between 60 and 97 percent (USFWS, 1995). There are three caves and one abandoned mine within the boundaries of Buffalo National River known to house one or two individuals of this species over the past fifteen years.

The Gray bat (*Myotis grisescens*) is known to use twelve caves and two abandoned mines at Buffalo National River. The Gray bat uses cave type habitat year round for roosting, rearing young, and hibernation. This species prefers to forage over streams in wooded riparian habitats. Habitat disturbance in the forms of forest conversion to agriculture, destruction of riparian forest, river impoundment, pesticides, river siltation, and roost disturbance are the most important factors seeming to affect this species (USFWS, 1982). The Gray bat has undergone a remarkable recovery in numbers. Much of this is due to closing roosts to prevent human disturbance. Buffalo National River has seven hibernacula, one maternity roost, and eight summer roost sites for this species. Population data has been collected by NPS, AGFC, and other researchers for the past eighteen years. There are twelve caves and two abandoned mines which are known to support Gray bats during some part of each year. Five of these caves, and one of the abandoned mines act as hibernacula. One of the caves is a maternity roost. Eight caves and one abandoned mine are used as summer roosts by males or non-reproducing females. The difference in the numbers reported here is a result of one cave being used both as a summer roost and winter roost. Within the area of interest between Woolum and the USFS Spring Creek trail terminus, there are six caves and two mines known to provide habitat to the Gray bat. The existing Buffalo River Trail from Woolum to Highway 65 passes over one of these caves. No impacts to the population or habitat of the cave have been detected through monitoring.

The Indiana bat (*Myotis sodalis*) is found in four hibernacula at Buffalo National River. The bat has not been captured in the park in the summer months, but there is the possibility that a maternity colony exists in the area. The Indiana bat hibernates in caves, but spends the summer roosting mainly in trees. There are no confirmed maternity colonies in the state. Female Indiana bats form small maternity colonies under exfoliating bark during the summer months. The colonies are most commonly located in bottomland or riparian areas, but have also been found in pastures and upland hardwoods. The bats will use any species of tree that has exfoliating bark. These may include shagbark hickory, white oak, red oak, ash trees, maple trees, elm trees, short leaf pine and snags with exfoliating bark. The maternity roosts are usually found in larger diameter trees. They are not generally a cavity roosting species. Primary maternity roosts are generally sited where they receive considerable sunlight. This may assist with pup development. Typically, the roost will be higher in the tree if the canopy closure is greater. This may be an effort to get more sunlight on the roost (Menzel et. al., 2001). Actions related to trail construction and use which may have impact on the species are disturbance of potential hibernacula and summer roosts. A lack of suitable summer roost trees does not seem to be a limiting factor in this species recovery; potential roost trees are regularly recruited from dead and dying trees.

The Eastern Small-Footed bat (*Myotis leibii*) has been found in one cave in the park and captured by mist netting in upland areas near the park. Its population numbers are assumed to be fairly low in this area. It has been captured in Newton and Searcy counties (Sealander and Heidt, 1990). These bats use caves and mines as their hibernacula. Apparently, north Arkansas is near the edge of the range of this species. Very little is known about their foraging habits and habitat preference in the warm months. Based on the Western Small-Footed bat, it is surmised that this species may forage mostly along stream margins in woodlands, catching small prey (BCI, 2001). They require cold, low humidity hibernation sites. They enter hibernacula late and leave early compared to other species of *Myotis*. They are generally gone from the caves by March (Barbour and Davis, 1969). In the summer the bat appears to roost in rock crevices and under rocks, fairly near the hibernation site (BCI, 2001).

3.1.3 *Floodplains and Wetlands*

The floodplains and wetlands of the park are numerous and ecologically important to the region. Seeps and springs are classified as wetlands due to their hydrologic qualities and vegetative composition. Riparian corridors are also protected at Buffalo National River because they provide energy to the streams in the form of leaves, stabilize banks with their roots systems, and uptake excess water during flood

events. Actions in floodplains and wetlands within National Park Service property must comply with Executive Order 11998, Floodplain Management and Executive Order 11990, Wetland Protection. Coordination with the United States Army Corps of Engineers and the Environmental Protection Agency is also required for most actions occurring in floodplains and wetlands. Unpaved trails are an excepted action under both Executive Orders.

3.2.0 Wilderness

Public Law 95-625, dated November 10, 1978, established the Buffalo National River Wilderness Area in three separate units; the Upper Buffalo Wilderness (2,200 acres), the Ponca Wilderness (11,300 acres), and the Lower Buffalo Wilderness (22,500 acres). All actions within designated Wilderness must comply with the Wilderness Act of 1964 that defines Wilderness as an area:

- Where the earth and its community of life are untrammelled by man;
- Of undeveloped federal land retaining its primeval character and influence;
- Which is protected and managed so as to preserve its natural conditions;
- Which has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- Which also may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

The Wilderness Act describes the goals of wilderness management as management “*for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness so as to provide for the protection of these areas, the preservation of their wilderness character...*”

The Wilderness Act, as interpreted, does not preclude human use including preservation of cultural resources related to human endeavors. The national river has a Wilderness and Backcountry Management Plan (1994) that describes the appropriate use and management of its three Wilderness areas. Backcountry camping, hiking, boating, and fishing are expected and usual uses of the Wilderness areas. The Wilderness and Backcountry Management Plan also describes the backcountry trail system and proposes potential additions to those trails systems.

The Lower Buffalo Wilderness Unit is located at the easternmost end of the park at the confluence of the White and Buffalo Rivers. The unit abuts the Leatherwood Wilderness Area administered by the United States Forest Service (Ozark National Forest). Floating, fishing, horseback riding and hunting are the primary recreational uses within the unit. Abandoned roads form an informal trail system through the Lower Buffalo Wilderness Unit with horseback riding permitted on designated and primitive trails.

3.3.0 Cultural Resources

The National Historic Preservation Act recognizes five property types: districts, sites, buildings, structures, and objects. As called for in the act, these categories are used in the National Register of Historic Places, the preeminent reference for properties worthy of preservation in the United States. To focus attention on management requirements within these property types, the *NPS Management Policies* categorize cultural resources as cultural landscapes, structures, ethnographic resources, archeological resources, and museum objects.

The cultural resources at Buffalo National River chronicle 12, 000 years of human activity. The river watershed evolved as individual pockets of humanity, distinctively individual from one end of the river to the other. Settled first by prehistoric gatherers, utilized by modern Native American groups for hunting, gathering, and possibly homes, and finally by settlers from the mountains of North Carolina and Tennessee and later many states, the resources reflect the inhabitants' cultural adaptation to an isolated and sometimes harsh southern mountain environment. It is the story of kinship and settlement, the growth of small river communities and social traditions, the use of river and land transportation to enter into a wider world of commerce and a change from agriculture to modern industry and recreation.

A comprehensive cultural landscape inventory has not been funded for the national river. There are some who believe that the entire national river may be one large cultural landscape in which are contained smaller, distinct elements. Although it is unknown which distinct cultural landscapes exist within the park's boundaries, the national river treats designated historic districts (none of which are in the alternative trail corridors) as potential cultural landscapes. Other potential areas include community sites, Civil War sites, and agricultural settlement areas. For the most part, fence-lines and old roadways are left in place to mark settlement patterns. Special use hay permits and historic leases maintain selected pastoral landscapes.

Standing structures and ruins are the most visible part of the overall national river cultural landscape and are scattered throughout its boundary. Settlement occurred along the river's length, in fertile tributary valleys and along forested slopes. Structures or other remains are virtually everywhere, whether still in use as part of active farms or long abandoned. The National Park Service's List of Classified Structures (structures on or eligible for the National Register) for Buffalo National River lists 256 structures. Under a 1988 Memorandum of Agreement with the Arkansas State Historic Preservation Officer, structures, including those in Wilderness, will be inventoried and determinations of National Register eligibility made. However, staff and funding constraints have focused National Register evaluations towards areas slated for park development with the result that only a few Wilderness area structures have been evaluated.

3.3.1 National Register Properties

The national river includes five designated historic districts and one eligible district. The Erbie and Boxley historic districts are not in the area of consideration for this project. All alternatives have the potential to affect the eligible Collier Homestead, located near Tyler Bend. The Rush Historic District is a 1300-acre mining district that contains standing buildings, building ruins, and old zinc mines and mining components. The district extends both north and south of the river within the Lower Buffalo River and potentially would be affected by trail alternatives that extend beyond highway 14. Buffalo River State Park Historic District, which includes the Civilian Conservation Corps structures, potentially would be affected by an alternative which extends north of the river and beyond highway 14. However, this trail alternative has been rejected. Cold Springs School, a Works Progress Administration structure of wood and stone in the Lower Buffalo Wilderness, potentially would be affected by a trail alternative south of the river and beyond Highway 14.

3.3.2 Ethnographic Resources

Ethnography is concerned with contemporary peoples associated with the national river, with their cultural systems or ways of life, and with the related technology, sites, structures, other material features, and natural resources within its boundaries. These groups typically assign significance to places closely linked with their own sense of purpose, existence as a community, and development as ethnically distinctive peoples. Important places may support subsistence or ceremonial activities or represent birthplaces of significant individuals or group origin sites. Both culturally affiliated American Indian tribes recognized by the federal government and white ethnic groups, which have endured for two generations or more within the boundaries, are considered traditional users. Ethnographic resources are subsistence and ceremonial locales and sites, structures, objects, and rural landscapes assigned cultural significance by traditional users. Natural resources may have heritage significance in activities and beliefs related to, for example, religion, healing, and subsistence. Some peoples' religious beliefs also require quarrying certain minerals or collecting certain plants in specific places for sacred or medicinal purposes.

Attention to the peoples whose lifeways are traditionally associated with resources under National Park Service stewardship is mandated in legislation and NPS policies. According to the 1988 Management Policies (5:11):

Certain contemporary Native American and other communities are permitted by law, regulation, or policy to pursue customary religious, subsistence, and other cultural uses of park resources with which they are traditionally associated. Such continuing use is often essential to the survival of family, community, or regional cultural systems, including patterns of belief and economic and religious life. Recognizing that its resource protection mandate affects this human use and cultural context of park resources, the National Park Service will plan and execute programs in ways that safeguard cultural and

natural resources while reflecting informed concern for the contemporary peoples and cultures traditionally associated with them.

Ethnographic surveys or studies are not currently available for the park due to staffing and funding constraints. In 2000, the National Park Service contracted for a cultural affiliation study in order to determine which federally recognized Native American tribes are affiliated with Buffalo National River. The study is in draft form at this time. Ten tribes have been reported to be culturally affiliated with the park:

- the Absentee Shawnee Tribe;
- the Caddo Tribe of Oklahoma;
- the Cherokee Nation of Oklahoma;
- the Eastern Shawnee Tribe of Oklahoma;
- the Osage Tribe of Oklahoma;
- the Quapaw Tribe of Oklahoma,
- the Shawnee Tribe;
- the Tunica-Biloxi Tribe of Louisiana;
- the United Keetoowah Band of the Cherokee Nation, and;
- the Wichita and Affiliated Tribes.

Archeological evidence indicates that these tribes are likely to have lived in the area during prehistoric or historic times. The Osage claimed this area as their hunting territory when white explorers first entered what is now Arkansas and continued to use it as such until 1817 and possibly afterwards. . From 1817 to 1828 the Buffalo River area was included in lands transferred by treaty to the Cherokee Nation. Local oral history for the upper part of the river, which is not within the project area, suggests that after 1828 some Native Americans continued to return to collect plants. Bengé's route of the Trail of Tears crossed the Arkansas Ozarks just north of the park boundary; locally it is believed that individuals left the main party and hid along the river valley, some secretly remaining.

A list of all plant and animal species present at Buffalo National River along with a description of the undertaking and maps of the alternative trail corridors have been provided to the ten affiliated tribes listed above. Though consultation, tribes have been invited to apprise Buffalo National River of ethnographic resources that have cultural and religious significance.

All trail alternatives, with the exception of Alternative A, have the potential to affect previously unknown ethnographic resources.

3.3.3 Archeological Resources

Buffalo National River contains numerous archeological sites, over 500 recorded to date, both prehistoric and historic, spanning almost 10,000 years of human history. A common occurrence at Buffalo National River is the overlay of historic structure upon historic archeological site upon prehistoric archeological site. Site condition varies from good to destroyed, with impact levels varying from low to severe.

Research and inventory studies prior to development in the Rush and Tyler Bend areas recommended a number of sites as eligible for the National Register with the conclusion that undoubtedly more sites would be found. Recent findings have verified the intensity and prevalence of prehistoric occupation of the region, and shed new light on the degree of civilization and development achieved by those early settlers of this drainage basin.

Known prehistoric sites extend from the Dalton Period (circa 8500-7900 BC) to the Mississippian (circa AD 900 to AD 1541). Prehistoric archeological resources at Buffalo River have been found in cave shelters, bluff shelters, open sites such as river terraces, and upland sites such as rocky outcrops. Cherty limestone outcrops along the rivers length contributed material for widespread tool making. Resources include both objects and structures. Objects are the typical expression of the archeological resource of the national river. Lithic debitage, as well as finished tools or portions thereof are found throughout the river on agricultural terraces and upland shelter sites. Less common, but found over the past 50 years are the remnants of ceramic pottery, fiber cordage, basketry and footwear, as well as charcoal and plant and animal "leftover" components from food storage/preparation. Structural sites have recently been added to the finds within park boundaries. The discovery of a baking oven in the

Boxley area and the remains of the first known prehistoric house structure in the Arkansas Ozarks (at Erbie) demonstrate the high significance of this largely unknown resource. Until recently, the Native Americans occupying the Ozarks were believed to make use of natural bluffs and caves for shelter rather than constructing dwellings. Archeological testing during planning prior to the development of the Erbie campground (1986-87) revealed post molds that indicated the use of constructed "pole house" shelters comparable to Mississippian sites elsewhere in the southeast. Burial sites have been discovered within the boundaries of the national river and are protected by federal and state laws.

Known historic archeological sites cover a period beginning in the early 1800s when modern Native Americans such as the Osage and the Cherokee were present. Most of the historic archeological sites are associated with nineteenth and twentieth century Euro-American settlements. These sites vary from vegetation-covered areas with no above ground resources, to abandoned farms, communities, and industries. Civil War engagements are reported to have taken place at various locations along the river. Sites associated with the region-wide mining of lead and zinc include the sites in the Rush Historic District as well as numerous unstudied sites in the Lower Buffalo Wilderness. Other known sites are associated with the processing of guano from bat caves to produce gunpowder. Sites associated with the logging industry, including major milling sites and "tie slides," where logs were pushed off ridges to glide down to the river to waiting rafts.

Numerous contract studies have provided information on a variety of archeological sites and recommendations for eligibility to the National Register. However, only one site in the Tyler Bend area is on the National Register of Historic Places and is not within the alternative corridors. Most archeological survey and testing has been done in conjunction with park construction projects for campgrounds or river access points. The park has not been funded for a comprehensive archeological survey. In particular, the Wilderness areas have had the least survey done of any of the park areas. Even in relatively well studied areas, testing has concentrated in particular locations and little is known about the extended area outside of the development zones. Known and previously undiscovered archeological sites and caves with cultural components always have the potential to be affected by any new trail construction. In the majority of circumstances, impacts to cultural resources can be avoided by the sensitive placement of the trail but in certain circumstances such as when the corridor is too narrow to avoid a site or when the placement of the trail would endanger trail users, Section 106 of the National Historic Preservation Act requires the government agency to address the effects of an undertaking and includes consultation with Native American tribes affiliated with the area of potential effect. The least amount of new trail construction has the least potential to effect cultural resources.

3.3.4 Cultural Landscapes

A comprehensive cultural landscape inventory has not been funded for the park. There has been some discussion that the entire park may be one large cultural landscape in which are contained smaller, distinct elements. Two of these smaller areas have been previously recognized in National Park Service studies: the Boxley Valley Historic District and the Erbie Historic Zone, both in the upper portion of the park. Other areas under consideration are the Rush Historic District and the Buffalo River State Park Historic District in the lower part of the park and the Collier Homestead Historic District in the middle section of the river.

It is unknown what other distinct cultural landscapes exist within the park's boundaries. Potential areas include other community sites and pre-Civil War agricultural settlement areas. Special use hay permits and historic leases have extended the use of some of these areas into the present.

Known potential landscapes within the area of potential impact are the Collier Homestead and the Rush mining district. Based on a pedestrian cultural resource survey on the north side of the river within the Lower Wilderness (conducted 2003 as part of prescribed burn preparations) cultural sites ranging from building foundation fragments to mining sites, fences, roads, and cemeteries were located. It is presumed that the south side of the river would have similar cultural material as farms and communities were known to exist in this area prior to park establishment. However, there has been no effort to summarize these finds within agricultural, community or mining contexts or landscapes.

3.3.5 Structures

Individual structures are the most visible part of the overall park cultural landscape. Settlement and use has occurred all along the river's length, in fertile tributary valleys and along forested slopes. Structures or their remains are virtually everywhere, some still in use as part of active farms, others long abandoned.

The National Park Service Service-wide List of Classified Structures (those on or eligible for the National Register) for Buffalo National River lists 256 structures. Under a 1988 Memorandum of Agreement with the Arkansas State Historic Preservation Officer, structures, including those in Wilderness, will be inventoried and determinations of National Register eligibility made. However, staff and funding constraints have focused Register evaluations towards areas slated for park development with the result that only a few Wilderness area structures have been evaluated.

Known structures within the area of potential impact are the Collier Homestead buildings and the Rush mining district structures. The only known standing structure in the Lower Wilderness within the area of potential impact is Cold Springs School, on the National Register of Historic Places. Undoubtedly there are remnants of farms, mining areas, and community areas that were abandoned prior to or after park acquisition, but these have mostly reverted to potential archeological sites.

3.3.6 Objects

Historic objects and fragments abound along the national river from scattered iron objects to intact mining, milling and farming equipment. Erosion and park development has literally unearthed many objects. It is unknown how much remains, but given the human history of the area, more discoveries are likely. A variety of horse-drawn farming equipment has been gathered from various river-bottom farms park-wide, and is collected in a special curatorial storage building at Tyler Bend. It is park policy to leave items in situ if the object can be reasonably protected from future removal.

3.4.0 Public Health and Safety

Actions initiated by Buffalo National River must minimize risks to human health and safety. Actions with the potential for health and safety risks include, but are not limited to, the construction and maintenance of roads, trails, and other park facilities. Trail standards published by the National Park Service outline the conditions required including maximum grade and width of formal trails for public safety. All formal trails within Buffalo National River currently meet these guidelines.

4.0 ENVIRONMENTAL CONSEQUENCES

Impact topics were established by the Interdisciplinary Team at Buffalo National River based upon logistical trail issues, resource protection requirements of the National Park Service (laws, policies, and regulations), and the collective knowledge of a broad range of disciplines within the park. Public comments were sought to the Draft Impact Topics (Appendices A and B) and no comments on the draft impact topics were received. The topics reflect the potential for direct, indirect, cumulative, long and short-term impacts. The majority of the evaluations of impacts address the initial installation of the trail. Conducting professional surveys and following NPS trail standards would prevent resource damage and reduce safety concerns in the development of any new trails. Long-term, cumulative impacts of a trail are difficult to predict and ultimately would be the result of the amount and type of use the trail receives.

4.1.0 Safety

Many of the scenic features of the Buffalo National River are inherently dangerous to traverse. Bluffs, ledges, and unstable ground are common throughout the narrow property. Placement of any new trail away from dangerous bluffs and ledges is considered the highest priority in the adoption of an exact trail route. Trails would not be built on or directly adjacent to these features without adequate mitigation in the form of fencing and warning signs as prescribed in the NPS Trail Standards.

4.1.1 *Laws, Regulations and Policies:*

NPS Management Policies (2001, Chapter 8.2.5.1) states:

“The Service recognizes that the park resources it must protect are not only a visitor attraction, but that they may also be potentially hazardous. In addition, the recreational activities of some visitors may be of an especially high-risk, high-adventure type, which pose a significant personal risk to participants, and which the Service cannot totally control. Park visitors must assume a substantial degree of risk and responsibility for their own safety when visiting areas that are managed and maintained as natural, cultural, or recreational environments.”

Adhering to NPS Trail Standards (1998) during the positioning and installation of any of the proposed alternatives would minimize the risk to employees, volunteers, and visitors to the extent possible. The measures include but are not limited to; installation of water bars, railings, steps, and signs for both safety and resource protection.

4.1.2 *Definitions and Evaluation Methods*

The issue of safety encompasses both public safety, in using the proposed alternative trail routes, and the safety of park personnel and volunteers in building and maintaining trails in areas with inconsistent terrain. It is reasonable to assume that most of the potential safety impacts are a reflection of the experience and behavior of visitors and employees on and around any of the described trail alternatives. No method exists for assessing the dangers of back-country trail installation and use, or to assess the potential occurrence of visitors becoming lost to ill effect. Therefore, the potential impacts to safety are reflected only in the number of miles of trail over which the potential impact would occur (by comparison only).

For the purposes of the proposed OHT/BRT project, a *significant impact* to safety would be the inability to locate any new trails away from potentially hazardous geologic/geographic features such as bluffs, ledges, and abandoned mines. None of the proposed alternatives pose a significant impact to safety because all the proposed routes can be made safe by sensitive trail placement and construction. Direct impacts include: safety of park personnel and volunteers while building, maintaining, and using trails; required river crossings; and placement of pedestrian crossings along major roads. No indirect or cumulative impacts to safety have been identified for any of the proposed Alternatives. No potential *impairments* are identified for the proposed project under the heading of safety.

4.1.3 *Safety Impacts by Alternative*

Alternative A:

Under Alternative A, no action would be taken and therefore, no changes would occur. Safety issues within the national river would remain at their current level.

Alternatives B- Trail South of Buffalo River to the Vicinity of Highway 14:

Direct impacts to safety under this alternative would occur only during the installation and maintenance of the trail; a length of 20 miles. Installation would be completed in less than one year and based on training and experience of the NPS trail crews and volunteers, the intensity of the potential impacts to safety is minimal. Injuries are expected to be minor if they occur at all. Indirect impacts to visitor safety based on visitor behavior cannot be assessed; the duration and intensity of these impacts would be constant as long as the trail is in use.

Alternative C- Full Trail South of Buffalo River to USFS Spring Creek:

Direct impacts to safety under this alternative would occur only during the installation and maintenance of the trail; a length of 45 miles. Installation would be completed in less than one year and based on training and experience of the NPS trail crews and volunteers, the intensity of the potential impacts to safety is minimal. Injuries are expected to be minor if they occur at all. Indirect impacts to visitor safety based on visitor behavior cannot be assessed; the duration and intensity of these impacts would be constant as long as the trail is in use.

Alternative D- Trail North of Buffalo River to Highway 14:

Direct impacts to safety under this alternative would occur only during the installation and maintenance of the trail; a length of 20 miles. Installation would be completed in less than one year and based on training and experience of the NPS trail crews and volunteers, the intensity of the potential impacts to safety is minimal. Injuries are expected to be minor if they occur at all. Indirect impacts to visitor safety based on visitor behavior cannot be assessed; the duration and intensity of these impacts would be constant as long as the trail is in use.

Alternative E- Full Trail to USFS Spring Creek (River Crossing):

Potential direct impacts to safety under this alternative would occur during the installation and maintenance of the trail; a length of 45 miles. Installation would be completed in less than one year and based on training and experience of the NPS trail crews and volunteers, the intensity of the potential impacts to safety is minimal. Injuries are expected to be minor if they occur at all. The Alternative has the added direct impact of a required crossing of the Highway 14 bridge. The Highway 14 bridge does not contain a pedestrian walkway and has a 55-mph speed limit. The duration and intensity of these impacts would be constant as long as the trail is in use.

Indirect impacts to visitor safety based on visitor behavior cannot be assessed; the duration and intensity of these impacts would be constant as long as the trail is in use.

4.1.4 Conclusions:

Alternative A has the least impact to safety as defined. Alternatives B and D are the safest alternatives based on the minimization of trail mileage across the park near dangerous landscape features. Alternative D, however, requires a river or road crossing at Highway 14, which is a safety concern.

Alternative C has the potential to be less safe than Alternatives B and D based upon the number of new miles of trail. Alternative E poses the greatest threat to safety than the other alternatives based on additional miles of trail and a required road or river crossing.

4.2.0 Park Operations

4.2.1 Laws, Regulations and Policies:

Administration of a trail (also known as a park facility) requires funding and consideration for the maintenance and construction of that facility. Chapter 9 of NPS Management Policies (2001) states the following concerning consideration of new facilities:

”The full integration of facilities into the park environment will involve...Thorough interdisciplinary resource, user, and short- and long- term structure maintenance analysis”; and

“There is a maintenance responsibility and cost for every asset that is administered by the National Park Service. A regular, periodic inventory and condition assessment of park assets will be performed to identify deficiencies and to ensure the cost- effective maintenance of all facilities. The costs of operation and the useful life of facilities and equipment are directly related to the type and level of maintenance provided. Therefore, the Service will conduct a program of preventive and rehabilitative maintenance and preservation to (1) provide a safe, sanitary, environmentally protective, and esthetically pleasing environment for park visitors and employees; (2) protect the physical integrity of facilities; and (3) preserve or maintain facilities in their optimum sustainable condition to the greatest extent possible.”

4.2.2 Definitions and Evaluation Methods

Park operations are the administration and day to day functioning of the park, including; staffing, funding, maintenance, and equipment needs. Park operations can be influenced by changes in visitation, facilities, travel routes, and by the occurrence of natural phenomena such as fires and floods.

The largest direct and long-term impact to the administration of the proposed new trail is the additional yearly maintenance costs that a new trail would require. Currently, volunteers under the guidance of the park Trail Coordinator, accomplish a significant amount of trail maintenance at the national river. A combination of volunteers and paid staff would also maintain any new trails built in support of the proposed OHT. Any new trails within the park would increase the staff hours needed to direct volunteer trail maintenance.

The existing 120-miles of maintained trails within Buffalo National River require 4436 hours to maintain per year. This figure is the combination of volunteer hours and the hours of paid trail crew staff; they do not include the coordination of trail maintenance. Based on these figures, the maintenance of trails at the national river requires 37 hours per mile annually. If adequate volunteers are not available to accomplish maintenance of new trails, the park would have to hire seasonal employees to accomplish the maintenance or close the trail within the park.

Other direct impacts to park operations are the costs of cultural and natural resource surveys to define the exact physical placement of the proposed trail extension and the physical installation/construction of the trail. Natural resource surveys will cost approximately \$100 per mile and archeological surveys will cost approximately \$640 per mile (\$740 per mile total cost). Surveys and construction are short duration, one-time costs.

Several indirect impacts are possible with the construction of the OHT/BRT. Current OHT use surrounding the national river is fairly low². However, if use of the OHT/BRT within the national river were to become high, the potential impacts could be: increased facilities use, increased interpretive and law enforcement contacts, and the associated costs. There is no valid means to predict the future number of BRT/OHT users.

For the proposed OHT/BRT extension project and the topic of park operations, a *significant impact* is one that adds to the costs of park operations beyond current levels. While much of the construction and maintenance of trails within the national river is accomplished with volunteer trail groups: the coordination and oversight of these groups requires many work hours. Overcoming the capacity of the park to oversee the maintenance of all its trails annually would constitute a significant impact. No additional funding for trail crew employees is available currently or anticipated in the near future. The park would be reliant on volunteers to keep any new OHT/BRT trails maintained to NPS Trail Standards (1998). Approving a trail that could not be surveyed due to lack of funding, would not constitute a significant impact to park operations but could delay the completion of the trail until funding could be obtained to complete the surveys. No potential for the *impairment* of park administration is identified for the proposed project.

The yearly maintenance costs and pre-installation surveys are both related directly to the number of miles of new trail. Therefore, the alternatives are evaluated on the number of new trail miles to be installed.

4.2.3 *Park Operations Impacts by Alternative*

Alternative A-No Action:

No impact to park operations are anticipated or identified for the No Action Alternative.

Alternative B- Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14:

Impacts to park operations would be an increase in the yearly workload of the Trail Coordinator (for 20 miles of new trail). The impacts would be continuous as long as the trail is open for public use.

Twenty miles of new trail would require one-time cultural/ natural resource surveys at a one-time cost of approximately \$14,800 to define the exact trail location.

Alternative C- Full Trail South of Buffalo River to USFS Spring Creek:

Forty-five miles of new trail would increase the yearly trail maintenance needed within the park. The impacts would be continuous as long as the trail is open for public use.

Further, initial survey work for resource protection would be approximately \$33,300 for 45 miles of new trail as a one-time cost.

Alternative D- Trail North of Buffalo River to Highway 14:

Impacts to park operations would be an increase in the yearly workload of the Trail Coordinator (for 20 miles of new trail). The impacts would be continuous as long as the trail is open for public use.

² Personal communication with Trails Coordinator, Nancy Feakes of Mark Twain National Forest, Rolla Missouri, Summer, 2001.

Twenty miles of new trail would require one-time cultural/ natural resource surveys at a one-time cost of approximately \$14,800 to define the exact trail location.

Alternative E- Trail North of Buffalo River to Highway 14:

Forty-five miles of new trail would increase the yearly trail maintenance needed within the park. The impacts would be continuous as long as the trail is open for public use. Further, initial survey work for resource protection would be approximately \$33,300 for 45 miles of new trail as a one-time cost.

4.2.4 Conclusions

Adoption of Alternative A would have the least impact on park operations because no additional trails would require construction or maintenance and no resource surveys would be conducted. Adoption of Alternatives B or D would cost approximately \$14,800 for survey work and increase the workload of trail maintenance by 740 hours per year. Adoption of either Alternative C or E would require \$33,300 for natural and cultural resource surveys and increase the workload of the trail crews by 1,665 hours per year. Based on these facts, Alternative A would impact park operations the least and Alternatives B and D would have less impact to park operations than Alternatives C and E.

4.3.0 Natural Resources

4.3.1 Laws, Regulations, and Policies

The following laws, regulations and Executive Orders are applicable to all proposed federal actions within national parks:

- National Park Service Organic Act of 1916
(PL Chapter 408, 39 Stat. 535 et seq., 16 USC 1) Through this act, Congress established the National Park Service and mandated that it "shall promote and regulate the use of the federal areas known as national parks, monuments, and reservations...by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is 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." The Organic Act authorizes the Secretary to promulgate rules and regulations necessary for management of the parks. This authority, among others, provides the basis for the regulations in 36 CFR 1.
- Redwood National Park Act
(PL 95-250, 92 Stat 163, as amended, 1978) This act amended NPS authorities legislation to direct that within the National Park System, "authorization of activities shall be construed and the protection, management, administration...shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established..." With this additional amendment to NPS law, the NPS is mandated to afford the highest standard of protection and care to park resources; no decision can compromise these resource values, except where specifically authorized by law.
- Exotic Organism (E.O. 11987)
This executive order requires federal agencies to "restrict the introduction of exotic species into the natural ecosystems on lands and waters which they own, lease, or hold for purposes of administration..." and "into any natural ecosystem of the United States," and to "encourage the States, local governments, and private citizens to prevent the introduction of exotic into natural ecosystems of the United States" unless the Secretaries of Agriculture or Interior "find that such introduction or exportation will not have an adverse effect on natural ecosystems."
- Endangered Species Act of 1973 (PL 93-205, 87 Stat 884, 7 USC 136, as amended)
This act requires federal agencies to ensure that their activities (authorized, funded, or carried out) will not jeopardize existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species.

4.3.2 *Definitions and Evaluation Methods*

For the purposes of the proposed project, the natural resources of the national river include its vegetation and wildlife resources. Installation of a trail is not expected to have major impacts on the natural resources of the park. By providing detailed surveys to avoid sensitive areas and species, impacts to natural resources would be minimized. Bluffs, ledges, and rock outcroppings along the river often contain rare and sensitive plants and plant communities that could be disturbed by the installation of a small trail, these areas will be avoided during any trail development for the proposed project through the completion of natural resource surveys.

The amount of use will ultimately determine the impacts of any new trail on the natural resources. Some removal of vegetation would be required to establish any new trails. The trails would conform to the national standards and would have a maximum tread of 24 inches wide (between 18-24 inches). In most areas of the park, this would require the cutting of a small amount of trees, and removal of the ground layer of vegetation. Since rare species and areas will be avoided, the removal of this minimal amount of vegetation should have very little or no impact on the functioning of the parks ecosystem or specific habitat types.

Since the OHT is currently complete at the north-west end (Woolum) and the south-east end (USFS) of the park, the development of social trails linking the two OHT segments is likely through the national river. Such random trail development may cause serious impacts to sensitive bat habitat and rare plants. Therefore, social trail development is considered an indirect impact.

The national river prepared a Biological Evaluation (BE) in the course of its consultation with the United States Fish and Wildlife Service (FWS). An edited copy (without location information), of the BE is available for viewing at Buffalo National River. The BE and information from the FWS has been used to provide a portion of the wildlife and vegetation analysis that follows. Given the sensitive nature of the rare resources, location data will not be made public in this document. The analysis of potential impacts to rare species (botanical and wildlife) is derived from the BE and has been approved by the US Fish and Wildlife Service.

Vegetation and Plant Communities

Due to the extent of the plant communities present at Buffalo National River, a trail with a maximum tread width of 24 inches is not likely to cause measurable impacts to the vegetation of the park. For the purposes of this analysis, rare plants and plant communities will be used as an indicator of impact potentials. Since the rare species occur sporadically throughout the park and are not fully inventoried or mapped, mileage of new trail is the only reliable indicator of the potential for damage to individual plants of these species at this time. While natural resource surveys will be conducted within the selected corridor to avoid these individuals, some impact to rare plants and sensitive habitat could occur by the development of social trails along any new trail developed.

Trail corridors can also provide the means by which invasive non-native plant species are spread through a natural area (Leung and Marion, 2000). Preventing the spread of non-native plant species is crucial to preserving native vegetation. While the potential for damage cannot be measured, minimizing trail mileage is desirable to reduce the area over which social trails could develop and vegetation impacts such as the spread of non-native plants could occur. Vegetation impacts for each alternative will be compared by new miles of trail to be installed to account for the potential spread of non-native plants and for protection of rare plant species and communities.

Buffalo Trails Coordinators estimate that on average, 15 trees per mile of less than 8-inch diameter may be removed during trail construction in forested areas, causing no detectable changes in plant ecology or abundance of individual tree/shrub species. No large trees would be removed during trail installation. Herbaceous layer vegetation will be removed within the tread of the trail in most areas (18-24 inches). Based on pre-installation surveys, no rare or sensitive plants would be removed during the installation. Removal of herbaceous vegetation will be undertaken only where required due to terrain, no changes to plant ecology or the abundance of individual plant species is expected to occur as a result of herbaceous vegetation removal during the construction of the trail.

For the purposes of evaluating the potential impacts to vegetation, the following ranking system is used:

- **Negligible/No Impact:** Impacts to vegetation are not visible or measurable. Exotic vegetation may be present but in very small numbers with no spread beyond the immediate trail tread.
- **Minor:** Impacts to vegetation are detectable but of low severity and confined to the trail tread. Impacts may include a slight increase in the spread and abundance of exotic plant species immediately adjacent to and/or within the trail tread.
- **Moderate:** Impacts are readily visible and may extend beyond the tread of the trail. However, no detectable changes in the species composition or ecology have occurred. Impacts may include a moderate increase in the spread and abundance of exotic plant species near the trail tread but without a distinct change in overall plant ecology or abundance of native plants.
- **Major:** Impacts to vegetation are severe and visible. Loss of sensitive species has occurred and/or the ecology of the plant communities has changed. Impacts would likely include the replacement of native plant species with invasive exotic plant species that affect large areas of the park beyond the trail tread.

For the purposes of the proposed project, a *significant impact* would be the loss of a rare species or an impact such as described above as “Major” within the park property. An *impairment* of the vegetation would be a change in the ecology of the park, loss of plant communities, or an uncontrollable invasion of exotic plant species that effects a majority of the park. No significant impacts or impairments are anticipated under any of the proposed alternatives.

Wildlife

The study of wildlife and recreation interactions is a relatively new science. Preliminary studies summarized in Leung and Marion (2000) indicate that even low intensity recreational impacts such as hiking, do influence wildlife along trails. Trail installation and influences the composition of bird species near trails. More research is needed to determine the potential impacts to other animal groups. The potential impacts to bird species composition appear to be directly related to trail existence and use. The effects last as long as the trail is in use. No information on cumulative effects is available at this time. The potential effects to bird composition can only be compared by mileage of trails for this project.

For the purpose of this Environmental Assessment, wildlife refers only to the rare and/or sensitive species that occur at the national river. Table 3 summarizes the rare species of the national river. Several have federal ranking under the Endangered Species Act. Protection of these species and their critical habitats within the national river is required by the Endangered Species Act of 1973 (PL 93-205, 87 Stat 884, 7 USC 136, as amended). The locations of most rare species within the national river are well documented. Conducting natural resource surveys within the selected corridor would ensure that the tread of the trail would not directly impact these species under any of the proposed alternatives. Indirect impacts are possible by providing access into areas where these species occur; resource surveys will endeavor to avoid these habitats when possible.

The focus of the analysis is on the rare bat species of the park because they are particularly sensitive to disturbance and do occur within the proposed project area. The other species are either unknown, not within the proposed project area, or are not sensitive to low-impact recreational uses such as hiking. Several of the caves are gated to prevent harassment of these species, more caves could be gated if required to exclude humans. Quantification of the number of known rare bat roosts and maternity sites within each proposed corridor provides a means to compare the potential impacts of each Alternative. Also, the following ranking has been developed to aid in the evaluation of potential impacts to wildlife for the proposed trail project.

- **Negligible/No Impact:** Impacts may include temporary (less than one day) disturbance of individuals of native wildlife species during construction although no changes in local populations of wildlife would occur. Rare species are undisturbed by both trail installation and hiking. Other native species

may temporarily flee when encountered by humans along the trail but return quickly once people have passed. No changes in breeding behavior, food supply, or habitat occur as a result of trail installation or use. No disturbance or impact to rare wildlife or their critical habitats would occur.

- **Minor:** Impacts may include temporary disturbance of native wildlife (less than one day) during construction although no changes in overall wildlife abundance occur. Impacts may include a minimal (confined to the immediate area of the trail) loss of breeding and/or feeding habitat for those species that are highly sensitive to disturbance by any human presence. This effect may be detectable but causes no changes in the overall abundance of species within the immediate trail corridor. No disturbance or impacts to rare wildlife or their critical habitats would occur.
- **Moderate:** Impacts are similar to those described as “minor” but with greater severity. Moderate impacts would effect the local presence of individual wildlife for more than a day. Additional impacts would include loss of food supply for herbivores and insects due to a the replacement of native vegetation with exotic vegetation over greater than 1 mile areas. The overall wildlife composition within the park would be unchanged, impacts would be confined to the areas surrounding the trail. Rare wildlife or critical habitats may be minimally disturbed or impacted but the presence of rare species would not change.
- **Major:** Rare wildlife species or their critical habitats are measurably disturbed or damaged. Changes in wildlife species composition occur within the park. Impacts to habitat occur beyond the areas adjacent to the trail leading fragmentation of the landscape that alters the normal array of wildlife.

For the purposes of the proposed project and the topic of natural resources, a *significant impact* is the loss or destruction of any individual of a rare species or the destruction of any rare species habitat. Changes to the current wildlife composition and habitats would also be considered significant as described as “Major Impacts” above. *Impairment* of natural resources for the proposed project is defined as any loss of currently present rare species or habitats from the park. Preliminary surveys indicate that no major/significant impacts or impairment would occur under any of the proposed alternatives provided that detailed natural resource surveys are completed during the establishment of the exact physical location of any new trails, as described.

4.3.3 *Natural Resource Impacts by Alternative*

Alternative A-No Action:

Adoption of Alternative A would have no direct impact on the natural resources of the national river. No new trail would be constructed and no new access to rare plant or wildlife habitats would be developed.

Indirect impacts of Alternative A include the development of social trails between Highway 65 and the USFS terminus at Spring Creek. The potential for natural resource impacts would be Moderate if social trails were to develop in the absence of an OHT extension through the park. Loss of resources from erosion, collection, disturbance of critical bat habitats, and trampling could cause the loss of rare species and habitats.

Alternative B- Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14

The adoption of Alternative B would confine the impacts of trail construction to the tread of the new trail (18-24 inches wide) over 20 miles. Removal of some ground layer vegetation and small trees and the potential for the spread of non-native vegetation would occur across 20 miles. Potential changes in bird species composition within the trail corridor would occur over 20 miles of new trail. Three caves associated with federally endangered bat species occur within the Alternative B corridor but will be avoided through surveys.

The anticipated impacts are considered Minor under this alternative. Construction time would occur at a rate of less than 1-mile per day. The presence of humans hiking along the trail is also considered a Minor impact to wildlife and vegetation.

Alternative C- Full Trail South of Buffalo River to USFS Spring Creek:

The adoption of Alternative C would confine the impacts of trail construction to the tread of the new trail (18-24 inches wide). Removal of some ground layer vegetation and small trees and the potential for the spread of non-native vegetation would occur across 45 miles. Potential changes in bird species composition within the trail corridor would occur over 45 miles of new trail. Five caves associated with federally endangered bat species occur within the Alternative C corridor.

The anticipated impacts are considered Minor under this alternative. Construction time would occur at a rate of less than 1-mile per day. The presence of humans hiking along the trail is also considered a Minor impact to wildlife and vegetation.

Alternative D- Trail North of Buffalo River to Highway 14:

The adoption of Alternative D would confine the impacts of trail construction to the tread of the new trail (18-24 inches wide). Removal of some ground layer vegetation and small trees and the potential for the spread of non-native vegetation would occur across 20 miles. Potential changes in bird species composition within the trail corridor would occur over 20 miles of new trail. One cave associated with federally endangered bat species occur within the Alternative D corridor but will be avoided through surveys.

The anticipated impacts are considered Minor under this alternative. Construction time would occur at a rate of less than 1-mile per day. The presence of humans hiking along the trail is also considered a Minor impact to wildlife and vegetation.

Alternative E- Full Trail to USFS Spring Creek (River Crossing):

The adoption of Alternative E would confine the impacts of trail construction to the tread of the new trail (18-24 inches wide). Removal of some ground layer vegetation and small trees and the potential for the spread of non-native vegetation would occur across 45 miles. Potential changes in bird species composition within the trail corridor would occur over 45 miles of new trail. Three caves associated with federally endangered bat species occur within the Alternative E corridor.

The anticipated impacts are considered Minor under this alternative. Construction time would occur at a rate of less than 1-mile per day. The presence of humans hiking along the trail is also considered a Minor impact to wildlife and vegetation.

4.3.4 Conclusions:

Based upon the analysis, Alternative A has the most potential to have an impact on the parks natural resources. No common or rare wildlife, plants, habitats, or communities would be directly disturbed under this alternative however, the indirect impacts from social trail development could adversely impact rare species and/or habitats and are considered Moderate.

Adoption of Alternative B or D would have similar potential impacts to natural resources because they are of equal length. Along either 20-mile trail corridor, there would be a possibility that non-native species could be introduced into the native plant communities and the current bird composition could be altered slightly. Alternative B could bring hikers into contact with 3 caves associated with federally endangered bat species. Two of these caves are currently gated, and the third could be gated to prevent disturbing bats. Alternative D could bring hikers into contact with one cave associated with federally endangered bat species. This cave is currently not gated, but can be if the need arises.

Under Alternatives C and E, the potential impacts to vegetation (non-native and native) would occur over 45 miles. Adoption of Alternative C or E could cause changes in bird composition along the trail corridor over 45 miles. If Alternative C was adopted, the trail could provide access to 5 endangered bat caves. Two of the caves are gated. Two of the remaining three could be gated if the trail had to pass near them. If Alternative E was adopted, the trail could provide access to 3 endangered bat caves. None of these caves are gated. Only two could be gated if needed.

Therefore, Alternative A would be least disruptive to the natural resources of the national river. Alternatives C and E have the greatest potential impacts to the natural resources based on mileage alone, all other impacts are considered Minor. None of the impacts are expected to be significant with the adoption of any of the proposed Alternatives.

4.4.0 Historic/Archeological Resources

4.4.1 Laws, Regulations, and Policies

The following laws, regulations and policies are applicable to the historic and archeological resources of the national river for the proposed project:

- **National Historic Preservation Act of 1966**

(PL 89-665, 80 Stat 915-919, 16 USC 470 et seq.) This established a federal historic preservation program. It authorized the Secretary of the Interior to (1) expand and maintain a national register of districts, sites, buildings, structures, and objects significant in American history; (2) establish a program of matching grants-in-aid to states for historical preservation; and (3) establish a program of matching grants-in-aid to the National Trust for Historic Preservation. The act also established the Advisory Council on Historic Preservation. The Director of the National Park Service or his or her designee is to be the Executive Director of the Council. A 1980 amendment to this act places specific responsibilities on federal agencies in terms of historic preservation and the conducting of their own programs, planning, and projects (Section 110).

Section 106 of the National Historic Preservation Act or NHPA requires federal agencies to conduct surveys to determine the location of: potentially historic or prehistoric sites; districts; structures; buildings; or objects that may be eligible for nomination to the Federal Register. The surveys are to be completed prior to initiating any actions that could produce adverse impacts to those resources, in this case, a trail. If resources are detected by surveys, the land agency must prepare an assessment of significance and a statement describing any mitigation that would be needed to document the site or otherwise protect it from adverse impacts. The assessment of significance and proposed mitigation must be submitted to the State Historic Preservation Officer for consultation and comment before the initiation of the project. In the context of the proposed OHT/BRT extension project, the requirements of NHPA, Section 106, dictate that the park must conduct cultural resource surveys prior to the installation of the trail and submit the results of those surveys along with any assessments of significance and proposed mitigation to the State Historic Preservation Officer for review and consultation.

- **Antiquities Act of 1906**

(PL Chapter 3060, 34 Stat 225, 16 USC 431-433) This act authorizes the President to declare national monuments to protect sites and objects; authorizes federal departments to grant permits for survey and excavation and for gathering of "objects of antiquity" and to enforce protection of archeological sites and objects under their jurisdiction; and requires that materials excavated be permanently preserved in public museums.

- **Archaeological Resources Protection Act of 1979**

(PL 96-95, 93 Stat 721, 16 USC 470aa-ll) This was enacted to prevent the illegal excavations and possession of archeological resources located on federal, other public, and Indian lands. In passing this act the Congress recognized that the only comparable statutory law, the 1906 Antiquities Act, was inadequate in terms of defining archeological resources and establishing appropriate penalty provisions. The act called for regulations to be promulgated jointly by the Secretaries of Interior, Agriculture, Defense, and the Chairman of the Board of the Tennessee Valley Authority.

4.4.2 Definitions and Evaluation Methods

The historic and archeological resources of the park include sensitive sites located along the entire length of the river including; properties and structures on or eligible for the national register, buried artifacts, and cultural sites. Installation of any new trail would require cultural resource surveys along the adopted route to avoid disturbing known archeological sites, historic objects, and properties, and identifying previously unknown sites.

Archeological Sites

The potential direct impacts of trail installation include disturbance and/or destruction of previously unknown archeological sites. Little chance of direct impacts exists under any of the proposed alternatives provided the cultural resource surveys and consultation with the State Historic Preservation Office are completed as described. Potential indirect impacts exist from installation of new trail by providing access to thieves (artifact collectors) that could result in the permanent loss of archeological resources from the national river. Although not anticipated, disturbance of undetected buried resources is always possible through the development of social trails and through the archeological survey process. Therefore, in the absence of park-wide surveys, minimizing new trail mileage is the best means for protecting these resources and is used as a quantitative measure of potential impacts.

In areas where archeological or historic resources are well buried, trails could be built using methods prescribed in the trail standards. In areas where resources are located just below the surface and no close alternative is available, thinner treads would be installed and no ground disturbance would occur; trails would be maintained only by use and mowing. In areas where archeological or historic resources are exposed, the trail would be re-routed to an area where no visible resources are seen.

The fact that the extent and composition of archeological and historic resources within the national river is largely unknown warrants great caution during development or ground disturbance of any kind. While surveys will provide some protection of these resources, the chance that some will go undetected remains. Beyond conducting surveys, reducing trail mileage for this project is the best means of protecting the entire range of cultural resources.

Historic Resources-Properties and Districts

Within the area of interest, there are three significant historic properties and districts listed on the national register. Just west of Highway 65 in the Tyler Bend area south of Buffalo River, is the Collier Homestead. The BRT currently passes through this area. The other historic district, Rush, is located in the LBW on both the south and north sides of the river. Cold Springs School is also located south of the river within the LBW. Numerous other structures exist within the LBW that have not been evaluated for inclusion on the national register. Indirect impacts could occur by providing unrestricted access to these sites, including; vandalism, theft, and arson. Since the areas are not staffed and access is unrestricted, minimizing direct access to these sites is desirable to protect them from potential impacts. Analysis for this topic cannot predict what, if any, potential impacts to these properties might be. Therefore, the number of properties within each proposed alternative corridor is used for comparative purposes.

Construction would occur at a rate of less than 1-mile per day for each of the alternative presented. Other impacts, including the potential for damage or loss of artifacts, would be present as long as the trail is in use. For the purposes of the proposed project, the following system for defining impacts has been developed.

- ***Negligible/No Impact:*** No ground disturbance of any sort occurs via trail construction; no change in current protection levels of archeological sites. No social trails develop and sites that have not been assessed for historic or pre-historic significance are disturbed. Access to historic districts and properties, both listed on the federal register or unstudied remains at current levels. Cultural landscapes retain their historic characteristic.
- ***Minor Impact:*** Access to historic properties/districts is increased from current levels but a well-defined route and adequate protection of resources from vandalism or theft is in place. Archeological sites are avoided by re-routing around them. When re-routing is impossible, archeological sites with minimal artifacts are either preserved by performing protective trail installation if the site is well-buried or formal collection and accession into a museum collection on a small scale (less than 5 sites total). Highly unique or significant archeological sites are completely avoided. Cultural landscapes retain their historic character.

- **Moderate impact:** Access to historic properties/districts is increased from current levels but a well-defined route is present. Little if any protection from vandalism or theft is possible. Archeological sites are avoided by re-routing around them. More than five archeological sites must be mitigated through construction methods or collection and accession into a museum collection. Mitigated archeological sites may be larger than described for minor impacts. Highly unique or significant archeological sites are completely avoided. Cultural landscapes may be slightly modified but still retain their historic character.
- **Major Impact:** Impact may include uncontrolled access to historic sites, districts and archeological sites. The defining characteristics of cultural landscapes may be compromised by altered traffic patterns or land uses (for example, a trail head placed within a farm field). Re-routing of trails around large archeological sites cannot be accomplished leading to mitigation of more than 10 sites.

A *significant impact* to the cultural resources for the proposed OHT/BRT project would be the disturbance, loss, or destruction of a site or object that has not been found ineligible for the National Register. Since the majority of the park has not been surveyed for archeology, the potential for significant impacts exists when disturbing the ground in any manner. However, by conducting cultural resource surveys during the establishment of the trail tread, no significant or “major” impacts to cultural resources are anticipated under any of the alternatives.

An *impairment* of cultural resources for the purposes of this trail project is difficult to define because surveys are incomplete. In general, the cumulative loss of sites, structures, or objects that have not been found ineligible for the National Register could constitute an impairment of the parks cultural resources. No impairments are anticipated under any of the proposed alternatives provided the cultural resource surveys are completed.

4.4.3 *Potential Impacts to Cultural Resources by Alternative Alternative A-No Action:*

Adoption of the “no-action” alternative would have no direct impacts on historic and archeological resources. No new trail construction would effectively protect archeological resources and historic properties from additional vulnerability to damage and theft beyond current levels.

However, the potential for the development of social trails is greatest under this alternative. Since no surveys to ensure protection of historic and archeological resources would occur, those resources could be damaged under this alternative. Therefore, the potential for Major impacts to historic and archeological sites exists under Alternative A.

Alternative B- Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14:

Under Alternative B, there is some potential for direct and indirect impacts to historic/archeological resources during construction, maintenance and trail use, however, these potential impacts are considered Minor. The completion of cultural resource surveys during the physical placement of the trail will prevent or minimize impacts. By assessing every mile of trail for the existence and location of buried or surface artifacts, trails would be built accordingly; with or without ground disturbance, routing around large or unique sites.

Potential impacts to historic structures and districts are confined to the Collier Homestead site located on the existing Buffalo River Trail. The Collier Homestead is currently in good condition; vandalism has been minimal at this site. No new direct or indirect impacts are expected at the Collier Homestead by adding the OHT designation to this portion of the current BRT.

Alternative C- Full Trail South of Buffalo River to USFS Spring Creek:

The potential for impacts to historic/archeological resources through collection or disturbance occurs over 45 miles under Alternative C, a Minor to Moderate impact based on the number of potential archeological sites to be mitigated. Alternative C provides access to the LBW where very little information exists regarding the existence and National Register significance of cultural resources. The potential for loss of resources that have not been evaluated for National Register significance exists. Two

districts and one lone structure listed on the National Register occur within the corridor of Alternative C; Collier Homestead, Rush Historic District and Cold Springs School. Impacts to these properties are possible but not anticipated under this Alternative. However due to the remote nature of Cold Springs School, protection and monitoring of this resource is not feasible so the potential impacts to historic structures under Alternative C is Minor to Moderate.

Alternative D- Trail North of Buffalo River to Highway 14:

Under Alternative D, there is some potential for direct impact to historic/archeological resources during construction over 20 miles but with adequate survey mitigation and re-routing are expected to be Minor. The completion of cultural resource surveys during the physical placement of the trail will minimize or eliminate these impacts. The Alternative D corridor would pass near the National Register listed, Collier Homestead. Increased impacts to this property are not expected under Alternative D, the site is currently accessible to the public. Potential impacts to Collier Homestead are considered Minor with the adoption of this alternative because the site is well-monitored and protected.

Alternative E- Full Trail to USFS Spring Creek (River Crossing):

The potential for impacts to historic/archeological resources from damage or theft under Alternative E occurs over 45 miles, a Minor to Moderate impact. Alternative E provides access to the LBW where very little information exists regarding the existence and National Register significance of cultural resources. The potential for loss of resources that have not been evaluated for National Register significance exists. Two districts and one lone structure listed on the National Register occur within the corridor of Alternative E; Collier Homestead, Rush Historic District and Cold Springs School. Impacts to these properties are possible but not anticipated under this Alternative. However due to the remote nature of Cold Springs School, protection and monitoring of this resource is not feasible so the potential impacts to historic structures under Alternative E is Minor to Moderate.

4.4.4 *Conclusions*

Alternative A poses the least threat for loss of resource from exposure and collection. The potential for some loss or damage of buried and surface resources would still exist under Alternatives A, B, C, D, and E by virtue of providing access to the property. Since Alternatives B and D reduce the trail miles constructed and provide access to less of the property, they are preferable, from a cultural resource protection perspective, than either Alternative C or E.

4.5.0 **Wilderness Values**

4.5.1 *Laws, Regulations, and Policies*

The **Wilderness Act** (PL 88-577, 78 Stat 890, 16 USC 1131 et seq.) established the National Wilderness Preservation System, composed of Congressionally designated federally owned areas. Federal agencies are required to administer these areas to provide for their use and enjoyment, now and in the future, and to protect and preserve their Wilderness character. All actions within designated Wilderness must comply with the Wilderness Act of 1964 that defines Wilderness as an area:

- Where the earth and its community of life are untrammelled by man;
- Of undeveloped federal land retaining its primeval character and influence;
- Which is protected and managed so as to preserve its natural conditions;
- Which has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- Which also may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

National Park Service Reference Manual #41, Wilderness Preservation and Management states: "Trails will be permitted within Wilderness when they are determined to be necessary for resource protection and/or for providing for visitor use for the purposes of Wilderness" (6.3.10.2), and;

“Recreational uses in National Park Service Wilderness areas will be of a nature that enable the areas to retain their primeval character and influence; protect and preserve natural conditions; leave the imprint of man’s work substantially unnoticeable; provide outstanding opportunities for solitude or primitive and unconfined types of recreation; and preserve Wilderness in an unimpaired condition” (6.4.3).

The approved Buffalo National River Wilderness and Backcountry Management Plan (1994) directs the national river to minimize new trails within the LBW and specifically if it considers the construction of a trail in support of the OHT.

4.5.2 *Definitions and Evaluation Methods*

The character or value of Wilderness is an intangible resource making the impacts to these values difficult to measure. Providing trails within Wilderness areas is often done to confine the impacts of use to a small area. Numerous trails and old roads already exist within the Lower Buffalo Wilderness and provide many recreational options to hikers and equestrians. Providing additional formal access into the LBW would not offer more visitor benefit than already exists. Providing more trails and access points than already exist could diminish the untrammeled nature of the Wilderness.

As a designated Wilderness, the LBW is treated within NPS wilderness management guidelines. The Wilderness designations at Buffalo National River were submitted in 1978, and made official in 1993 when all non-approved Wilderness uses ceased. The relative youth of the LBW as a Wilderness area is evident in the many old roads and trails present.

The majority of the impacts of building a new trail within the LBW are from the cumulative impacts of trail use across the property. Within the LBW, illegal activities are not uncommon, such as the use of Off-Road-Vehicles and the manufacturing of drugs. By providing an additional access point into the area, such activities could increase, decreasing the Wilderness values below current levels through disruptive noise, smell, and the visual impacts of trash. The concern for the LBW is in setting a precedent for further development in an area already struggling to retain its Wilderness values.

It is not possible to quantify the potential impacts of trail development on Wilderness values. For the purpose of this Environmental Assessment, each Alternative is evaluated only by whether or not it provides additional access to the LBW and the following qualitative ranking system:

- ***Negligible/No Impact:*** Current visitation to designated Wilderness Areas does not change measurably. The “untrammeled nature” of the LBW remains at current levels. Little evidence of human activity is present. Social trails within the LBW remain at current levels.
- ***Minor Impact:*** Current visitation to the LBW is increased slightly. New trails are built using only un-powered hand tools with minimum disturbance to natural quiet and scenic values within the LBW. New trails are developed on old roads and trails if resource surveys permit it. Social trail development is discouraged by trail blazes.
- ***Moderate impact:*** Current visitation to the LBW is increased measurably. Visitation is high enough that social trails may develop near scenic features with some impact to the “untrammeled nature” of the Wilderness. New trails constructed would avoid sensitive areas and only un-powered hand tools would be used for construction. Encountering signs of human use would be expected but not common.
- ***Major Impact:*** Wilderness values are impacted such that encountering evidence of human use would be common within the LBW. Numerous social trails develop threatening the “untrammeled nature” of the wilderness. Evidence of human use is obvious.

A *significant impact* for the purposes of the proposed OHT/BRT extension project would be the intangible loss of Wilderness values of the LBW; natural quiet, an untrammeled landscape, and natural environment. No significant impacts are anticipated under any of the alternatives. An *impairment* of Wilderness values would be the loss of Wilderness designation stemming from over-development, loss of scenic values, natural quiet, and the untrammeled nature of the LBW. Preventing over-development of the

property and allowing natural processes to continue should prevent impairment of Wilderness values. A new trail is not expected to cause an impairment of these values.

Alternative A-No Action:

Direct impacts to Wilderness values would be preserved at their current level; no additional trails would be built within the LBW. However, the potential for the development of social trails is highest under this alternative. Impacts due to social trails are anticipated to be Minor to Moderate under this alternative.

Alternative B- Extension of the Buffalo River Trail South of Buffalo River to the Vicinity of Highway 14:

Wilderness values would be preserved at their current level. No additional trails would be built within the LBW. Since the OHT would continue off of park property, the potential for social trail development is very low under this alternative. The impacts to Wilderness values are expected to be Negligible under Alternative B.

Alternative C- Full Trail South of Buffalo River to USFS Spring Creek

Alternative C would require the addition of 21 miles of new trail within the Lower Buffalo Wilderness. Degradation of Wilderness values within the Lower Buffalo Wilderness could occur under either of these alternatives by adding another trail in a landscape that already contains a maze of primitive trails and old roads. An additional point of access to the area may also increase the use of Off-Road-Vehicles and incidence of illegal activities that currently occur in the LBW. The potential impacts to Wilderness values under Alternative C are Moderate.

Alternative D- Trail North of Buffalo River to Highway 14:

Wilderness values would be preserved at their current level. No additional trails would be built within the LBW. Since the OHT would continue off of park property, the potential for social trail development is very low under this alternative. The impacts to Wilderness values are expected to be Negligible under Alternative D.

Alternative E- Full Trail to USFS Spring Creek (River Crossing):

Under Alternative E, 21 miles of new trail would be built within the Lower Buffalo Wilderness. Degradation of Wilderness values within the Lower Buffalo Wilderness could occur under either of these alternatives by adding another trail in a landscape that already contains a maze of primitive trails and old roads. An additional point of access to the area may also increase the use of Off-Road-Vehicles and incidence of illegal activities that currently occur in the LBW. The potential impacts to Wilderness values under Alternative C are Moderate.

4.5.4 Conclusions:

Alternatives B and D would have no impact to Wilderness values. No new trail would be built within the LBW under these alternatives and a route established that specifically avoids the LBW. Since numerous trail networks and old roads are already present within the LBW, the construction of new trails would provide no additional visitor benefit.

Alternative A has the most potential for adverse impacts to Wilderness values because social trails are likely to develop within the LBW if no formal route is designated. Alternatives C and E would add to the trails of the LBW; 21 miles of new trail would be constructed in the LBW under either alternative and lead all hikers into the Wilderness area. Maintaining and protecting the Wilderness values of the LBW are best met by Alternatives B and D.

5.0 CONSULTATION AND COORDINATION

- **Public Review**

The public has been involved in the review of draft Alternatives and Impact Topics through public meetings and notices. Public review of this document will also occur following internal and NPS regional reviews. Comments received in the course of public meetings and through the mail are available for review at Buffalo National River.

- **Compliance with Section 7 of the Endangered Species Act (ESA)**

Park management must consult with the USFWS pursuant to Section 7 of the ESA on any existing or proposed park activities or programs which "may affect" endangered species or result in the adverse modification of critical habitat. In keeping with the requirements of the ESA, the park prepared a Biological Evaluation to determine if the proposed alternatives are not likely to adversely effect listed species in the project area. The USFWS concurred with the conclusion that the proposed alternatives are not likely to adversely effect listed species. Recommendations to avoid and/or minimize effects were incorporated into the project and can be found in Appendix B.

- **Consultation with the Arkansas State Historic Preservation Office (SHPO) for Compliance with Section 106 of the National Historic Preservation Act**

Formal consultation with the SHPO will be completed through the review of this document. Further SHPO consultation will occur after the completion of archeological survey work proposed after the approval of this document by request of the SHPO (per verbal consultation on 7/9/03, Suzie Rogers)

- **Consultation with Affiliated Native American Tribes under the American Indian Religious Freedom Act (AIRFA) August 11, 1978 (42 U.S.C. 1996, as amended)**

Consultation with the affiliated Native American Tribes was conducted for the proposed project. Letters and plant lists were sent to each tribe to allow for comments and concerns with regard to culturally significant plant species (copies of the letter and plant lists are available for review at Buffalo National River). No comments were received. The EA will also be sent to the affiliated tribes for comment following regional approval.

A list of interested parties and those who provided comments are available at Buffalo National River. Letters will be sent to these parties alerting them to the availability of the EA for review and comment when the 30-day public review begins.

6.0 PREPARERS AND REVIEWERS

The following people contributed to the completion of this Environmental Assessment:

Ivan D. Miller, Superintendent, Buffalo National River
George Oviatt, Chief, Resource Management Division, Buffalo National River (retired)
David Mott, Chief, Resource Management Division, Buffalo National River
Sammy Lail, Resource Management Division, Buffalo National River
Zed Davenport, Maintenance Mechanic (Trails Coordinator), Buffalo National River
Doug Wilson, Chief of Interpretation, Buffalo National River
Charlotte Hunter, Archeologist, Buffalo National River
Suzie Rogers, Historian, Buffalo National River
Gia Wagner, Natural Resource Specialist, Lincoln Boyhood National Memorial
Diana Angelo, Biological Technician, Buffalo National River
Chuck Bitting, Geologist, Buffalo National River
Connie Watkins-Lively, Fire Program Assistant, Buffalo National River
Rochelle MacMillan, Fire Use Module Clerk, Buffalo National River

7.0 REFERENCES

- Bitting, C. 2003. Biological Evaluation of the Actions Proposed in: Draft Environmental Assessment for the Extension of the Ozark Highlands Trail within Buffalo National River, Arkansas (unpublished, Buffalo National River)
- Bryant, William S.; McComb, William C.; Fralish, James S. 1993. Oak-hickory forests (western mesophytic/oak-hickory forests). In: Martin, William H.; Boyce, Stephen G.; Echternacht, Arthur C., eds. Biodiversity of the southeastern United States: Upland terrestrial communities. New York: John Wiley & Sons, Inc: 143-201. [21938]
- Barbour, R. W., W. H. Davis, 1969. Bats of America. University Press of Kentucky, Lexington, Kentucky
- BCI, 2001. Bats in Eastern Woodlands. Bat Conservation International, Inc., Austin, Texas
- Cannon, B. J., W. M. Blakely, J. C. Bednarz, 2001. Distribution and Habitat Use of Swainson's Warblers in Southeastern and Northern Arkansas, 2000 Annual Report to NPS.
- Dechant, J. A., 1994. Flower List for Buffalo National River Around Erbie Historic Area, Jasper, Arkansas. National Park Service, Buffalo National River, Resource Management Library
- Fritz, Gayle J. 2000. Levels of native biodiversity in Eastern North America. In: Minnis, P.E. and Elisens, W.J., eds. Biodiversity & Native America. University of Oklahoma Press. Norman, OK.
- Hardwick, A., A. Powell, 2000. Preliminary Survey for Swainson's Warblers at Buffalo National River, Arkansas, 2000. USGS Northern Prairie Wildlife Research Center, Arkansas Project Office, Department of Biological Sciences, University of Arkansas, Fayetteville, Arkansas
- Harris, J. L., 1996. Freshwater Mussel Resources of the Buffalo National River, Arkansas, Phase 1 Qualitative Survey: Location, Species Composition, and Status of Mussel Beds. National Park Service, Buffalo National River, Resource Management Library
- Hinterthuer, B., 1994. Plants Observed Along Leatherwood Creek, Ponca, Arkansas. National Park Service, Buffalo National River, Resource Management Library
- Kral, R., 1983. A Report on Some Rare, Threatened or Endangered Forest Related Vascular Plants of the South. Technical Publication R8-TP 2. Volumes I and II. USDA Forest Service, Southern Region, Atlanta, Georgia
- Leung, Y. and Marion, J., 2000. Recreation Impacts and Management in Wilderness: A State-of Knowledge Review. USDA Forest Service Proceedings RMRS-P-15-Vol. 5.
- Logan, J. M., 1992. The Glades of the Buffalo National River, Arkansas. Masters Thesis. Iowa State University, Ames, Iowa
- Logan, J. M., 1999. A Qualitative Vegetational Assessment of Selected Open Fields of the Buffalo National River, Arkansas. National Park Service, Buffalo National River, Resource Management Library
- Meek, S. E., H. W. Clark, 1912. The Mussels of the Big Buffalo Fork of White River, Arkansas. Department of Commerce and Labor, Bureau of Fisheries, Bureau of Fisheries Document No. 759, Government Printing Office, Washington D.C.
- Menzel, M. A., J. M. Menzel, T. C. Carter, W. M. Ford, J. W. Edwards, 2001. Review of the Forest Habitat Relationships of the Indiana bat (*Myotis sodalis*). United States Department of Agriculture, Forest Service, Northeastern Research Station, General Technical Report NE-284

- NatureServe Explorer: An Online Encyclopedia of Life [web application]. 2001. Version 1.6 . Arlington, Virginia, USA; NatureServe. Available: <http://www.natureserve.org/explorer>. (Accessed: October 16, 2002).
- Noss, R.F., E.T. LaRoe, III, and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. U.S. Dept of the Interior, National Biological Service. Biol. Rep. 28
- Preston, Richard. 1989. *North American Trees, 4th Edition*. Iowa State University Press. Ames, Iowa.
- Rebertus, A. J., S. Jenkins, 1994. Savanna and Glade Vegetation of Turkey Mountain, Arkansas. University of Missouri, the School of Natural Resources, Columbia, Missouri
- Rettig, J., 1996. Rare Plant Survey of the Proposed Erbie-Pruitt Horse Trail Route, Buffalo National River. National Park Service, Buffalo National River, Resource Management Library
- Robison, H. W. and T. M. Buchanan, 1988. Fishes of Arkansas: Their Biology and Distribution. The University of Arkansas press, Fayetteville, Arkansas
- Sasse, D. B., 2003. email correspondence on bat surveys
- Sealander, J. A., G. A. Heidt, 1990. Arkansas Mammals: Their Natural History, Classification, and Distribution. The University of Arkansas press, Fayetteville, Arkansas
- Shimer, John. 1972. *Field Guide to the Landforms of the United States*. Macmillan Publishing Co. New York.
- Smith, E. B., 1988. An Atlas and Annotated List of the Vascular Plants of Arkansas, Second Edition.
- Tucker, G. E., 1990. Draft Interim Management Guide for Moore's Delphinium (*Delphinium newtonianum*). Ozark National Forest
- USDOI-NPS, 2001. Directors Order #12 Handbook.
- USDOI-NPS, 2001. Management Policies.
- USDOI-NPS, 1999. Resource Manual #41, Wilderness Preservation and Management.
- USDOI-NPS, 1998. National Park Service Trail Standards.
- USFWS, 1982. Gray Bat Recovery Plan. United States Department of Interior, Fish and Wildlife Service
- USFWS, 1995. Ozark Big-Eared Bat *Plecotus townsendii ingens* (Handley), Revised Recovery Plan. United States Department of Interior, Fish and Wildlife Service
- USFWS, 2002. Amendment to the June 25, 1998 Biological Opinion on the Effects of Management Activities Conducted by Ozark-Saint Francis National Forest on the Indiana Bat. United States Fish and Wildlife Service, Arkansas Field Office, Conway, Arkansas
- Witsell, Theo, 2002. Phone conversation on rare plants

APPENDIX A:

SUMMARY OF PUBLIC SCOPING: February/March, 2001

Prior to initiating the process of compliance with the National Environmental Policy Act of 1969 (NEPA), Buffalo National River requested public comments through direct mailings and in area newspapers to identify the potential issues and public sentiment regarding the extension of the Ozark Highlands Trail (OHT) through Buffalo National River property. The following questions were included with the request for comments. Comments other than those directed at these questions were also encouraged and accepted.

- How can Buffalo National River provide an OHT through-trail and protect the “untouched” character of the Lower Buffalo Wilderness? (Wilderness protection)
- How will the National Park Service protect sensitive archeological and natural resources and establish its portion of the OHT that provides an optimal visitor experience? (Type of use and resource protection)
- How can the National Park Service minimize the length of the OHT within its boundaries and provide for visitor safety on bluffs and ledges. (Construction, maintenance, and safety)

SUMMARY OF PUBLIC COMMENTS RECEIVED

Public comments regarding the establishment of the Ozark Highlands Trail connection through the Buffalo National River:

- *Build the trail connection through the Lower Buffalo Wilderness.*
- *Do not build a trail through the Lower Buffalo Wilderness.*
- *The trail is not feasible due to safety issues.*

Park Response:

Buffalo National River will address this issue by continuing to analyze alternatives with an Environmental Assessment as prescribed by the NEPA.

Public comments regarding appropriate use of the Trail through the Lower Buffalo Wilderness:

- *Preserve the wilderness values of the Lower Buffalo Wilderness.*
- *The connection should be “footpath only” to minimize impacts.*
- *Enforce wilderness regulations on use.*
- *Restrict number of visitors in wilderness to protect wilderness value of solitude by issuing permits.*
- *Prohibit commercial and high impact recreational uses in the Lower Buffalo Wilderness.*
- *Do not allow camping in sensitive areas.*

Park Response:

Appropriate use of wilderness trails within Buffalo National River is addressed in its Wilderness and Backcountry Management Plan. Appropriate use will also be analyzed in the Environmental Assessment.

Public comments on trail placement and construction:

- *Avoid placing the trail on the north side of the river to avoid having to cross the river.*
- *Minimize access points to the trail within the wilderness.*
- *The Trail should provide access to the river.*
- *The Trail should avoid rare habitats.*
- *Minimize trail markers but balance this with safety.*
- *Place the trail along the southern boundary of the Lower Buffalo Wilderness.*
- *Avoid placing the trail on slopes to avoid erosion.*
- *Several responses included proposed trail routes with maps.*

Park Response:

The National Park Service and Buffalo National River are responsible for providing opportunities for public enjoyment of resources and for preserving and protecting those resources from damage or impairment under The Organic Act. Therefore, trail placement and construction must support resource conservation. All of the alternatives developed for the Environmental Assessment must provide for the protection and preservation of cultural and natural resources.

Other public comments:

- *The National Environmental Policy Act should not apply to the development of this trail.*

Park Response:

The National Environmental Policy Act of 1969 applies to all federal actions with a few exceptions. The proposed actions are not “excepted actions” therefore, NEPA process and documentation must be completed for the proposed project.

DRAFT ALTERNATIVES OZARK HIGHLANDS TRAIL AND BUFFALO NATIONAL RIVER

The following Draft Alternatives were developed by an Interdisciplinary Team comprised of National Park Service personnel. They do not represent any final decisions by Buffalo National River; rather they are reasonable alternatives for further discussion and development through planning and public comment.

The possibility of expanding park boundaries to accommodate the OHT where it cannot safely be located within BNR property was considered but rejected as an alternative. The alternative was rejected based on both feasibility and complexity.

Based on topography, current use, and existing trails the Interdisciplinary Team found it useful to divide the proposed trail into the following 3 segments between Woolum and the US Forest Service OHT terminus at Spring Creek:

1. The first segment encompasses the area of the park between Woolum and Highway 65. The Buffalo River Trail could be utilized through this section with no additional resource disturbance or trail construction (“No Action”). Construction of a new trail in this section was considered but rejected because a useable trail already exists. A new trail would greatly increase trail maintenance requirements with no additional visitor benefit.
2. The middle section lies between Highway 65 and Highway 14 at the Lower Buffalo Wilderness boundary. Numerous alternatives exist within this section including: installation of a new trail to the north of the Buffalo River; installation of a new trail to the south of the Buffalo River; no new trail but allowing river access and orienteering to continue within this segment through the provision of convenient access points; and “no action” that would require an extension of the trail onto non-NPS lands (private easements or County Roads).
3. The eastern-most segment is proposed within the Lower Buffalo Wilderness. Alternatives for this section include the following: provision of a formal trail north or south of the Buffalo River; permit river and orienteering access (no trail), or “no action” (trail organizations would be free to pursue alternative routes around the national river).

DRAFT ALTERNATIVE A

“No Action”

“No Action” is a required alternative under the National Environmental Policy Act of 1969 (NEPA). Draft Alternative A, “No Action”, for the Ozark Highlands Trail (OHT) at Buffalo National River would permit OHT users to utilize the national river’s existing trails and/or the Buffalo River to travel between the town of Woolum and the US Forest Service OHT terminus at Spring Creek. No additional trails would be constructed within Buffalo National River to accommodate OHT traffic. Trail organizers would be free to pursue alternate routes around the national river under this alternative.

DRAFT ALTERNATIVE B

Full Trail South of Buffalo River to USFS Spring Creek

Draft Alternative B would use the existing Buffalo River Trail between Woolum and Highway 65 for the Ozark Highlands Trail. An extension of the Buffalo River Trail would be constructed south of the river to Highway 14. Within the Lower Buffalo Wilderness between Highway 14 and the US Forest Service OHT terminus at Spring Creek, the OHT would utilize existing roads and new trail construction where

needed. Implementation of Draft Alternative B would require the construction of roughly 45 miles of new trail within Buffalo National River.

ALTERNATIVE C

Trail South of Buffalo River to Highway 14

Draft Alternative C would use the existing Buffalo River Trail between Woolum and Highway 65. An extension of the Buffalo River Trail would be built south of the river to Highway 14. No formal trail would be built through the Lower Buffalo Wilderness; rather orienteering or floating along the river would provide a link to the US Forest Service trail terminus at Spring Creek. Implementation of Draft Alternative C would require the construction of roughly 20 miles of new trail within Buffalo National River.

DRAFT ALTERNATIVE D

Full Trail to USFS Spring Creek (River Crossing)

Draft Alternative D would utilize the existing Buffalo River Trail between Woolum and Highway 65. An extension of the Buffalo River Trail would be constructed north of the river between Highway 65 and Highway 14. The trail would cross the Highway 14 bridge and begin a route south of the Buffalo River through the Lower Buffalo Wilderness and end at USFS Spring Creek. Adoption of Draft Alternative D would require the construction of roughly 45 miles of new trails within Buffalo National River.

DRAFT ALTERNATIVE E

Trail North of Buffalo River to Highway 14

Draft Alternative E would use the existing Buffalo River Trail between Woolum and Highway 65. An extension of the Buffalo River Trail north of the river to Highway 14 would be constructed. At Highway 14, the formal trail would end and no formal trail would be established with the Lower Buffalo Wilderness. Travel between Highway 14 to the US Forest Service OHT terminus at Spring Creek would occur via orienteering and/or floating. Adoption of Draft Alternative E would require the construction of roughly 20 miles of new trail within Buffalo National River.

PLANNING CONSIDERATIONS FOR THE PROPOSED OZARK HIGHLANDS TRAIL THROUGH BUFFALO NATIONAL RIVER JULY 2001

The following are concerns and issues that were generated in an internal park meeting held in July 2001 regarding the development of the Environmental Assessment for the proposed Ozark Highlands Trail (OHT) project within Buffalo National River.

- Limitations based on USFS trail extension placement directly adjacent to BNR's Lower Buffalo Wilderness Area and current eastern OHT location at Woolum;
- Safety of visitors and maintenance crews on steep bluffs and grades;
- Based on current staffing levels, the need to minimize mileage of new trails;
- National Park Service (NPS) Organic Act requirements to preserve and protect resources for future generations by preventing impairments while providing for the public enjoyment of those same resources (resources include cultural, natural, and scenic);
- Need to act at this time due to commitment made in NPS planning documents to allow the OHT to cross through BNR property.
- Construction of a trail in designated wilderness may reduce wilderness values and/or set a precedent for future development within its wilderness areas.
- Current estimates (informal) of OHT use in Missouri are quite low. Is there enough visitor benefit to warrant the construction and maintenance of more trails within BNR?

SUMMARY OF PUBLIC COMMENTS RECEIVED ON THE DRAFT OHT/BRT ALTERNATIVES AND BUFFALO NATIONAL RIVER RESPONSE

1. The majority of responses were in support of a particular Draft Alternative.

The NEPA process does not include a public 'vote'. Public input is used to ensure that all potential alternatives and impact topics are considered and evaluated. However, these supportive letters did serve to confirm that all possible alternatives were addressed because each of them garnered support and no new suggestions were made.

2. Concerns over the potential designation of an OHT extension within Buffalo National River as 'hiking only' were voiced.

No changes to existing approved use are suggested within this document. The existing Trail Plan provides for the continued use of the Buffalo River Trail as a multiple-use trail (hiking/equestrian). The extension of the Buffalo River Trail to accommodate OHT traffic will retain both hiking and equestrian as acceptable uses.

3. Disallow the use of motorized All-Terrain-Vehicles or mountain bikes on any new trails.

No motorized vehicles or bicycles are approved for use on any of the Buffalo National River trails, as outlined in park planning documents.

4. Limit group sizes on any new trails built in the Lower Buffalo Wilderness.

Do not permit camping in sensitive areas of the Lower Buffalo Wilderness.

Group size and/or camping limits and the educational materials needed to support such regulations would be a costly endeavor. Enforcement would not be possible under current staffing levels.

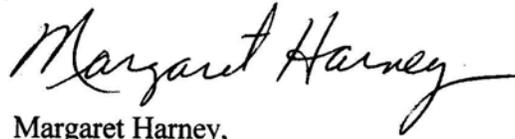
5. Provide access to the Lower Buffalo Wilderness to connect with the Ozark National Forest section of the OHT.

Providing 20 miles of trail into the Lower Buffalo Wilderness (LBW) is an impact discussed within this document. Before the establishment of the national river and the wilderness designation of what is now the LBW, the property was used for many purposes. Many old roads and primitive trails are present and are used by park visitors. Since the recreational opportunity to visit this resource along these many routes already exists, providing yet another trail would be redundant. While providing designated trails in wilderness areas does (as comments suggested), confine impacts to a small width of property, many roads and trails are already present but do not happen to connect to the National Forest Service's OHT terminus. As a designated wilderness area, the LBW is managed within NPS wilderness guidelines. Establishing new trails within the LBW could set a precedent for further disturbance such as trailhead parking lots, more trails, or development along the boundaries of the park property. Connecting the OHT between the Ozark National Forest and Highway 14 on public land, such as state and county road right-of-ways, is possible without using the property of the national river.

Because the Environmental Assessment contained no specific trail locations, nor a Biological Evaluation analyzing potential effects, we are requesting further correspondence once cave/trail interactions are formalized.

We appreciate your interest in protection of threatened and endangered species. If you have further questions please contact Steve Osborne at (501)-513-4479.

Sincerely,

A handwritten signature in black ink that reads "Margaret Harney". The signature is written in a cursive style with a long, sweeping tail on the "y".

Margaret Harney,
Acting Field Supervisor